

THE E. S. C. QUARTERLY

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WINTER, 1947

North Carolina Possesses A Bountiful Supply of Metallic Minerals



NORTH CAROLINA'S BEAUTIFUL STATE CAPITOL IN RALEIGH

Constructed of Gneiss, a Crystalline Rock Quarried Within One Mile of Its Site. Seven Years in Building. Completed in 1840

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Employment Security Commission of North Carolina

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Mount Airy Granite Famous for Buildings and Monuments

By M. R. DUNNAGAN, *Informational Service Representative, ESC*

About 75 years ago, one Robert S. Gilmer purchased a large farm in Surry County, on a portion of which part of the Town of Mount Airy is now located. Within the farm area, about two miles from the site of the Town of Mount Airy, was a huge rock formation, known locally as "The Rock," about 50 acres in area and in appearance something like a huge oyster shell. The farm was bought at a "per acre" rate, and, as it was not suitable for farm purposes, "The Rock" was not counted in the acreage, but was given to the purchaser without charge as a part of the farm area.

That part of the farm which was then considered worthless is now famous as the largest open-faced granite quarry in the world, with 80 acres of workable granite exposed. From its surface many thousands of tons of granite have been quarried and sold for millions of dollars for use in public buildings, bridges, homes, memorials, and mausoleums in practically every state in the nation.

In 1889, while the Cape Fear and Yadkin Valley Railroad was being built from Wilmington to Mount Airy, an English-born family named Woodruff, then living in Greensboro, had the contract for building the railroad stations between Greensboro and Mount Airy. Four sons in this family, William, George, Thomas and Frank, lived in Mount Airy while completing the construction work on that end of the line.

Seeing possibilities in "The Rock," whose principal use up to that time was as a location for picnics for the people in the surrounding countryside, these Woodruff brothers purchased it and some of the surrounding land from Mr. Gilmer for about \$5,000. They set about quarrying the granite immediately upon purchase in 1889, and several years later in 1904, The North Carolina Granite Corporation was formed.

Around 1910, John Davis Sargent, an experienced quarryman from Vermont was brought to Mount Airy to operate the quarry. Mr. Sargent soon saw the possibilities of cutting stone for buildings, monuments, etc., and leased from the Woodruff brothers the cutting sheds which they had been operating along with the quarry. Mr. Sargent then formed the J. D. Sargent Granite Co. on his own and began cutting the granite into dimension, monumental, and other types of stone. The J. D. Sargent Granite Co. bought the rough granite from the Woodruff's corporation, which Mr. Sargent continued to run for them.

It was not long before the young cutting company became the largest part of the operation, and having proved itself was taken into the larger corporation with Mr. Sargent as president of the North Carolina Granite Corporation.

Shortly after this Francis H. Fries and W. F. Shaffner, bankers of Winston-Salem, and Charles B. Keesee, a banker in Martinsville, Va. became interested financially in the corporation, and they together with Mr. Sargent formed the "big four" stockholders, after buying out the interests of all other stockholders, including the Woodruff brothers. Messrs. Fries, Shaffner, and Keesee had come to know of the quarry through dealings, and vacations spent at White Sulphur Springs, near Mount Airy.

"BIG FOUR" DEVELOP QUARRY

This "big four," sparked by the dynamic Mr. Sar-

KILLED GENERAL, LATER SHARPENED TOOLS TO CARVE MONUMENT TO HIM

The State of Pennsylvania, during the years after the War Between the States, decided to erect a monument to its illustrious sons, and gave the contract to the owners of the Mount Airy granite quarry for the stone, the Ionic columns and the heroic statues of the citizens it was to honor. The material was produced and the monument was erected at Gettysburg, commemorating that famous battle and rising high above the battleground.

When most of the figures of noted Pennsylvania men had been completed or were nearing completion, a resident of Pennsylvania came to North Carolina on other matters. He knew of the plans for the monument and visited the quarry more than once. Taking others to see the work, he pointed out the various distinguished men represented. He pointed to one statue, explaining that it was of General Reynolds, of Pennsylvania, and that he had been killed in the Battle of Gettysburg.

"I think it is entirely appropriate," spoke up one of his guests, "for Pennsylvania to have this work done in North Carolina, in Surry County and here at Mount Airy. For it was," he continued, "a Surry County and a Mount Airy man who killed General Reynolds. In fact, the man who killed General Reynolds is the man who is now and has been for some years in charge of making and sharpening the tools with which the statue of General Reynolds was carved."

