BALMAT-EDWARDS TALC DISTRICT

Life and Death of an industry
FIRST TALC MILL
IN THE UNITED STATES

NEAR THIS POINT WAS ERECTED THE FIRST MILL IN THE UNITED STATES TO GRIND TALC ON A COMMERCIAL BASIS. IT WAS BUILT BY THE AGALITE FIBRE CO. IN 1876 TO MANUFACTURE INTO POWDER THE FIBROUS TALC ORE TAKEN FROM THE MINE ON THE ABNER WIGHT FARM. THE MILL WAS OPERATED BY STEAM WITH A CAPACITY OF 8 TONS PER DAY.

ERECTED BY THE INTERNATIONAL TALC CO., INC AND THE TOWN OF FOWLER
A Brief geological history

Over a billion years ago this area was covered in seawater resulting in sediments tens of thousands of feet thick. Subsequently, over hundreds of millions of years, the sediments were altered under great heat and pressure to become the marbles, gneisses, schists, and quartzites of today. These sediments covered a massive area extending over most of eastern Canada and through a small neck in the Alexandria Bay area to include the Adirondacks. This series of highly deformed rocks is referred to as the Grenville event.

The following more detailed explanation of the unique geology of this area was written by John Johnson, a career geologist in the Balmat area zinc mining industry:

“The origins of the talc mining industry came about from the unique geology of the Balmat-Edwards area. Surface outcroppings revealed a sequence of carbonate-rich stratigraphy interlayered with silicate-rich strata including the talc-tremolite layer. Years of study defined the stratigraphic column of the Balmat-Edwards rocks. Sixteen stratigraphic units are described and characterized by an alternating sequence of relatively pure dolomitic marbles interlayered with units of calc-silicate rocks. Units 1,3,5,7,9, and 12 are predominately dolomitic marbles which are identical but with minor exceptions. The remaining units (Units 2,4,6,8,10,11,13,14,15,16) in the geologic column are calc-silicate rocks, and several distinct “marker” units. The unique and easily identified “marker” units include unit 13, the talc-tremolite schist.

The Balmat-Edwards marble belt is a small entity in the aerially expansiveness of the Grenville rock series. This rock series has undergone high-grade metamorphism, during an event dating 1.1 billion years ago. The precursor sedimentary/volcanic ‘pile’ was buried to great depth, subjected to enormous pressure, and while in semi-plastic stage folded multiple times. Uplift and erosion over hundreds of millions of years brought these rocks to the surface, transformed from their original marine sedimentary composition into a metamorphic sequence with new minerology”.

Now that you know how the talc/tremolite zone was geologically generated, the commercial products within this zone are not geologically important. Whatever the finished product is, it must meet a minimum whiteness specification. All ore development must be based on this important fact.

Pure tremolite is a mineral with a hardness of 5-6 on a 0-10 scale. Talc is a 1 on a 0-10 scale. Both minerals have a commercial use. This difference only plays a role regarding the product that it is used in. Ceramics use more tremolite and paints use more talc as a rule. Talc is a hydrous magnesium silicate and tremolite is a hydrous calcium magnesium silicate. The chemical difference is not generally important. Particle shape is much more important in a variety of products. Different types of paint require different amounts of oil absorption which is controlled by particle shapes. As you can see, it’s the physical characteristics that control which raw material is used to satisfy the large variety of finished products. Ceramics customers have a shrinkage specification which needs to be controlled by the type of raw ore. Throughout the ore zone, each mine has a blend of
these characteristics and so supplying a customer with the needed raw material can be problematic. International Talc Co. and Gouverneur Talc Co., being the last two companies to survive, had access to enough ore types to satisfy most of the demand. As it turned out, it was not an ore problem that killed the business. An explanation of the critical problems can be found at the end of this document.

**Raw ore to finished product**

The commercial talc-tremolite zone extends from the Balmat area to Talcville, approximately 7.5 miles. Its thickness ranges from several hundred feet in some areas to as little as an inferred trace in others. The universal characteristic required for all products is that they must be white. This specification dominated all prospecting as to what was considered commercial ore. White ore is then mined based on the other characteristics mentioned above. The mine provides the mill with the specific type of ore needed. The milling process controls the product through the grinding and classification circuits. Laboratory testing at different stages through the milling circuits assures quality products for each of the numerous grades.

**Balmat-Edwards Talc District Map Included as Exhibit 1**

**Mining and Mineral History**

Exhibit 1 is the most important single item in this industrial history document. It contains information not easily or readily available to the public.

Names and locations of all known mines and mills along the talc belt are shown on the composite map titled “133 years of Mining” dated 2023. The base maps used to display talc history were generated from the USGS standard 7½ minute quadrangle maps. They were modified to retain only major reference features such as roads, rivers, and lakes. This allowed for maximum clarity of all new data. All known archival maps and drawings were digitized and processed in the “Autocad” graphics program. This provided the means for viewing, editing, and plotting at any scale. Underground mines are shown haulage levels only, which is all that’s needed to display the size of each mine.
A brief description of how the industry got started

In the mid-1870s, Daniel Minthorn and Colonel Henry Palmer played a major role in the development of the Talc industry. Mr. Minthorn was interested in a recently discovered outcropping of scale talc on the Wight property just south of the village of Fowler and north of Balmat. Mr. Palmer, having a history in the paper industry, envisioned a use in paper for the talc fiber he discovered on a road cut in the Freemansburg (now Talcville) area. Both discoveries revealed a high-quality talc mineral. The two areas were separated by nearly five miles and the physical nature of the talc was distinctly different. Scale talc is a soft platy material (resembling fish scales) whereas the Freemansburg material is a soft pliable fiber. Both varieties were nearly pure talc and if either of these varieties was ground well enough, they worked well as a filler in a variety of finished products. The early grinding process was a crude technology like grinding flour. (I have one of the grinding wheels from the Lower Adirondack Pulp Mill in my back yard. (photo below) There were several others in the ruins of the Asbestos Pulp Co. mill (1892) in Hailesboro.) Grinding and classifying a quality finished product slowly evolved over the years into sophisticated milling and monitoring of the raw ore into extremely fine particle sizes, that could be reproduced into a uniform quality product.
Adirondack Pulp Co. mill

Columbian Talc Co. mill 1895 located on Island Branch
Agalite Pulp Co. 1878-79 below Island Branch Bridge, Hailesboro. Later Int. Tale #4mill
St. Lawrence Pulp Company mill 1883, acquired by International Pulp Company in 1893 as #3 mill, located at #10 River Drive in Hailesboro. Burned in 1947 and later developed a Hydroelectric plant, currently owned by "Patriot Hydro". This hydro plant has had 5 or 6 different owners since it was first constructed in 1981. My new home is located exactly where the water tower was in this picture.
Loomis # 3 mill
International talc’s 6 mill was a major producer for many years. The International Talc office and other support facilities were also located at this site. There were 8 grinding mills in two rows of 4. Initially, the mills were driven by an amazing rope drive. It was a completely mechanical power transfer from the turbans through a maze of pullies, to each line of 4 mills. When I first saw this system operating, I couldn’t believe the quality of design and engineering it represented. It was almost totally silent and ran the mills perfectly. Unfortunately, there was a problem later, as demand went up, the low water flow during the summer (the period of highest demand) caused unacceptable production losses. The solution was to abandon the rope drive and electrify the mills.
GTC # 1 mill
This mill represents the latest in technology with its grinding and classification capability and most importantly with the large storage capacity shown by the numerous silos.
### Talc production summary

The following two exhibits, 1 chart and 1 graph, summarize historical talc production. The chart shows production by company and the graph shows production by year as well as cumulative production from 1876 to the end of production in 2009. The tons shown represent finished product only and do not include waste tonnage, which in the case of the Arnold open pit is a very large number. All the underground mines produced waste, but no records were kept.

<table>
<thead>
<tr>
<th>Talc Companies</th>
<th>Tons Produced Summary</th>
<th>Years Produced Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Lawrence Minerals Co.</td>
<td>0</td>
<td>1876-1893</td>
</tr>
<tr>
<td>Agalite Fibre Company</td>
<td>56,935</td>
<td>1876-1893</td>
</tr>
<tr>
<td>Mineral Attrition Mills Co.</td>
<td>2,860</td>
<td>1876-1879</td>
</tr>
<tr>
<td>Bayaud &amp; Stevens Co.</td>
<td>3,178</td>
<td>1880-1884</td>
</tr>
<tr>
<td>Natural Dam Pulp Co.</td>
<td>22,457</td>
<td>1885-1893</td>
</tr>
<tr>
<td>Gouverneur Pulp Co.</td>
<td>1,463</td>
<td>1870-1881</td>
</tr>
<tr>
<td>Adirondack Pulp Co.</td>
<td>63,395</td>
<td>1882-1893</td>
</tr>
<tr>
<td>Gouverneur Talc Co. (1)</td>
<td>4,467</td>
<td>1880-1882</td>
</tr>
<tr>
<td>St Lawrence Fibre &amp; Pulp Co.</td>
<td>12,450</td>
<td>1883-1887</td>
</tr>
<tr>
<td>St Lawrence Pulp Co.</td>
<td>33,346</td>
<td>1888-1892</td>
</tr>
<tr>
<td>Northern N.Y. Mfg. Co.</td>
<td>7,515</td>
<td>1883-1892</td>
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<tr>
<td>Gardner Pulp Co.</td>
<td>34,088</td>
<td>1885-1892</td>
</tr>
<tr>
<td>United States Talc Co.</td>
<td>50,025</td>
<td>1893-1905</td>
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<tr>
<td>Gouverneur Asbestos Pulp Co.</td>
<td>12,566</td>
<td>1891-1892</td>
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<tr>
<td>Asbestos Pulp Co.</td>
<td>18,665</td>
<td>1892-1894</td>
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<td>American Talc Co.</td>
<td>37,684</td>
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<tr>
<td>Keller Brothers</td>
<td>20,825</td>
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<tr>
<td>Columbian Talc Company</td>
<td>26,279</td>
<td>1895-1900</td>
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<td>Ontario Talc Co.</td>
<td>75,513</td>
<td>1900-1916</td>
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<td>International Pulp Co.</td>
<td>2,442,243</td>
<td>1893-1943</td>
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<tr>
<td>Union Talc Co.</td>
<td>81,676</td>
<td>1900-1907</td>
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<tr>
<td>Uniform Fibrous Talc Co.</td>
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<td>1909-1921</td>
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<tr>
<td>Standard Talc Co.</td>
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<td></td>
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<tr>
<td>Dominion Co.</td>
<td>0</td>
<td></td>
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<tr>
<td>International Talc Co.</td>
<td>2,999,082</td>
<td>1944-1973</td>
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<tr>
<td>W. H. Loomis Talc Co.</td>
<td>1,709,760</td>
<td>1920-1952</td>
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<tr>
<td>Reynolds Talc Co.</td>
<td>24,000</td>
<td>1955-1958</td>
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<tr>
<td>Gouverneur Talc Co. (RTV)</td>
<td>7,789,535</td>
<td>1948-2009</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>16,165,055</strong></td>
<td></td>
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</table>
The next graphic shows the evolution of talc companies as they competed in the market.
Local geologic characteristics