And, as the man who had shot General Reynolds was pointed out, as he went about his forge working on tools used in the quarry, the story was unfolded. It has been picked out of the blacksmith, who previously had operated a blacksmith shop near Dobson, by friends who knew something of the incident. The blacksmith and tool sharpener was so modest that they had to keep picking and questioning to get him to relate what happened.

Sharpshooter Frank Wood and Private Cox, it developed, were in the thick of the fight at Gettysburg. In some way they became separated from their company and found themselves in a railroad cut, right in the line of fire. Nearby, they saw a rail fence and ducked to it for protection. From this cover they surveyed the scene. A few hundred yards away they saw on a big horse a man, gold braid on his hat, epauletts on his shoulders, scabbard and boots with spurs and other accoutrements speaking of high rank. He was standing up in his stirrups, waving his sword and shouting to his men.

"Give them hell, boys. Give them the grape. Give them hell. Give them the grape."

Private Cox asked Sharpshooter Wood if he couldn't pick that man off at that distance. Wood wasn't sure, but thought he could. He estimated the distance, raised the sights on his musket, took deliberate aim, and fired. The man fell from his horse, dead.

That was General Reynolds and Sharpshooter Wood, back home and a blacksmith for several years, went with the Mount Airy granite firm to make and sharpen tools, and produced the tools with which the statue of General Reynolds was cut and chiseled and formed. (See picture of Pennsylvania Monument, page 6)—M. R. D.

(Information supplied by Caleb H. Haynes, Mount Airy, N. C.)

Note—Information for this article was furnished largely by John P. Frank, president, N. C. Granite Corp., Caleb H. Haynes, Mount Airy, N. C., and from an article published in "Rock Products," McLean-Hunter Pub. Corp., Chicago 6, Ill.

gent, actually and figuratively, put Mount Airy granite on the map of most states in the Union. Novel methods of advertising and publicizing this granite were promoted by Mr. Sargent and his associates. By-products of the quarry were utilized and many new uses for granite from the screening to dimension blocks were devised and developed.

During this time the "big four" would take into the firm promising young men, test them, give them positions of importance and trust, and when they proved their mettle, allow them to purchase stock, or, in some cases, give them stock to increase their interest in the success of the firm.

One of these employees was John Prather Frank, son of Methodist missionaries to Japan. Mr. Frank was taught by his parents in Japan. His entire formal schooling included one year in high school at Mount Airy, two years at Trinity Park school on the Trinity College campus, and four years at Duke University. He specialized in business administration. After finishing college at 20 years of age, Mr. Frank applied for a job at the quarry, was hired at \$15 a week and paid \$20 for his second week. He started in the drafting room, worked there about eight months and was transferred to the business office, doing clerical work.

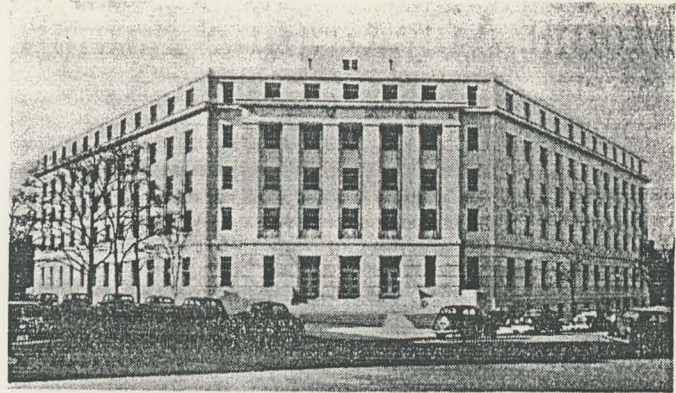
After four years Mr. Frank was elected assistant secretary-treasurer of the firm. In 1935 he was promoted to secretary-treasurer, in 1940 to vice-president, and in July, 1945, following the death of Mr. Sargent, was elected president of The North Carolina Granite Corporation.

Chris Binder was brought into the business in 1916 by Mr. Sargent, who recognized his ability as a cut stone man. Mr. Binder's experience was gathered from operations in New England, Pennsylvania, and Georgia. It was not long before he became Manager of the Cut Stone Department of the corporation, and has operated that department successfully for the

BUILDINGS, BRIDGES, MEMORIALS PRODUCED FROM MT. AIRY GRANITE

Mount Airy granite has been used in the construction of many nationally known buildings bridges, mausoleums, monuments and memorials throughout the eastern half of the United States. A listing of some of these and their locations is given below:

Arlington Memorial Bridge	Washington, D. C.
Wright Brothers Memorial	Kitty Hawk, N. C.
Department of Justice Building	Raleigh, N. C.
Union Trust Building	Washington, D. C.
Patterson Monument	Dayton, Ohio
Cuneo Mausoleum	Chicago, Ill.
Dodbe (Brothers) Mausoleum	Detroit, Mich.
U. S. Post Office	Siler City, N. C.
Rose Hill Mausoleum	Chicago, Ill.
Mississippi River Bridge (85% Complete)	Memphis, Tenn.
Delaware River Bridge	Philadelphia-Camden, N. J.
State Education Building	Raleigh, N. C.
Masonic Monument (part)	Acacia Park, Buffalo, N. Y.
Modernistic Mausoleum	Fredonia, N. Y.
Ward Hall, U. S. Naval Academy	Annapolis, Md.
U. S. Gold Bullion Depository	Fort Knox, Ky.
U. S. Post Office	Mount Airy, N. C.
Jefferson-Standard Bldg. (1st floor)	Greensboro, N. C.
McCourtie Mausoleum	Somerset Center, Mich.
Pennsylvania Monument	Gettysburg, Penn.
Cone Mausoleum	Greensboro, N. C.
George Rogers Clark Memorial—Pylons	Vincennes, Ind.
Guilford County Court House	Greensboro, N. C.



North Carolina Education Building in Raleigh, housing several State Departments and agencies. Exterior facing and approaches cut from white Mount Airy granite.

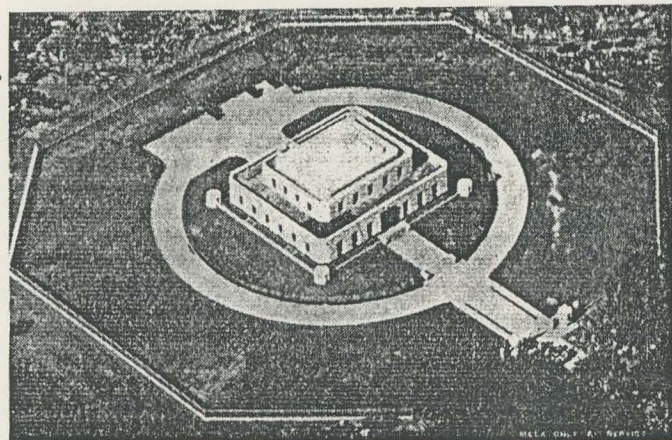
past 30 years. At the present time he is Vice-President and General Manager of the parent corporation.

Other officers of the corporation, all of whom "grew up" on the job and acquired stock, in addition to President Frank and Vice-President Binder, include: Frank L. Smith, Treasurer; G. Kellock Hale, Jr., Secretary; A. Clark Lackey, Chief Draftsman; and Dallas M. Owens, Chief Estimator.

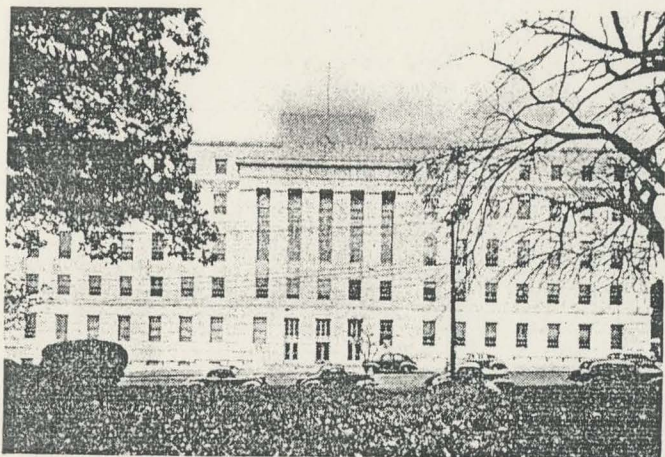
Meanwhile, as members of the "big four" died, their interests were taken over in the most part by other members of their families, although some has been left in trust for their heirs.