The Talc-Tremolite deposits display a major variation in mineralogy depending on the location within the district. The metamorphic alteration sequence of these sedimentary Grenville limestones; (over a billion years old) to dolomitic marble, to tremolite, to many physical variations of talc, make up the marketable products, if they meet the whiteness specifications. Physical characteristics within this zone that affect the marketable products are almost limitless and must be sampled and tested in the laboratory to meet specifications. Strikes of the bedding planes in the region are Southwest to Northeast dipping to the Northwest. Major folding produced conditions of plastic flow, faulting, and shearing that added to the complexity of the orebody. Efficient mining required a great deal of prospect drilling and professional geological mapping to understand the highly complex deformation. Fortunately, many of the drag type folds produced good quality tremolite and talc. These ores were generally of higher quality and worked well in the end products that required filler material. (i.e., paints, ceramics, plastics, putties, etc.) Because talc and tremolite are inert, they can be combined with most other ingredients without causing undesirable reactions. It was equally fortunate that the alteration into tremolite and talc was normally abrupt and distinct. Products that required virtually pure crystalline tremolite could be mined selectively without unacceptable talc contamination.

Severe folding and shearing of the west side of Gouverneur Talc’s #1 mine was so intense that the integrity of the rock was compromised, making mining especially difficult and dangerous. Broken ore piles of this scale talc were highly polished and slippery, making it difficult and hazardous to walk on. The integrity of this ore zone was challenging to mine. Small openings revealed how unstable the walls were going to be. Normal stabilizing methods of bolting wire mesh to the wall surfaces would not work because the beds were too thick for the bolts to reach stable rocks. Established methods of mining unstable ores of this nature would be to allow them to cave in until it stabilized itself. This would seldom work because unacceptable contamination would fall in with the good ore making it all unusable. Fortunately, not all commercial scale ores were this difficult, and this type of ore was plentiful throughout the district.

Talcville mines & ore zones

The near surface ores in Talcville are unconnected and were mined as two distinct zones. The S.W. zone is referred to as the Palmer mines. The N.E. zone is referred to as the Anthony mines.

The Palmer mines area starts a short distance south and west of the Oswegatchie river at the Hyatt mine, run by the Gardner Pulp Co., and proceeds NE under the river to 2 ½ mine, about 2500 ft. Several companies mined in this area in the late 1800s and early 1900s. There were at least 8 shafts developed. Names of mines or shafts in this area
include Hyatt, Wiggins & Murphy, U.S or Freeman, Blue shaft, (Probably named later for the ice that formed in the shaft) Agalite, Palmer, # 1, # 2, & # 2 ½. Wintergreen Hill Mine, run by Uniform Fibrous Talc Company, near the southwest end and the Palmer Mine (later 2 ½) on the northeast end outlined the mined limits. Other early companies involved in this area were the United States Talc Company, Gouverneur Pulp Company, Agalite Fibre Company, and the Asbestos Pulp Company. Much more detail of the makeup and history of the old talc mining companies can be found in an account written by Julius h. Bartlett, Gouverneur Village Historian in 1952. (Gouverneur museum)

Wintergreen Hill mine was not mined very long due to the influx of water and was never connected to the other mines in this area. The minshaft was located on an outcrop within a few feet of the north bank of the river. It provided ore for the Uniform Fibrous Talc Co. mill built on the same property and serviced with its own rail siding. Abandonment of the original shaft lead to the development of a second shaft. I assume that the knowledge learned about the ore zone allowed the company to accurately locate and develop the new shaft. The result was a unique concrete lined vertical shaft. Development of the mine never produced much by the time the company shut down, the only complex with mine, mill, and shipping from one site. This was the first talc mill powered by electricity. The hydro plant nearby known as Sullivan power provided electricity. This company had production and financial problems during and after establishing the facility. The mill started production in 1907 and struggled alone until after the first World War in 1921.

The early shafts (except the one mentioned above) were normally sunk on outcrops or near outcrops and followed the ore down dip. This procedure was common because it allowed for simultaneous quality evaluation and immediate production of ore. It frequently caused long-term mining problems due to a tendency to mine too much ore from the shaft. These mining methods were at the mercy of whatever rock conditions they passed through on the way down. Most of the shafts required a changing pitch as they followed the ore down dip, causing inefficient access and ore hoisting. Shaft dimensions larger than the minimum size required for ore hoisting tend to cause the shaft to become increasingly unmanageable for safe access. The only practical solution to a “shaft gone bad” was to abandon the shaft and start a new one. In at least one instance, too much ore removed from the footwall required several feet of timber cribbing to keep the rail on grade for ore hoisting. Later, as the timbers rotted, it became a maintenance nightmare. It also caused problems in maintaining the roof that was too high to reach for control.

As mining progressed over the years, and companies consolidated, new development connected most of the old mines, becoming one large mine now operated by International Talc Co. Great care was needed when developing around old mines that were full of water. The majority of the mines produced considerable amounts of water that required large sumps and an assortment of sizable pumps to keep the mines from flooding.
As it turned out, 2½ Shaft, the last hoisting shaft that was mining this area had to be shut down for safety reasons. “2½, also known as the Freeman mine, was one of the original mines and was in operation for about 70 years. Like most of the shafts, this one followed the ore down the dip. Unfortunately, the dip of the ore changed dramatically from the original shallow dip of about 30 degrees to a very steep dip of about 80 degrees by the time it had reached the 8th level (about 550 feet below the surface). This meant that the shaft in following the ore to each succeeding level had to increase the dip to stay with the ore. The result being, the deeper they went the more cumbersome it became. It not only steepened incrementally from 30 to 80 degrees, but it also developed a twist that further complicated hoisting operations. Each of the changes in degrees meant that roller guides were required to carry the hoist cable. These dip changes, referred to as “knuckles”, must be carefully negotiated, thus reducing the hoisting speed as the skip travels up and down. To make matters worse, streams of water constantly ran from numerous cracks, raining on anyone in the shaft. This mine was also rather unique because its hoist was located over 500 feet from the shaft across the river in an old talc mill (Gardner Pulp Co.) remodeled into a hoist room. This hoist serviced the only mine that had a cable-carrying tower about halfway between the hoist and the shaft. The shaft collar was in a typical outcrop and the ore skips dumped directly into the rail cars on the siding.

The hoist building was originally built as an iron ore furnace and later became the Gardner Pulp Co and subsequently a hydroelectric plant. The hydro plant was run by Oswegatchie Light and Power (a subsidiary of International Talc Co.) and shut down sometime in the early 1900s. Later, as the dam deteriorated, International Talc Co. decided, for safety reasons, to breach the concrete dam and let most of the water out of the pond. This decision was not very popular with some of the residents along the river because they lost the esthetics of the pond, as well as some homeowner’s water supply pipes were left high and dry. Much later, a new modern hydro plant was built on the site, reestablishing the pond. This plant is still operating.
The Anthony talc zone and the Palmer talc zone both developed in the 1880s. The Palmer ore zone provided continuous ore until the closing of 2 ½ Mine in 1958.

The Anthony ore zone was mined continuously until the 1970s. I am not aware of some of the original shaft names but after International Pulp Co. acquired all the mining rights by 1894, they referred to all shafts by number. Starting at the S. W. end of this zone, #3 shaft was in a rock outcrop 25-30 feet above and at the edge of a large meadow that ran about 2000 feet from 2 ½ shaft in the Palmer zone. The overburden in this meadow is known to be at least 80 feet in depth with no underground workings.

Advancing towards the N. E. the numbers proceeded in sequence through #8 Shaft. In addition to the shafts there were several prospect pits that were usually full of water and unmapped. #4 Shaft (see photo above) in this series was a unique shaft because of the system of ore dumping. Skips from underground were hoisted into the headframe and a ramp rail was lowered so that as the skip was backed off it traveled across the surface to dump directly into a railroad hopper car on the siding. Note: I have the 4 Mine bull wheel from this hoist that supports the American Flagpole in the front yard.
The bull wheel from #4 mine Talcville is part of the raised flower garden and flag holder in my new home.

The Anthony mining zone like the Palmer zone had inclined shafts that followed the ore and were problems later. This policy was changed when International Talc sank what turned out to be the final shaft in this zone. This shaft was designed and sunk at a uniform angle of about 68 degrees in sound waste rock with dimensions no larger than required for operation of the ore skip. It was also designed to be in close proximity to the 3rd level of the old #4 shaft so that appropriate connections could be made. The new shaft was referred to as 1042 Shaft, but the mine was still called #3 Mine.

Ore quality in the Talcville fibers consisted primarily of two basic specifications: 1. Minimum color or brightness (required in all talc/tremolite products from any mine) 2. Quality, or aspect ratio (fiber length compared to fiber diameter). It was important that the range of specifications of any product (especially fiber) be quite narrow to meet the minimum specification.