The present Board of Directors, in addition to President Frank and Vice-President Binder, include: W. F. Shaffner, Jr., real estate and insurance man of Winston-Salem, who with his sister, Mrs. Virginia Shaffner Pleasants, inherited their father's stock; Morgan Simmons, chairman of the board at the American Furniture Co., in Martinsville, Va., and a former associate of Mr. Sargent at the quarry; and Charles E. Norfleet, vice-president of the Wachovia Bank & Trust Co., in Winston-Salem.

In addition to owning 500 acres of land, including the 80 acre face of the quarry, this firm also owns 1200 acres of land, embracing valuable granite deposits, in Wilkes and Alleghany counties, located in



Famous U. S. Gold Bullion Depository, Fort Knox, Ky. Exterior walls, machine gun turrets and gate houses cut from white Mount Airy granite.



North Carolina Justice Building in Raleigh. Exterior facings and approaches were cut from white Mount Airy granite. It houses N. C. Supreme Court, Attorney General, State Bureau of Investigation, Selective Service, National Guard and other offices.

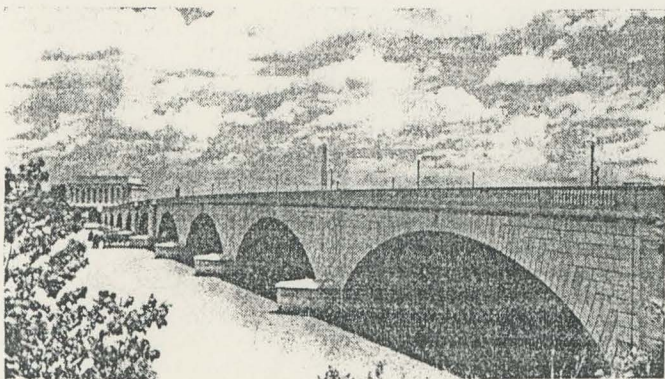
the Traphill area of the Elkin-Roaring Gap highway. Little activity is carried on at this latter site at present.

COMPOSITION AND CONDITIONS

"The Rock" at Mount Airy still has the appearance of a monstrous oyster shell, even though probably 50,000,000 cubic feet of granite have been removed. During periods of normal operations about 3,000 carloads are removed each year, yet it is estimated that 500 years of quarrying at that rate will not exhaust the supply. The granite surface is still above or even with the surrounding land area—no underground or below surface operations.

Mount Airy granite is described as a biotite granite of medium grain, almost white, but with a light grey appearance. The feldspar, principal constituent, is white; the quartz is blue-gray and the small amount of mica is black. All of these parts are evenly distributed throughout the entire deposit, resulting in a remarkable uniformity.

Tests are interesting. They show that a cubic foot of this granite weighs 165 pounds; that the crushing strength per square inch is 23,069 pounds. They also reveal that the water absorbed by a cubic



Well-known Arlington Memorial Bridge, connecting Arlington Cemetery and the City of Washington. Bridge and approaches contain 685 carloads of finished white Mount Airy granite.

foot of this granite is only 0.33 of a pound. This means that if 165 pounds of this granite were submerged in water, it would absorb less than one-third of a pound of the water. Its crushing strength and water resistant qualities are pointed to as particularly desirable in the construction of large buildings and bridges.

The average person will be surprised at the simplicity of the quarrying processes. Dynamite is never used for quarrying. Results of its use would be disastrous. Its force would shatter and crack the granite, causing flaws in the blocks. Nor is compressed air used in the lifting process, although it is used extensively in granite quarrying and cutting.

Mother Nature, with her heat expansion in summer and cold contraction in winter, is a most valuable worker at this quarry. Her chief ally and aide is one of the oldest of explosives, black gunpowder, and this is used sparingly. The splitting quality of the granite aids in the quarrying. The grain of the granite is horizontal and a light force starts a split which gives a smoother surface than is achieved in splitting boards. Also, regular and even force exerted through the principle of the wedge gives a smooth and remarkably even perpendicular split. It is the same principle used by the ice man who marks a chunk of ice with his axe, gives a harder stroke and a smooth, even, 50-pound piece of ice separates itself.

So, when a sheet of granite is needed for large cut or dimension stone construction, a hole, about 2½ inches in diameter, is drilled perpendicularly into the granite four to eight feet deep. A small, very small, charge of black powder is placed at the bottom of this hole and exploded. The explosion merely starts a small horizontal crack in all directions from the bottom of the hole. A slightly larger charge of powder is exploded, extending this crack or split in the granite. Another slightly larger charge is exploded, extending the split still further, but not damaging the granite. This process is continued until the horizontal split is as large as is needed, or it is left for

HUGE CUT STONES AND FINE GRIT COME FROM MOUNT AIRY GRANITE

The wide range of sizes and wider range of uses for Mount Airy granite is shown in the following list:

Cut Stone—Huge blocks, shaped and sculptured, form mausoleums, monuments and memorials, columns, heroic figures and other decorations for buildings.

Dimension Stone—Used in constructing buildings, bridges and other large structures.

Paving Blocks—Usually 4½x5x10 inches or size desired, and Street Curbing, usual or unusual sizes.

Flagstones—Made from quarry blisters, from one to five inches thick, form artistic, rough natural stones for walkways in gardens, floors of open places and other bases.

Rough Ashlar—Suitable for schools and churches, 6x9x4 inches, and larger, ready for use as it comes from the quarry.

Rubble—Needs shaping, before use in building walls.

Rip-Rap—Odd sizes of quarry refuse, suitable for sea walls, embankments and aggregates for heavy concrete foundations.

Crushed Stone—Crushed to various sizes. One machine reduces granite to 2¼ inches or down to one inch, screened for size. Another crusher reduces it further. It is used as road material and concrete aggregates, 2½ inches and down; for roofing gravel, ¾ to ¾ inch; aggregates for making concrete blocks and lamp posts; station yard and track ballast, ¼ inch and down; poultry grit, in sieve sizes for turkeys and old, young and baby chicks.

the heat of the sun and the cooler nights, or the cold of winter to continue the splitting process.

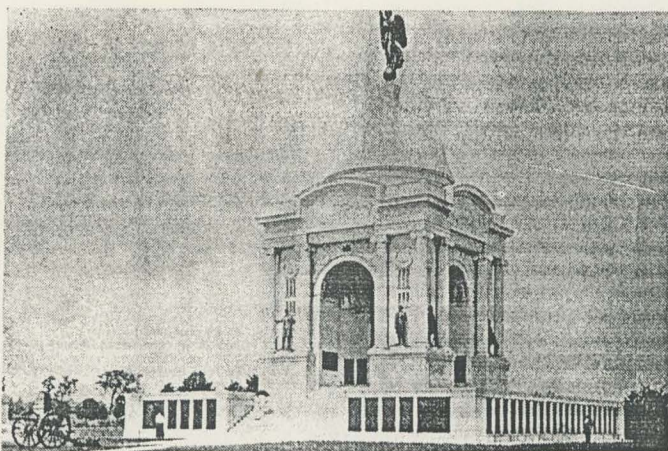
By "soundings" on the surface, that is, tapping the granite with a hammer, it is possible by the sound produced to tell how far the split extends in all directions from the original base of the hole. If it is discovered that the split is not extending in the directions desired to get the sheet (if four to eight feet thick granite can be called a sheet), then a new hole is drilled further along in that direction to a similar depth and black powder is exploded to extend the split already started. This undersurface split can and sometimes is extended over an area including several acres. So, it is possible to split off a sheet four to eight feet thick and acres in area.

PEEL OFF HUGE GRANITE SHEETS

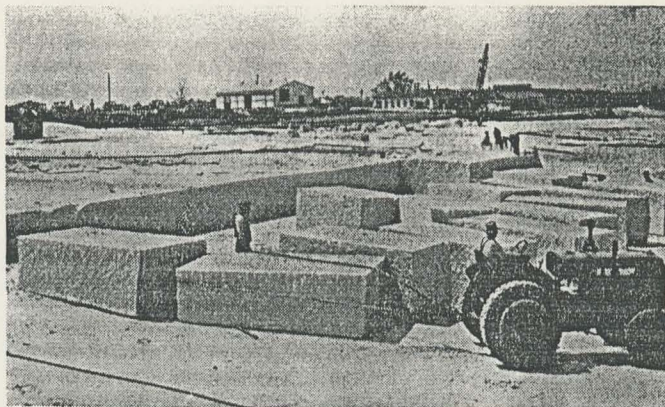
Naturally, such large sheets cannot be handled. When the area is sufficient for current needs, holes are drilled perpendicularly a few inches deep and a few inches apart. The wedge principle is used to separate the entire sheet of the blocks. Wedges are driven into these shallow holes and tightened gradually. Due to the markings made by the drilled holes, the granite splits perpendicularly almost as regularly and evenly as it does horizontally. The heat and cold expansion and contraction also help this process of cutting the blocks of granite to the size needed.