Lower grade fibers could be made in two ways: 1. Mix low-grade or non-fiber ores with high-grade fiber. 2. Mine and ship ores that are as close as possible to the quality specification requested. The second option was preferable because it would conserve the better fibers (least plentiful ores) for the premium products. This principle of
mining products that met minimum specifications is equally important in some of the hard ore grades that were the predominant products in the later years. Conservation principles remain important to maximize ore reserves and control mining costs. The quality of the Talcville fibers is quite unique and contributed to some excellent finished products in the market. (i.e., special high-quality paints) Unfortunately for the talc market, in the 1970’s, the national asbestos health problem was being aggressively pursued by OSHA (Occupational Safety and Health Administration), an agency of the federal government. It was OSHA’s contention that the Talcville fibers were asbestos and should be handled and labeled as a hazardous material. Gouverneur Talc Co maintained that the material was talc, not asbestos. The controversy continued for several years and eventually went to federal court. The company ultimately prevailed in the long and expensive battle, but the controversy discouraged many customers from using or staying involved with the product. As a result, GTC decided to abandon the fiber business and the Talcville mines were shut down.

Fiber was the principal product mined in both zones. I had no personal underground experience in the Palmer zone, but it obviously contained similar minerals to those found in the Anthony zone. This can be verified by observing the mineral assortment found in the dumps in this area. They are essentially the same as those found in the Anthony zone, including the standard fiber structure. Typical minerals would include: Tirodite, Hexagonite, Anthophyllite, Actinolite, & Tremolite/Talc along with a host of darker minerals such as: pyrite, graphite, serpentine, mica, chlorite, etc. This area also has an abundance of florescent minerals, such as: tirodite, tremolite, & talc. Iridescent tremolite was found at the bottom of No 4 shaft in a hanging wall crosscut. This was the only place that I can recall ever seeing iridescent tremolite anywhere in the talc district.

Another unusual property associated with tremolite is triboluminescence. This is a characteristic that causes a mineral to become luminous when struck or scratched with a hammer or pick. Tremolite usually exhibits this property throughout the talc district. When developing new headings, it was sometimes helpful to turn off your cap lamp and scratch across the face to get a feel for the percentage of tremolite in the rock. The degree of triboluminescence can help in estimating the degree of alteration from tremolite to talc.

Considerable primary and secondary drag folding is prevalent in varying degrees throughout the region because of the extreme metamorphic defamion. Some of the best quality ores are found in these secondary folds. In some cases, it would be fiber talc and other cases it could be good quality tremolite. This probably took place during the last of at least five major metamorphic episodes. Because of these drag folds the normal strike and dip of talc ore were not always the best criteria for projecting the quality ore to depth. The same principle applies when mining from lower development levels to levels above. This was particularly true in the Talcville fibers and was also true in the west side of Gouverneur Talc’s #1 Mine. In this mine, attempting to develop a desired type of ore by mining up the dip of these tight folds, contact with waste material was unavoidable. This resulted in many years of frustration in the designed mining plan. These inconsistencies were very costly in time and materials and ultimately resulted in abandonment of partially developed stopes. For this reason, in certain areas, it was important to orient and
develop the stopes along the plunge of the folds. To do this, the apex of the fold had to be precisely located to establish the draw point for development to the level above. Once this was accomplished, stopes were developed that produced waste free ore from level to level. The recumbent fold that contained the ore was structurally strong and could be opened without fear of cave ins.

**Typical Talcville mining methods**

The Mining methods in use at the time the Talcville mines were closed (last mine closed about 1978) were not very different from those a hundred years ago. Of course, the equipment has improved over time, but the basic methods of extraction are very similar. Drilling in the beginning was done by hand with a steel and hammer. The ore was hoisted using horsepower. Horse and wagon (or Sleigh) were the only available way to get the ore to the mill until the railroad was built. Local farmers contracted as talc haulers. In most cases the haul distance was averaging about eight miles. The photo below shows a recently refurbished talc hauling wagon.
The next improvement was pneumatic drills with no wet capability. For the health of the miners, the most important change was the modification of the drills from dry drilling to wet drilling. This took place shortly before I started working underground in 1955. The old timers in the Talcville fibers would tell many stories regarding what it was like to drill dry underground. Of all the different drilling situations, raise drilling produced the worst dust conditions in the mine. Raises are a form of development driven from a lower level to the level above with cross sectional dimensions a little more than 4X4 feet. If possible, they would be driven on a pitch of 40 degrees or steeper so the broken rock would fall by gravity to the bottom. Raises were small dead headings with no air movement at the face, except for the compressed air that was coming from the pneumatic drill. Normally the raise driller would drill and fire about 19 holes that were 5 to 7 feet long.

The photos below show a typical raise during its development stage. It was being surveyed to record and verify the accuracy of its progress on its way to the level above. I took the picture of Bruce Gale (my helper) up the raise and he took my picture looking down.

Surveying helper @ face of Raise above transit

Note climbing pins and drillers platform
Drilling in high fiber caused the air to be especially saturated with fine dust particles that tended to remain airborne because of the shape of the particles. Dust would be so dense that visibility was zero and when the round was finished the only thing that wasn’t white on the driller’s face would be his nostrils and eyes. Dust conditions in the early mills were bad and possibly worse than the mine atmosphere because grinding was done dry and dust collecting equipment was rudimentary. Particle size in the air would be smaller and more dangerous to the lungs. After the wet drilling change occurred, holes drilled in high quality fiber behaved unlike any other rock drilling in the district. The return cuttings, coming from these holes, were unique. These cuttings had so much surface area that it would absorb all the water that could be fed through the drill and the slurry that came out of the hole was a thick paste. In fact, if the driller was not especially alert to reduce the feed pressure (penetration rate) the steel could bind in the hole to the extent that it could not be retrieved. It was not unusual for this to happen when the driller was drilling in a hard crystalline rock or tremolite ore and without warning hit a high fiber vein. Frequently, before he could react his steel was bound in the hole beyond recovery. By comparison, drilling in normal crystalline rock produced return water with no change in viscosity regardless of how fast the penetration rate.

The main haulage levels were drilled about 8 by 8 feet in cross section and the holes loaded with explosives and fired. Each of these rounds advance about 6 to 8 ft. The
broken rock was loaded out the next morning using “Eimco” loaders on rails. These overshot loaders had a front bucket that dug into the muck pile and threw the material over the top into a rail car attached to the rear of the loader. These machines were run on compressed air and could swing from side to side as they worked their way into the pile, cleaning the eight-foot-wide drift from wall to wall. Most of the cars would hold about 1 ½ to 2 tons. Main haulage levels advanced along the strike of the ore to locations where a designed draw point was established. Draw points for production ore were located at the end of lateral drifts (X-cuts) usually curving off the main haulage drift far enough to allow the loader and at least one car to load ore. Each X-cut had its own rail switch so it could load ore without interfering with the main line. From the draw point a raise (about 4 ½ X 4 ½ ft.) would be driven to the next level above. The production mining began when the small raise was enlarged in a funnel shape (choke) from the draw point into stopes (large rooms) normally about 50 ft. wide and to whatever height the ore conditions would allow. Each of these draw points were sampled and tested regularly. Based on sample tests and the foreman’s experience, the mine would attempt to provide whatever grade of ore the mill requested. Many draw points were utilized to mix the ore for each days production. The ore was then hauled to the shaft with battery electric locomotives, dumped into the skip, hoisted to the surface where the skip would dump into a holding chute, or directly into a railroad car or truck for hauling to the mill. Each of the old mines had variations in how they would hoist and dump the ore, but the principal procedure was the same.

The high-quality fiber in the Talcville area does not seem to extend laterally in either direction beyond the current mining limits. As #3 Mine developed to the N. E., approaching a mineral rights property boundary, the quality of the fiber gradually degenerated into a mediocre ore that was marginal in color. The projection of this ore over the property line, owned by the heirs of the John Newton lot, had similar marginal fiber quality characteristics. In the 1950s an attempt was made by the Reynolds Talc Co. to mine and mill this ore. An adit (tunnel) within a few feet of the town highway was driven through a nearly vertical gneiss outcrop, crosscutting into the ore zone where a small mine was developed.
This #3 Mine headframe was the last mine to operate in the Talcville area. It was the only shaft in Talcville that was designed specifically as a hoisting shaft. It’s main product was high quality fiber talc. The transition from rail to truck hauling was needed because the loaded rail cars were delayed for many hours before delivery to the mill, causing the moist warm mine ore to be frozen into one large lump. Mills had to use large torches to thaw the ore before it could by unloaded.

At the same time, they developed an open pit on the surface above the underground workings. A series of about 8 or 10 surface diamond drill holes were drilled to evaluate the deeper projections of the orebody. The ore shown in these holes did not indicate any improvement in quality. This operation never achieved full production before it was shut down. A mill was built on the same property close to the underground mine. The ore was fed to the mill at the top of the hill and proceeded by gravity through the milling process. I believe the mill was designed to be a 50-ton a day operation, but it only ran a brief time before it was shut down in the 1950s.

Similarly, the quality fiber at the Wintergreen mine did not extend very far to the S. W. Talc was mined just across the river in the Hyatt mine, but all indications are that it was more tremolitic in nature. Old diamond drill holes on this property show some potential for a ceramic grade of tremolite ore.
Personal mining anecdotes

The preceding description of how ore is broken, loaded, hauled, and hoisted to the surface does not provide reliable control for maximum size of the chunks that can be handled in the mill crushers. Therefore, it was left up to the mining crew to control the size. Human nature being what it is: there were problems that persisted over the years concerning the sending of oversized chunks to the mill. The ore, when delivered to the mill, would be dumped into the mill ore sheds. These sheds could hold plenty of ore inventory to supply the needs of the 24-hour milling process. At the bottom, or draw point, of these sheds the mill crew would use scrapers to drag the ore into their small jaw crushers for primary crushing. The problem came when the oversize chunks would not fit in the jaw of the crusher. When this occurred, the crushing crew would have to break the chunks with a sledgehammer until they passed through the crusher. Of course, this was hard labor and would slow down the crushing production. Naturally, the crusher man’s temperament was inversely proportional to the number of chunks they had to break by hand. Inevitably, they would complain to the mill supervisors who would in turn complain to the mine dept. This would be a common point of friction between the departments. In the case of the fiber from #3 mine the problem was exacerbated, because the oversize chunks of high fiber were nearly impossible to break with a sledgehammer. The fiber was so tough that a man could pound a hole through the chunk and it still wouldn’t break. The miners that were loading these chunks would either underestimate the size or neglect their orders to not send large chunks to the mill. When the miners came across these chunks they were supposed to stop loading and drill a hole in the piece and blast it. (standard block-holing procedure) Of course blasting in the mine was inconvenient, smoky, and time consuming. Warning signals (Air whistle) would be blown to keep other people out of the area when blasting. If the loader man was confronted with an excessive number of the chunks, he would complain to the stope driller that he wasn’t breaking the ore small enough. So, the friction was not just between the mine and mill. The General Manager (in this case it was Fred Kuehl) eventually became frustrated with this problem, so he ordered the miners responsible to report to the mill. It was now their problem to break the ore with the sledgehammer. This approach seemed to work well in reducing the number of oversize chunks going to the mills. To my knowledge, this only happened one time.

Normally the miners carried a conventional lunch bucket to the level where they expected to have lunch. Usually, each level underground had a heated dining area with picnic style tables in a room with cement floor and painted walls. Electric bar type heaters provided a comfortable environment. Some of the men at No. 3 Mine in Talcville wanted more than cold sandwiches for lunch so they adapted the heaters to operate as cook stoves and ovens. It was not uncommon to smell venison stew, or some other exotic dish being prepared. These dining rooms were usually located near the shaft station, so the tramming crew would see to it that the cooking was supervised properly.

It is not unusual to have a few bats in the underground workings of any mine but the circumstances involving #3 mine in the late 1960s were unusual. During this period
the operating mine was developing under the old #4 mine shaft area. Breakthroughs into the 4th level were being made in the normal process of mining into the old mine workings. It was in this area of the mine that you could see thousands of bats clinging to the hanging wall (ceiling) of the old stopes in clusters the size of basketballs. Many of the clusters would appear to have 50 to 100 bats clinging to each other. The mine lamp beam panned across the area would pick up several bats flying around, but the vast majority were hibernating or sleeping until dark and time to go out feeding. I was not particularly at ease in this environment. The reality of bats zipping around while trying to survey and map new developments or just walking down the drift dodging to avoid the expected collision was not my idea of fun. On one occasion, while surveying in a cramped area requiring a low instrument setup, I was bent over trying to get my foresight when one of the bats landed in the palm of my outstretched hand. A reflex shake of the hand propelled him to the floor for his last flight.

In the early 1970s International Talc Co. put the company up for sale. Various interested parties would come to evaluate the prospects. One of the parties included Gouverneur Talc Co. I was asked to explain and show the mining assets for their evaluation. George Erdman, V.P & General manager, and Art Thompson Assistant manager, were scheduled for a tour of #3 mine. Transportation accommodations into this mine consisted of a ladder placed in the ore skip, which could hold 4 or 5 people. The shaft was on a pitch of about 67 degrees, which appears nearly vertical. Each level in the shaft had a bell pull cord system to signal the hoist man as to your destination level. The federal Mine Safety & Health Department had recently required us to install a rope or cable from the surface to the bottom of the shaft that was connected to this signal system. This contingency line provided for emergency and/or maintenance control if something should happen between levels where you need to signal the hoist man or have direct control of the skip. As far as I know, this shaft had never had any mechanical operating problems. On the morning of the tour, we boarded the skip, and I rang the bell to take us to the 4th level. When we had been lowered about 100 feet the skip jumped the track and we were bumping along with the wheels of the skip striking one cross tie after another. I was taken by complete surprise, so when I reached over and grabbed the cord, we all were greatly relieved when the skip stopped immediately, and we could start breathing again. All shafts have ladders installed as a manway in case of emergency situations, so we proceeded to climb back up to the surface. I never knew exactly what caused the skip to leave the track but after the situation had been corrected, we rescheduled the tour and there were no more problems. As it turned out, Gouverneur Talc Co. did purchase the assets of International Talc Co in 1974.

Hoisting and servicing most talc mines, with incline shafts, was done with one set of rails and one open bucket skip. The skips were designed with a bail attached at the bottom of the bucket. Pins through the bail allowed the front wheels to follow a curved rail into the surface dump while the rear of the skip continued up the incline until the bucket was essentially bottom side up, thereby emptying the ore. When ore was being hoisted there were two men involved; one man in the mine to fill the skip bucket and the hoist man to hoist and dump the skip at the surface. This mode of operation only required one bell to tell the hoist man that the skip was loaded, and he could hoist, dump and
return to the loading level to repeat the cycle. The hoist would run at full speed while hoisting. However, when men were being transported in the shaft, a signal was given to the hoistman that men were aboard and the hoistman would repeat the signal to confirm before the skip would move to the signaled destination. This told the hoistman to engage safety locks to prevent hoisting men into the dump by mistake. With men on board the skip also traveled at reduced speed. Given this brief description of the operations in the shaft, imagine how surprised I was to learn that a longtime foreman of this mine had been riding the ore skip whenever he was in a hurry to get somewhere. This practice required that he be in position to step on the skip as it was passing through a level at full speed and then step off at his destination level usually also at full speed. It didn’t matter whether he wanted to go up the shaft or down, the procedure was the same. Needless to say, there was very little room for error and of course the hoistman would have no idea that anyone was riding on the skip. Like any risky job, it seems that when men are overly familiar with their job, they tend to take more and more risks. Luckily, this man lived to retire.

Mine accidents

In Feb. 1897 the U.S. Talc Co. had the worst single mine accident in talc mining history. There were six men killed in one cave in:

1. William Dawley
2. Charles W LaRock
3. John Mathews
4. Fred Hurley McCoy
5. Milford Stuart McLaughlin
6. Alfred Tetherton.

Sixty-three years later, on July 11, 1960, another multiple fatality occurred in the International Talc Company no. 3 Mine. This tragic accident was apparently caused because of hurrying to get a main haulage development round fired before quitting time. The driller was being assisted in loading by two men (not normally involved) when some holes in the round went off prematurely, killing all three men.

1. Howard Ernest Fuller
2. Douglas Skeldon
3. Clark Milton Zanker

According to records compiled by Mrs. LaVerne H. Freeman, (a descendant of one of the main talc mineral rights owners and the Town of Edwards Historian) there were a total of 18 men killed in the Talcville mines through the closing of #3 mine by Gouverneur Talc Co in 1974.

On May 4th, 1970, at the same #3 mine there was another fatality that took place while I was in the mine surveying. John Joseph Matejcik, a long-time driller in the mines, was fatally injured by a large rock falling directly on top of him. This accident was especially sad because John was not only one of the best drillers I had ever worked with; he was as safety conscious as any miner I knew. John was working in a small stope, which had broken into the bottom haulage level of old #4 Mine workings. In the process
of mining the area a crack had developed in the hanging (roof) under which he had to pass each morning when entering his stope. He was constantly aware of the crack, and he worked on this with a scaling bar every morning for days without success. As it turned out, the crack he was working on was keyed into another chunk that he was standing under so when the original chunk finally came down the second piece came with it directly on top of him. It was obvious when we arrived at the site that he had no chance of surviving. Word of the accident quickly spread to the rest of the men underground and to those at the surface. It took quite a while before the chunk could be pried up sufficiently to remove his body and carry him to the shaft to be hoisted to the surface. By this time, his brother Paul, who was the hoistman, knew that he was hosting his brother to the surface.

At this point, a human-interest story that primarily involves the Matejcik family presents a perspective of not only how talc got mined, but also how lives were lived in the early days. Inserted below is the story by Helen “Nellie” Matejcik that takes place early in the 20th century relating to when she came to Talcville as a little girl. A daughter of immigrant parents from Austria-Hungary who could not speak English when she entered grammar school. These events were an important part of life in rural America. This story came to my attention on the Internet and because it relates to the early history of the talc mines, I think it provides an interesting portrayal of the kind of people that contribute a great deal to explain the success of the industry. Not only her father but three of “Nellies” brothers worked in the mining business. These boys not only mined talc they were all members of the Northern New York baseball champions. A picture of this team and the role that many of them played in the talc business is also included.

The Edwards History and Genealogy Center

Tales From Around Town

Nellie’s Memories

Helen “Nellie” Matejcik Nacincik (1912-1998) was born in the town of Hermon, of an immigrant family from Austria-Hungary who came to the area because of the work in the mines. The family later moved to Talcville, Town of Edwards, for the work in the talc mine in that community. She was the second oldest child of the seven children of John and Mary Krsak Matejcik. Although she did not have the opportunity for a high school education, apparently, the
desire for it was always in the back of her mind, and when in her seventies, she took classes for a GED diploma near her home in Michigan. While attending these classes, her natural talent for storytelling, using events from her life, came to the surface, and the following stories are her thoughts as she relates growing up in a small mining town in Northern New York, beginning with the difficulties encountered because of the inability to speak English.

Permission was received from her daughter, Peggy Nacincik Pierpont, to allow the adding of these marvelous memories to the Edwards History Center Internet site for all to enjoy and be enlightened of an age gone by.

**Early School Years**

I started school in a two-room building in a small mining town in upstate New York. One room had first to fourth grade and the other fifth to eighth grade. The building had two sets of steps, or stairs, on either end and entered a hall, which had hooks on one side to hang up our coats. At the end of the hall was a table with a pail of water for drinking purposes. The privy was outside, with two separate entrances.

Since my sister nor I could speak English at the time, we had to put up with a lot of ridicule and tormenting jeers from the other children. However, we had an understanding teacher and she pantomimed programs that enabled us to learn English and before too long we were accepted by the other pupils. There must have been about fifty little desks and the teachers really put themselves out to teach us.

Of the early games, I remember tag and relay races. We also played “Annie, Annie, Over”, throwing the ball over a roof and someone catching it on the other side. We had three high swings and seesaws for the younger ones.