Sizes of granite blocks are limited to capacity of railroad cars. It is possible for cars to carry a maximum of 100 tons, although 50 tons is nearer the usual car. Twelve cubic feet of granite weigh about a ton. Maximum sizes of blocks are 40 feet by 5 feet by 5 feet. More usual sizes are 30x4x4 feet.

The Arlington Memorial Bridge, connecting Washington and Arlington Cemetery over the Potomac River, is one of the largest masses of Mount Airy granite. In its construction 685 carloads of granite were used. The weight of this granite is about



Pennsylvania Monument at Gettysburg, Pa., honoring military leaders in War Between the States, including General Reynolds, one of the heroic figures. Structure and figures carved from white Mount Airy granite. (See article, Page 3, headed "Killed General. Later Sharpened Tools to Carve Monument to Him.")



Quarry Ledge View, showing sheet and blocks of white Mount Airy granite, with garage, compressor room and blacksmith shop in background.

30,000 tons. A solid train of freight cars sufficient to haul the granite used in this bridge would be more than four miles in length.

The Mississippi River bridge at Memphis, Tenn., now under construction and about 85 percent complete, will contain 320 carloads of granite. In this bridge will be seven granite piers, 100 feet high, 90 feet long and 20 feet wide.

BY-PRODUCTS BECOME IMPORTANT

At the Mount Airy granite quarry there is practically no loss. The sizes are all used, from the largest cut stone to the fine grit fed to baby chicks to help them grind the food they take into their craws. The range is from cut and dimension stone down through paving blocks and street curbing, flagstones, rough ashlar, rubble, rip-rap, crushed stone, gravel and poultry grit. This poultry grit production is developing into one of the firm's important sources of income. Several carloads are shipped each week, graded into grit for turkeys, grown chickens, broilers, fryers and for baby chicks. It supplies a needed product for another growing North Carolina industry—poultry raising. And, large quantities go to all states east of Colorado.

Full utilization of the granite quarried is due to extensive study and planning to take advantage of all sizes of stone and over a long period. Cut stone and dimension stone form more than two-thirds of the total sales, yet utilize only slightly more than one-fourth of the total volume of material. By-products are just that when attention is directed toward producing the main items, but when periods of slack big business occur, the by-products become the more important products of the quarry.

In the early 1890s the Cape Fear and Yadkin Valley Railroad was completed from Mount Airy to Wilmington, thus giving Mount Airy granite an outlet to other railroads. A spur track surrounds "The Rock" and passes the cutting and crushing houses. This railroad, now the Atlantic and Yadkin Railway,

connects at nearby points with other far-reaching railroad lines.

Power for operation is supplied by electricity and by a 175-horsepower engine and two 150-horsepower coal burning boilers. Electric cranes, compressors, granite crushers, locomotives, granite lathes, steam cranes, diesel shovels, granite saws, sand blast and other equipment are in operation at the plant. Indicative of the value of this equipment is a new crusher just installed which cost \$35,000.

The Mount Airy granite quarry operates with a normal force of about 400 workers. With veterans returning for training they are gradually getting back to that level. Many former G. I.'s are learning the granite business. And more could be used.

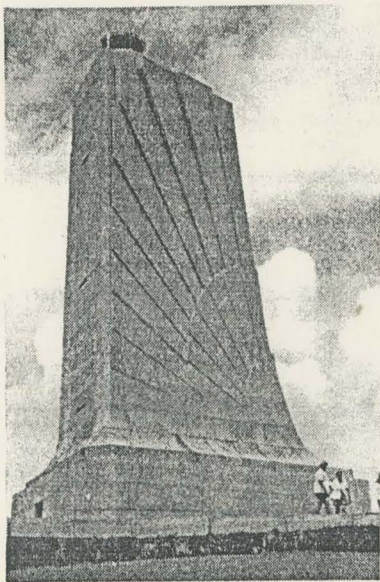
At the peak of operations in 1925-1926 about 800 workers were employed. During the war period and the later restrictions in building, the industry was hard hit in its bigger operations, the by-products saving the day. However, production is gradually returning to normal, and the granite industry hopes to get going in a big way in the next few years.