Being such a small village, we didn’t have any clubs. We didn’t even have a movie house and only a small country store, and if the owner of the store didn’t have the merchandise wanted, he would order it for you from Sears or the Montgomery Ward catalog. The only contests we’d have in school were to see who had the best written paper or report card. With the best report, the winner would have every Friday afternoon off until the next monthly test. I think we all tried for that.

We weren’t into fashion in the 1920’s. As long as we had clean clothes and bodies and made a neat appearance and were well behaved, our teachers were satisfied.

**A Day From the Past - Berry Picking**

Between the ages of ten to eighteen, my brothers and I and my younger sister, Anna, spent the berry picking season doing just that, picking blueberries and blackberries. My older sister, Mary, generally stayed home with our baby sister and to make lunch for Dad and the boarders.

My three younger brothers, and they were all younger than I, and a younger sister, Anna, and Mom and a neighbor and her two older children would start in the morning. Dad would drive us as far as the meadow that was about half a mile away from the trail that would take us to the ridges where we picked the berries.

The meadow usually had high grass and my little sister had to be carried sometimes because the grass would be wet with dew and we’d all be wet up and over our knees before we’d get to
the ridges, shivering and cold, the younger ones crying often. However, the sun would soon warm us up.

Mom would prepare hard-boiled eggs and bread and cheese, pickles and sometimes fruit for our lunches. We drank the lake water with our meal. Mom would wrap the eggs, bread, and cheese in a cloth square and tie it around me, as we had a lot of walking to do – sometimes seven or eight ridges to find the berries.

My brother, Paul, and I carried bushel baskets on our shoulders and Mom carried the pails and small pots ‘til we got to the berrying spots and then we’d pick the berries into the small pails and pots and empty them into the bushel baskets. Each basket held thirty-two quarts and we had a twelve quart pail that Mom carried and smaller pails that my brother, Peter, carried. John and Anna were too small to carry anything on the trail going home. When the berries were plentiful, we would get the baskets and pails filled early and get started for home early, nevertheless, we were happy to see Dad either coming to the ridges to meet us or waiting for us at the meadow.

At seven o’clock every night the train would stop by our house and the engineer and fireman would drop off two milk cans, which would hold fifty quarts each and on the return trip pick up whatever berries we had picked. Most days we had picked about eighty quarts, which was very good for the children and Mom.

At the end of the day we had a treat – an ice cream cone. All in all, a pleasant day, as I recall. I guess at that young age we didn’t mind the cold and wet and later the hot sun, but it is nice to think so far back and remember how it was. Thanks for the memories of yesteryear.
A Box Social gets its name from what it implies. A social get-together and a box – a place to put the eats or goodies in, an ordinary paper box, or container, decorated for that purpose. Generally a country house, or a farmhouse, and a fiddler in the community were the necessities.

The lady would prepare the box of food, generally sandwiches, cake, or fruit dessert and make a pretty package with ribbons and bows and sometimes a cigar on it and then hope that her boyfriend would bid on it.

The box would be placed on the table as the ladies came in. After most of the guests were in, the dancing would begin as soon as the fiddlers came in. Most of the dances were square dances, tho there were waltzes and foxtrots, too.

During intermission the auctioneer would announce the time to auction the food boxes and the fun would begin. The bids began at $1.00 and some went as high as $20.00. Once my brother bought my box for $6.00. That was a laugh because his girlfriend had given me the paper and ribbon to decorate my box. He thought it was hers. Whoever bought the box had to eat with whose box it was. His girlfriend’s box was bought by my other brother, so he had her with him anyway. We all had fun together.

We had the Socials for quite a while once a month at different residences and I don’t know when or why they were discontinued. They were fun while they lasted.

The Box Socials were an entertainment not only for teenagers, but also for older people and grandmas and grandpas, who really whooped it up when a group of the oldies got together. The oldies knew the old songs and most of the barn dances. It was more fun watching them than participating in the dances. Everyone knew each other and it was their way to show their appreciation at being one of the crowd. It was fun that was really enjoyed.
This family was typical of many immigrants’ families employed in the mines. The boys in the photo are left to right, Paul, Pete, John.

One of the raise drillers referred to earlier in this article “as being totally white except for eyes and nostril” was a Portuguese immigrant. His name was Manuel Gaumes and he lived close enough to the mines that he walked to work along the railroad tracks. In the early part of the century there were mining operations all over northern New York. All these mines employed immigrants from all over the European continent. Today, most of these mines in New York State are closed and abandoned.

As you can tell by now, mining is a very dangerous occupation. Prior to working for International Talc, I was in the engineering dept. of the St. Joe Lead Company for about 10 years. St. Joe’s No. 2 zinc mine was located close to and in some cases immediately adjacent to the Gouverneur talc mines. During my years with St. Joe there were several fatalities as well as many serious accidents. On one occasion while measuring contract development footage at St. Joe’s no. 3 mine, my helper (Bruce Whitford) and I were in an open stope where a raise was being driven. David Dill, a geologist, had just recently washed the dust from the rock surface to map the geologic features. In all likelihood, this was a contributing factor causing a large chunk to fall from the hanging (roof) of the stope striking Bruce on the head and pinning him underneath. The geologist was still washing in an adjacent stope so I informed him of the accident, but two people were not capable of lifting a chunk of this size to remove Bruce. It seemed like it took forever to notify the necessary people, with the stretcher, to recover Bruce. Bruce’s injuries were severe, and he died later in the hospital.

In this same mine, one of the drillers (Ken Sweet) was working in a large open stope on a narrow bench at about the 300-foot elevation level. The bluff of this bench was vertical nearly all the way to the 900 level. Normally a man working that close to a bluff would be tied off with a rope connected to a pin secured solidly to the rock, but for some reason he was not tied off and he fell to his death nearly 600 feet below. He was an experienced miner, and we will never know the circumstances that caused this accident. When dealing with heavy machinery, explosives, and rock falls you can be sure there is plenty of opportunity for accidents. I experienced an incident that I will never forget while working for St. Joe. I hadn’t been with the company for very long when my helper and I were measuring development contracts, and we had a raise to measure. The raise driller was at the face nearly 100 feet up at an angle of about 70 degrees. The procedure was to either yell at the driller that you were coming up or if he was drilling, we would turn off his air line so he would know that someone was below. In this case I took the end of the measuring tape and proceeded up the raise to measure the drillers advance. This driller (Dick Cornell) was one that usually advanced his raise 6 ½ to 7 feet per round. He was also a driller that only installed one pair of climbing pins per round. This meant that if you were standing on one pair of pins the next pair was about 6-7 feet above. This was not a particular problem in climbing up the average raise but when the raise is in the 70-degree range, it seems that you are climbing nearly straight up. After having made the measurement of his advancement I started climbing down. This is where I ran into a
problem. I managed to retreat down for two or three sets of pins until I reached a pair that I couldn’t negotiate. Climbing down under these circumstances is more difficult than the climb up because your cap lamp does not light the area adequately to see where to put your feet as you lower yourself down to the next set of pins. Even more difficult, than the light problem, was the reality that as you bend over to grab the same set of pins that you are standing on your hard hat strikes the rock wall before your hands can reach the pins. I tried different procedures, but I couldn’t get a grip on the lower pins in order to remove my feet down to the next set of pins. The more I tried the more anxious I became, breaking out in a cold sweat, and wondering if I would ever make it down in one piece. The driller tried to help but there wasn’t much that he could do because he couldn’t get below me. He finally directed me to a notch in the rock where I could put one foot while I reached down to get a grip on the pin. I was still shaking when I finally reached the bottom.

There was another unpleasant and difficult moment many years later in the Gouverneur Tale No. 1 mine. In this case the raise was much flatter, which turned out to be lucky. I was with the mine superintendent as we went up the raise to see the driller and found him in a very distressed condition. He had had some kind of physical attack that left him totally irrational, flailing around with his arms and shouting all kinds of obscenities. He was incapable of communicating or understanding instructions. It turned out to be my job to stay with him until the superintendent could find help. It seemed like forever before he returned with some help and a stretcher.

Cave-ins like the one shown below were not uncommon throughout the Talcville mining area. Another major subsidence occurred on the western end of the U. S. or Freeman Mine swallowing a large area including a substantial part of the Talcville-Emeryville road. Surface subsidence was also a problem in the Anthony mines. The S. W. end of this mining area (#3 + #4 shaft area) eventually subsided showing major cracks and movement, some of which were under the old rail siding that serviced #4 shaft.
Near misses

While mining toward the S. W. on the 3rd level of No 3 Mine a raise driller reported to the foreman that he had hit some water in one of the holes in his raise round. The foreman told him to go ahead and fire the round. The result was a breakthrough into the workings of old abandoned #5 mine. The result was a flood of water rushing down the main level toward the shaft. Mine development blasting is always done at the end of the shift, so the men were at the shaft waiting to be hoisted to the surface. By the time the last man boarded the skip, the water was of sufficient depth that they had to duck under the guard rail which was under water. Luckily, everyone escaped without injury.

Number 3 mine normally ran on a single day shift schedule. The headframe at this mine was all structural steel with an open chute that would hold several skip loads of ore. A drop gate at the end of the chute held the ore until a truck or open gondola rail car were in position to accept the ore. Normally the railroad would deliver these cars to the mine site on the late shift. For some reason, when the miners finished the shift, the chute gate was left in the open position. When the train backed in to leave the empty cars for the next day, they ran into the gate with the result being a badly twisted chute and headframe. The mine was out of production for sum time before repairs could be made.