The labor at the quarry is native, efficient and satisfied. Many workers have been on the payroll almost since they became old enough to work. In fact, at "The Rock" may be found grandfathers, fathers and sons working side by side.

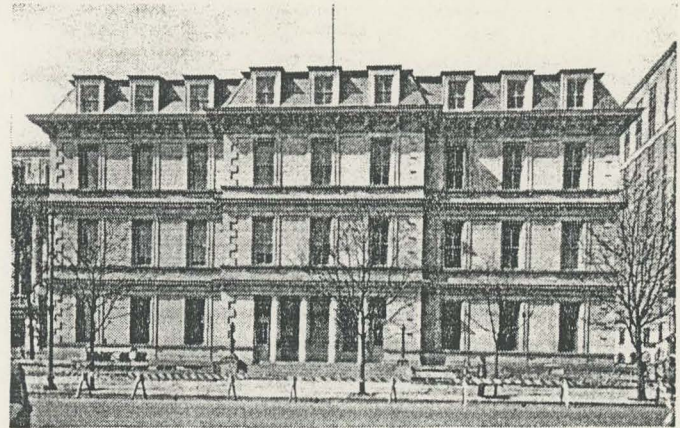
Notable is the cleanliness and neatness observed at the quarry. Unsuitable parts are cleaned up just about as soon as they accumulate in the production of the many by-products of the quarry. The keep-clean thought is stressed and new workers soon realize that they are

to keep the place clean and neat. It soon becomes regular routine. That is why the place always has the appearance of just having been scrubbed and swept.

Mount Airy granite officials are awaiting the all-clear signal, when the immediate needs of veterans and others for housing have been met. Then conditions are expected to be so they can proceed with big contracts for buildings and bridges, as well as for monuments, memorials, mausoleums and other smaller products of the quarry.



Wright Memorial on Kill Devil Hill, Kitty Hawk, N. C., honoring Orville and Wilbur Wright who flew the first heavier than air plane carrying the weight of a man from this spot on December 17, 1903. Constructed of white Mount Airy marble, with parts of Rowan County granite.



Raleigh, N. C. United States Postoffice. First large building erected of Rowan County gray granite. Cornerstone laid July 4, 1874. Enlarged in 1913-14 and again in 1937-38, both times with Rowan County granite.

TALC MINING IS AN IMPORTANT ACTIVITY IN CHEROKEE COUNTY

Talc mining is developing into an important industry in Cherokee County. Two or three talc mines have been operated in various sections of the country, but a rich vein has been struck not far from the town limits of Murphy and is now being worked extensively.

Large quantities of talc are being mined a short distance underground by the Hitchcock Corporation, headed by Francis Bourne, and is being processed in a plant at the mouth of the mine.

Talcum powder, of course, is the first item thought of when talc is mentioned—and is an important item produced by the Cherokee County Plant. The lump talc is ground into a fine powder and that is talcum powder, practically the finished product, except for the addition of perfume.

The Hitchcock Corporation also produces talc pencils which are used in marking all kinds of materials, especially iron and steel, which have to be subjected to intense heat. Talc marks, numbers to identify iron and steel parts, are just as plain after these materials have been subjected to intense heat as they were before.

Two types of pencils are made by this plant. Both are about six inches long. One is a round pencil, about the size of the usual lead pencil, but composed entirely of talc. The other is a flat pencil, approximately the shape of a carpenter's pencil, also composed entirely of talc. The waste talc from trimming or turning these pencils is suitable for making talcum powder.

Talc is described as a mineral composed of magnesium, silica and water, and is commonly classed as hydrous, magnesian silicate. It is soft and has a greasy or soapy feeling. Talc is related to soapstone, although talc is classified as a mineral and soapstone is of the rock family and is composed of talc, chlorite, and impurities. Like talc, soapstone is soft and has a greasy or oily feeling.