Early 1900s miners

Early mining was labor intensive requiring large work crews doing most of the work by hand. Mining has always been a high-risk occupation that needs a special kind of person. They needed to feel comfortable underground, and they needed the strength and stamina for hard labor and common sense to solve unforeseen problems. (Not unlike a good farmer.) Drilling, blasting, and running heavy mining equipment required talent.
Talcville was a nice little mining town bordering the beautiful Oswegatchie River with a school, general stores, railroad station and a baseball diamond. This was the time in our history when most villages, with industrial enterprises, looked forward to watching their quality baseball team. Talcville was one of these communities. Communities took pride in these teams and found it to be a favorite form of entertainment. As I understand it, if you wanted a job in the mines, and you had any talent on the diamond, you went to the head of the hiring list. The Talcville teams were very highly regarded over the years and had a fine record against teams from much larger communities. In the 1940s they were known as Duchano’s All-Stars and were later called “Talcos”. In 1946, the Talcos scored 20 win and 3 losses and were the champions of the northern New York Adirondack semi-professional league. Three brothers, John, Paul, & Pete Matejchik, were regular players on this team. Jim Doyle became mine foreman at the Arnold Open Pit Mine until the sale of International Talc to Gouverneur Talc Co. Jake Gaynes was first baseman for the team and retired as mine foreman at #3 mine in Talcville.

The Wintergreen shaft appears to be the limit of the fiber talc ore zone to the S. W. There is one more mine across the Oswegatchie River, which was mined for a short time, starting about 1888. This was the Gideon Freeman mine, and the ore was used in the Gardner Pulp Co. mill that later became the hoist and compressor site for International Talc No. 2 ½ Mine. The ore was of questionable quality and the mining was short lived. Gardner and those associated with him sold to the Asbestos Pulp Company in
1892. This site was also an active zinc mining area. In 1917 Grasselli Chemical Company did some diamond drilling at, what was referred to as, the Hyatt prospect. Grasselli along with J. H. McLear operated the Hyatt Mine between 1918 and 1922. Universal Exploration took over the property in 1930 and carried on additional development drilling. Between 1930 and 1949, Universal mined the property. In 1974 St. Joe Minerals Corporation did some additional diamond drilling and mined continuously from 1974 to 1983. Zinc Corporation of America reopened the mine for a fourth time in 1990 and they mined until 1998. Some of the diamond drill holes on this property show a grade of the harder tremolite ore with possible potential value in the future.

As we trace the inferred talc structure to the S.W. there is no known commercial talc for about 2 ½ miles until the intersection of Rt. 58 and the West Branch of the Oswegatchie. This is the site of an incline shaft located a few feet north of Rt. 58 and west of the Oswegatchie and known as the Ontario Mine. The Ontario Talc Company originally operated the mine in the early 1900s. It supplied their mill located about two miles up the West Branch until the mill burned in November 1916. The mill was never rebuilt. Loomis Talc Co. acquired the mine and mineral rights, and it became their No. 4 Mine. This mine produced primarily a soft scale talc product. It was in operation during World War II, and it is my understanding that the product was strategically important to the U. S. Navy for special electrical insulators. The mine had eight main levels and extended about ½ mile laterally. The four lower levels extended N.E. under the river to the point where the quality ore pinched out. The U.S. government drilled diamond drill holes between this mine and the Hyatt Mine showing no commercial ore. Ore quality also deteriorated at the S. W. end of the mine. Two small mines were developed S.W. of the Ontario (No. 4 Mine). The first mine, known as the Vanamie, developed about 200 feet from the workings of the Ontario Mine. The next mine, known as the Johnson Mine, was located about 1000 feet west of the VanNamie. Both these mines were very small, most likely due to an inferior quality of ore. David Ryder, a long-time engineer and employee of the W. H. Loomis Talc Co., confirmed the poor ore quality. He said they were very wet mines and that a man was accidentally drowned at the bottom of the Johnson Mine shaft.

The next mine in our progress to the S. W. is located south of route 58 and about ¾ of a mile south of the Fowler intersection. Commonly known as the Arnold Mine. This mine played a major long-term role in future events involving the Loomis and International companies. The mine was supplying most of the ore for the Loomis company. It was named for the owners of the mineral rights and was first mined in the middle 1890s. The Keller Brothers mill at Fullerville and the Columbian Mill on the Island Branch of the Oswegatchie River used most of the ore. W. H. Loomis acquired the lease on this property along with many others in 1919. The mine was the largest and deepest talc mine of its time. The shaft was inclined on the dip of the ore and had 15 main haulage levels. W. H. Loomis Talc Company developed most of its underground production. By the time the mine was closed in 1953 it was about 1000 feet deep and had a lateral extent of about 3600 feet. The ore from this mine was mostly medium to soft and used primarily in paint products. The ore on the N. E. side of the shaft was mostly soft scale talc that gradually pinched out about
1500 feet from the shaft. Ore on the S. W. side of the shaft displayed more variety in its characteristics. There was some range in the hardness of the commercial ores, but the availability of the harder tremolitic ores was very limited. Soft scale and a rather large lens of what was generally referred to as short fiber were the major products from this mine. The structural stability of the rock in some areas of this mine was unreliable. It was unsafe to mine in larger openings because of rock falls. Dave Ryder (Engineer for Loomis) related one story about a main level development crew that went to the shaft for their lunch break and when they returned to their work place it had caved in and filled the opening. He said, “Frequently while working underground you would hear rock falling in the old stope mining areas.”

Some bizarre events regarding the Arnold Mine, mentioned above, resulted from the following circumstances:

1. The strategic aspect of the location of the mineral rights property lines between W. H. Loomis and International Talc. See plan map showing new unmined ore.
2. Product changes in the talc markets.
3. Changes in the financial structure and top management due to a series of deaths.

W. H. Loomis was probably the most professionally run and progressive talc company of its day. The company’s primary business was the mining and marketing of talc products. They had very competent professional people both in mine management and engineering, ore management, and marketing as well as milling technology. The company did continuous research and development in new markets, developed new products, and improved milling procedures by utilization of pilot plant testing. Mr. Loomis acquired substantial acreage in mineral and surface properties. Unlike other talc companies he used the surface for major farming enterprises. Talc markets, being somewhat cyclical, were compatible with the flexible utilization of the labor force between the two enterprises. The people I knew who worked for Loomis were very complimentary of the company’s business practices and its relations with its employees. They seemed to have a great deal of loyalty. Business was apparently very good until the middle 1940s. Mr. W. Leonard Caten was made Vice President in 1926 and maintained that position until his death in 1939. Only 3 years later W. H. Loomis died. A brother, E. E. Loomis, the major stockholder in the company, had also recently died. Given the vacuum in management, stocks changed hands leading to the acquisition of controlling interest by Eastern Magnesia Talc Company of Burlington VT. Many changes ensued and the downward spiral accelerated. The new management began to high grade the mines, which is the kiss of death to any long-term mining prospects. By the early 1950s the company was for sale.

Before the involvement of Eastern Magnesia, there were other reasons for the Loomis companies post World War II business decline. Major changes were taking place in the markets. Water-based paints that used substantially less talc were replacing oil paints. At the same time, ceramic markets were growing rapidly and the filler for these products required more tremolitic material rather than talc material of which the Loomis mines had very little.

International Talc Company’s acquisition of the Loomis Talc Company, on December 15, 1953, was much more of an asset than anyone knew at the time. The obvious benefits were to secure a larger share of the market, as well as an increased milling capacity from the two mills at Popple Hill. The unknown asset, at the time, was access to a massive ore body available from the surface. This ore body’s dimensions and susceptibility to open
pit mining were never contemplated until an unusual sequence of circumstances took place. These events started with the waste pile that Loomis had generated over the years at the Arnold Mine. This pile contained about 75,000 tons of waste which International could market with customers in the roofing business. It was this roofing market product that led to a much more important and unexpected benefit. When the waste pile was nearly used up, International’s management started looking for a low-cost replacement of similar waste type ore. It was at this point that Peter Rocca, superintendent of mines, suggested that he could get the same type of off-color ore from an outcrop located just above the Arnold Shaft. By purchasing some used surface mining machinery, a small open pit mine was started. As this small pit progressed the ore improved in quality, and it became evident that this was the same structure as the quality tremolitic ore being mined underground in the Wight Mine. Development of the pit was accelerated with the purchase of additional equipment and periodic outside contractors for stripping of the overburden. The phasing in of pit production within this orebody took place in the early 1960’s and it was capable of full production by November of 1967 when the underground Wight Mine was closed. The following plan and cross section maps (Figure 1 & 2) show in graphic form the unusual location of this major ore body that was unknown until International Talc’s Wight Mine development happened to run into it in the 1950s?

There was no diamond drill prospecting, nor any other indications of its existence. As shown on the plan map, (exhibit 2) the lens of hard ceramic ore (blue hexagon pattern) was located immediately adjacent to Loomis Talc property (red property line) but did not appear in any of the Arnold underground working. A typical cross section (located on plan map) also shows the lens shape of this ore body in depth. Gouverneur Talc Company has been mining this ore from the surface for over 41 years until 2009.
The following series of Arnold Mine stripping photos are shown to record the basic evolution of what was required to stay ahead of ore mining. To mine virgin ore the surface must be free of any overburden, therefore all newly exposed ore must be washed. This cleaning process was not a one-step operation. The dirt washed from the high knobs accumulated in the low valleys, and eventually some hand work would be required to clean up the narrow deep valleys.

The early stripping was done with company equipment, but it soon became obvious that we could not keep up with the ore requirements. From then on, we contracted with outside companies to do the stripping. Over the life of the pit, I think there were at least five separate stripping contracts. The final stripping was done with an in-house hydraulic slurry system.
The scraper dozer equipment below required large areas in order to be efficient. The overburden was mostly fine sand to clay glacial layering that had entrapped water. This type of material has what is defined as thixotropic characteristics. As a result, the daily scenario was an early morning surface that was highway hard. As the day progressed these scrapers created a wave in front of the front wheels that might be described as hard Jello. At this point the tires did not penetrate the surface, but if they did not move the work area, then at some point the scraper would drop into the surface and be hopelessly stuck. On one occasion, the scraper and two D9 dozers were all stuck to the point the company had to bring in a very large crane from Massena, to get them out.

I remember on at least one occasion, standing next to operating machines, when the ground was in its Jello state, a spout of water erupted resulting in a pile of fine sand in the shape of a small volcano about foot high and 2 feet in diameter.
Typical contract stripping 1970s and 1980s.

Fresh water pump feeding high pressure water to cannon on barge. Note: 8-inch polypropylene pipe used for both fresh water and slurry discharge.
Note fresh water line top left of photo

Slurry being pumped from barge to a sequence of 3 settling ponds. (Article author in picture)
The following photos show the Arnold Pit as a mine, and the natural reclamation that evolves after the mine is abandoned. These photos are looking from South to North. The first photo shows the mine shortly after it was abandoned.

6 Post abandonment photo series from about 2000 to present

The following photos show the Arnold Pit as a mine, and the natural reclamation that evolves after the mine is abandoned. These photos are looking from South to North. The first photo shows the mine shortly after it was abandoned.
This photo was taken in Aug. 2020. The water is still rising as of 2023 at a rate of about 2-3 feet/yr.
The next mine to the S. W. is the Wight Mine mentioned above. This is an old mine with a typical inclined shaft that was sunk on soft scale talc. There are six main levels at about 50-foot intervals. Ore hoisted and milled from the original mine was mostly soft scale talc. Two distinct horizons of the soft ore were mined. The two horizons were separated by a major thickness of waste. The waste rock extended laterally from the shaft area to the N. E. about 1200 to 1300 feet. As a result of this waste the mining required two parallel developments, one along the foot wall ore and another along the hanging wall ore, about 300 feet to the west. This lens of waste narrowed considerably on the N. E. at approximately the same area where the foot wall drift encountered the hard ceramic ore. At this point, mining methods were not unlike all the other old tale mines, but later after the massive new hard ore was discovered the mining system changed dramatically. The new orebody plus access to the area with two drifts resulted in a new mining plan. A sub drift (called a grizzly sub) was developed about 45 feet above and following the line of the main drift. This sub was connected to the main level by a series of raises, evenly spaced to allow for 50-foot-wide stopes and 20-foot-wide pillars. At the grizzly level on the center line of each stope, grizzly rails were installed to control maximum rock size. At the main level, gates were installed to control loading of rail cars for haulage to the shaft. This system was able to produce much more efficiently than any other talc mine to date. The ore was now hauled to the shaft with one way traffic. Three locomotives, each with several ore cars, trammed ore to the shaft. Exhibit 1 shows the two drifts, and Exhibit 2 and 3 show a typical stope development.

As part of the Union Contract with International Talc, there was a long-standing negotiated incentive production bonus system that applied to underground mines. No. 3 Mine in Talcville and the Wight Mine were both paid bonus on all tonnage hoisted over an established base tonnage. The difference in the amount of bonus made by each of these mines was not even in the same ballpark. The Wight Mine earned much more with less effort. The higher efficiency of the Wight Mine generated such large bonuses that it became
the talk of the mining community. Even the men working in the highly paid zinc mines couldn’t believe how much the Wight Mine crew was making. They not only made large checks, but they could also hoist the days production requirement by 11:00 to 12:00 o’clock in the morning and go home with credit for the 8-hour shift. Naturally, these jobs were highly coveted and filled by the high seniority miners.

Other Wight Mine tid-bits

There is an unusual geologic feature showing in the Wight mine. On the 6th level, Southwest of the shaft, the drift clearly exposed an “overturned fold”. As you walk along the drift you are traveling along the strike of the ore with a moderate N. W. dip clearly showing. (approximately 30 degrees) Continuing along the strike of the ore the dips are getting steeper as the drift turns toward the south. As you approach due south the dip is almost vertical. Continuing along the curve toward the southeast the dip goes past vertical and starts to flatten out toward the 30 degrees where you started. By this time the strike of the structure has made a 180-degree turn. The same structure is shown in the level above, but development was abandoned before showing the complete fold. I believe this is the same structure projected to the surface, that was mined as a small open pit that fed the original talc mill on the Wight property.

On the 6th level of the hanging wall drift, mentioned previously, there was also a drift development to the S. W. The ore quality was marginal to poor when it was stopped less than 300 feet from a drift headed in the opposite direction from the Woodcock Mine. This was the No. 3 Loomis talc mine that was closed and abandoned April 16, 1952. The alignment and elevation of this drift was nearly on target for connection had it continued. Logic clearly indicated that both mines were developing on the same geologic structure.

The talc zone between the Wight and Arnold mine is the only area that I know of that contained unique inclusions within the scale talc. These inclusions, like the scale, were nearly pure talc, but they were a distinctly different crystal structure that resembled a wooden log. It could frequently be extracted from the scale matrix as a separate segment. In most cases, it would not be more a few inches to 2 or 3 feet in length. It had the appearance of petrified wood and when crushed it usually broke down into long flexible fibers. If struck on the end with a hammer, the fibers would flair without breaking into a maze of fibers. Occasionally, the alteration to fiber would be incomplete, and the crystal was friable and acicular. I have found some samples that may even be friable on one end and fibrous on the other.

The next mine to the S. W. is the Woodcock (Loomis No. 3) mine mentioned above that is less than 300 feet from workings of the Wight Mine. This Loomis mine is another example of the company doing a commendable job of engineering and mining questionable ore under difficult circumstances. There were no large clean ore horizons to work with. Both hard and soft ores were available, but they were in narrow veins and frequently integrated with contaminates. The company tackled the mixed ore problem with a headframe like no other in the district. The shaft bearing and pitch were engineered to sink adjacent to the ore structure with a uniform pitch. A well-designed headframe was completely enclosed and capable of distributing each skip load of ore into any one of 4
chutes. The skip dumped it’s load onto a large flat steel platform that provided access to each of the chutes. This allowed a sorting crew to direct the good ore to one chute and waste material to another. Trucks loaded from these chutes and took the ore or waste to the appropriate destination. Mining marginal ore is inherently difficult and costly, but the Loomis company was able to recover substantial commercial ore with this system. This mine was of moderate size. It ranged laterally about 1200 feet with 8 levels.

The talc zone S. W. of the Woodcock appears mostly non-commercial until you reach the Balmat or American Mine. All the Grenville’s marbles (including the talc beds) end in a major terminal geo-syncline located in the area of the No. 2 Zinc mine shaft and the GTC No. 1 shaft. This geo-syncline generated a substantial talc deposit as well as a major zinc deposit mined by St. Joe Lead Company in their No. 2 Mine. The American Talc Company mined this ore in the late 1800’s to 1905 until their steam driven mill burned to the ground. The original American Mine that fed this mill was later incorporated into the No. 1 Mine of Gouverneur Talc.
The success of Gouverneur Talc Company would never have transpired if International Talc Company had retained the mineral rights on the property. Apparently, this decision was made with two things in mind: 1. They didn’t realize that there was a major ceramic orebody on this property. 2. They had very large ore reserves, and they saw no need to maintain the lease expense. In any case, it appears to have been a decision that changed talc history. Whether or not International Talc Company continued in the business, Gouverneur Talc Company would, most likely, never have become involved. International Talc would have been the sole producer and remained a very marketable company.

The reality is that Gouverneur Talc did pick up the mineral right and they drilled a few diamond drill holes and came up with a very sizable multi-grade orebody. They
designed an efficient double compartment vertical shaft that eventually reached the 1100-foot level. One compartment contained the man-cage/ore bucket, and the other compartment contained a counterweight. The skip in this shaft was the first of its kind in the Balmat-Edwards talc district. It consisted of an enclosed man cage compartment with a six-ton capacity ore bucket suspended underneath. To help balance the starting load of ore from the various levels there was a counterweight in the second compartment. This would in effect reduce the six-ton load in half. The hoist for this shaft was also unusual because the drum was grooved to fit the cable with the counterweight cable coming off the bottom of the drum and the cage cable coming off the top of the drum. With just a single drum one vehicle is going down while the other is coming up. This made for a very smooth-running hoist. One problem with this design is the limited capacity of cable that can be loaded on the drum. When the shaft was deepened to the 1100 level, that was the limit. If the mine was to go deeper a completely new hoist would have to be installed.

The next unique feature in the layout of the GTC No. 1 Mine consists of underground jaw crushers. There were two crushers installed adjacent to the shaft. One was installed at the 700 level and the second on the 1100 level. Under each crusher there is a storage area with a connecting chute and control gates, for skip loading. This gave the mine a much more efficient and positive method of controlling the size of the chunks. In any mine, the sooner the chunks are reduced to a manageable size the more efficiently they can be handled. To be able to feed the ore into the chute that feeds the skip requires an even flow and accurate control. The ore being loaded into the skip bucket had to be pre-measured at six tons so that the skip did not over-flow and fall down the shaft. This required two gates in the chute. When the gate was opened to load the skip the second gate had to be closed to hold back the excess ore. The second part of the cycle was to then close the skip gate and open the upper gate to refill the measured amount for the next skip load. Even with this system, a few chunks would spill and regular shaft maintenance was required to clean up the bottom of the shaft. Any ore mined on the 300 and 500 level was passed down connecting raises to the 700 crusher and all the ore mined on the 900 and 1100 levels feed to the 1100 crusher.

The American Mine and subsequently GTC 1 mine are geologically located at the S. W. end of the talc zone. All the structural beds, including those containing the talc have gone through major geo-synclinal folding on the East side of Sylvia Lake to a terminal truncation at Rt. 812 just south of GTC No. 1 Shaft. This syncline is the structure that contains a major zinc deposit on one horizon and the talc deposit in another. The two zones are so close that in some areas they are in direct contact with each other. This major deformation resulted in the splitting of the talc zone into two separate veins. They were called the American Vein (named after the American Mine) and the Main Vein. It is the Main Vein that is near the zinc veins. The relationship of these two veins has created a highly unusual mining situation. Mineral rights on the property is specific between zinc and talc with one company owning the zinc and another company owning the talc. Mining by the two companies was, for many years, going on concurrently. With the mining being so close to each other, it was imperative that the surveyed location of active working be accurate. Periodic exchanges of mine maps were used to keep track of each other. Unfortunately, efforts to avoid each other did not always succeed. To my knowledge, there
were four occasions where the two mines broke into each other. Most of the accidents were minor, but on one occasion the hole blasted between the two mines was so large that it short-circuited the ventilation system of both mines. It required a major effort to get enough materials to the site to seal up the breach. Both companies were responsible for the neglect that resulted in these accidents. Luckily there was no one hurt from the blasting.

The American Vein and the No. 2 zinc ore veins were far enough apart so that close monitoring was never needed. The structure in this area plunged at a fairly flat angle (about 30 degrees) and the zinc ores were well below the American Vein and plunging at the same angle. Information relating to the different rock zones, (1 major stratigraphic horizons) most of which could be observed in the main zinc haulage drift on the 900 level. This drift was driven about a mile and a half from the No. 2 zinc mine and connected to the No. 3 zinc mine. Many of the stratigraphic layers, including the talc veins, intersected this drift and could be readily identified. There was even talk at one time of the possibility of the talc mine taking over the No. 2 zinc mine after the zinc company shut down their operation. There would have been many technical problems to resolve but it would have given GTC access to the deeper American Vein ores.

The American Talc Vein was the major source of the ore reserves for GTC before the acquisition of International Talc in 1974. This vein was very thick (especially in the apex of the syncline) and was nearly 100% ore from footwall to hanging wall. It was not uncommon for the stopes in this area to be 60-80 feet high. Even though these stopes were large, mass mining methods could not be used because the layering within the ore zone had different characteristics that required selective mining for the various finished products. Mining techniques in this vein were dictated by the flat dip (about 30 degrees) mentioned earlier. Almost no broken ore ran by gravity, therefore all the blasted ore had to be dragged down to the loading point by large 3 drum slushers. (30-60 H.P) One drum would drag the slusher buckets up the slope to the mining face and the second drum would drag the ore laden bucket down to the loading point. The third drum was used to shift the bucket laterally from sidewall to sidewall in order to recover all the ore. The loading points in this mine were called ramps constructed of structural steel beams with a thick heavy steel plate and square hole located directly over the haulage track. The beams of these ramps were located just high enough so the ore cars had clearance to pass under. The slushers were located on the backside of the ramps just a few feet from the ore pass hole. Ore trains with several cars would be positioned under the hole and the slusher operator would drag ore over the hole to fall into the ore car. As each car was filled the tram operator moved the next car under the hole. The slusher operator used his cap lamp to flash the tram operator for proper positioning of the empty cars. This system worked reasonably well but it was far from perfect. Large chunks would get wedged into the hole requiring hand baring or sledging to dislodge them. Larger chunks that would not pass the hole had to be secondary blasted. The blasting would disrupt and delay other surrounding activities because the blast area had to be protected from anyone wandering into the blast. Dust and smoke would take some time to clear, causing further delay. There was an expedient method used to avoid the secondary blasting and increase the contract bonus. When the oversized chunks accumulated and obstructed normal ore flow they used the heavy buckets to break up the chunks. They did this by putting simultaneous tension on two of the cables (the pull down
and the draw back) causing the large bucket to lift into the air and slam down onto the chunks to break them. There was little doubt that it saved the operator time and increased production. (and bonus) Unfortunately it also resulted in breaking the big buckets. Major down time resulted while cracks were welded at the site or removed to the surface shop for major repair. The large 60-inch buckets were massive, heavy, and very awkward to move through the mine and up the shaft. Disciplinary action to avoid this damage was difficult to enforce.

Specific resistance is a finished product specification not mentioned until now. Gouverneur Talc and its No. 1 Mine was the only company that had to be concerned with this specification which was important to some of the ceramic customers. The hard ceramic ores in the RTV No. 1 mine show a gradual increase of trace sulfates (gypsum & anhydrite) with depth. These are the minerals that adversely affect specific resistance. This reduces available ore reserves for this market and complicates any future mining below the 700 level in the American vein. The impending problem was alleviated by the acquisition of the Arnold Pit ore.

**Drill holes for blasting rock**

Technology for drilling holes underground has been constantly changing. At the end of the late 19th and early 20th century when horses were used to haul the ore up the shafts, drilling was done with a handheld steel struck by a sledgehammer. Most mining operations had forges for shaping and hardening the bit end of the steel. Drillers carried a variety of different length steel to their workplace for the days drilling. Dull steel was returned for re-sharpening and the cycle repeated. Blacksmiths became very knowledgeable about alloys and tempering for max wear.

After the invention of the pneumatic drill, things changed rapidly. Compressors were installed and compressed air lines were run throughout the mine workings. Drill steel was still forged in the local shops for many years. The blacksmith shops were equipped with pneumatic hammers and special dies to shape the hot steel to fit the drill chucks on one end and bits on the other. Gradually these shops were outdated by manufactured steel with thread on bits. These early bits were still tempered steel that could be sharpened a couple of times before they were discarded for new ones. Manufactured bits with carbide inserts were the next major improvement that substantially increased the number of feet that could be drilled without sharpening. Using special grinding wheels, carbide bits could also be sharpened. Carbide bits reduced the carrying of heavy steel back and forth to the workplace. Bits were carried to and from the workplace on a long-bent wire like a large safety pin clipped over their belt. Gradually these tread on bits have been replaced with manufactured integral steel with carbide chisel bits.

Gouverneur Talc’s No. 1 Mine was the first talc mine to utilize a major piece of equipment designed to bore holes underground that were 3 or 4 feet in diameter. It was a massive machine driven by a large electric motor used to turn the bore hole steel as well as supply hydraulic cylinders with enough pressure to push the steel through the rock. When properly aligned, this machine drilled an eight-inch hole to an opening below. Like conventional raises, this development required a pitch inclined enough that the cuttings
would fall by gravity to the bottom. After the eight-inch hole had broken through to the lower level a three-foot bit was attached to the same steel. The large bit with numerous carbide inserts was then pulled back to the starting point. The completed hole could then be opened for ore production, improved ventilation or, as a manway.

Modern underground mines are now set up to access, drill, and haul ore with mechanized equipment. Drilling is usually done with jumbo drills mounted on diesel or electric vehicles, capable of moving throughout the mine workings. Underground loaders and trucks are used to move the ore. G.T.C. is currently utilizing this type of mechanized equipment in an underground wollastonite mine in the Harrisville area.

**Details of events leading to the death of a major industry**
The following quote was written by Dana Putman, retired general manager of Gouverneur Talc Company. Dana was in a position to know the details leading up to the death of the talc industry. I want to thank Dana for this important contribution. The talc industry had its negative and positive aspects, but there is no doubt that it was a major contributor to the economy of the north county for 133 years.

"R. T. Vanderbilt Company (RTV) closed Gouverneur Talc Company (GTC) in 2009 and ended the mining and processing of their tremolitic talc products. The problems that led to the closing started in 1971 when OSHA decided to regulate exposure to all tremolite minerals, asbestiform and non-asbestiform, the same as exposure to asbestos. This action resulted in a lawsuit against OSHA by R. T. Vanderbilt Company. Regulation of all tremolite as asbestos would have made it impossible for RTV to continue the operation of their tremolitic talc mining operation. RTV prevailed in a court decision in 1992 and OSHA rescinded the regulation of “non-asbestiform” tremolite fibers. The court decision established that the tremolite in GTC products is non-asbestiform. The decision did not establish that GTC products were not a cause of mesothelioma or other lung diseases.

RTV has stated that EPA, OSHA, and MSHA: "have all confirmed that the industrial talc mined in upstate New York does not contain asbestos." That statement has been widely and vigorously disputed. OSHA declared that the tremolite in GTC products was non-asbestiform, but no declaration was made that those products did not contain asbestos in some other form. OSHA also made no declaration that those products were not hazardous to GTC workers or to consumers of those products.

GTC operated for nearly 61 years. During that period GTC employed fewer than 800 people. Approximately twelve of those employees developed pleural mesothelioma. It is generally accepted that the most common cause of pleural mesothelioma, a cancer of the inner lining of the lung, is inhalation of asbestos fibers. Pleural mesothelioma is always fatal. The annual incidence of pleural mesothelioma in the USA is approximately one case in 100,000 people. Considering this rate, and that GTC operated for 61 years, GTC employees statistically should have experienced less than one case of pleural mesothelioma.
A study of GTC product samples using advanced microscopy analytical methods was done more than a decade after GTC was closed. This study determined that GTC products contained microscopic particles of true asbestos. These particles would seem to be the reason for the twelve cases of pleural mesothelioma in GTC employees.

For decades large numbers of employees of GTC customers have filed claims that their mesothelioma was caused by GTC products. As the association of GTC products with mesothelioma became more obvious GTC began to lose customers. GTC was also losing customers as a result of domestic and foreign competition from other cheaper mineral fillers, especially in the ceramic industry. The asbestos/mesothelioma problem, combined with general market trends, caused the end of Gouverneur Talc Company, Inc.”

The postmortem of the talc industry is unique, but for a variety of reasons, mostly economic, nearly all the mining operations in northern New York are no longer operating. When I first started with St. Joe Lead Company in the mid-1950s there were 4 large iron ore mines, a large titanium mine active in the area. All have been closed. Gouverneur marble and a host of older mines all over the north country mining lead, graphite, and other minerals prospered, and eventually closed. From Antwerp to Somerville there were at least 8 shafts mining hematite iron. For more details, a search of the internet provides historical data of hundreds of mining operations that no longer operate. Currently, the mining of zinc, garnet, and wollastonite are about all that remain operating in northern N. Y.

To summarize, I want to reemphasize the reason I felt I needed to preserve the details of the history of this Industry. First, the underground information in exhibit 1 would have been lost forever. Secondly, the story of the development of the Arnold Pit, the largest and last talc ore body to be mined, was a result of a very unusual set of circumstances that needed to be told. I hope the maps and cross-sections do an adequate job of displaying the unique conditions that lead to this important event. 1. Who owned the mineral rights at what point in time? 2. What was the type of ore in demand at the time? 3. When did the knowledge of the size of the orebody become known. 4. Why was the Loomis company for sale at the time when International was in the market. 5. What impact did the new competition “Gouverneur Talc Company” have. If the answer to any of these questions had been different, who knows what would have happened.

Fred Totten