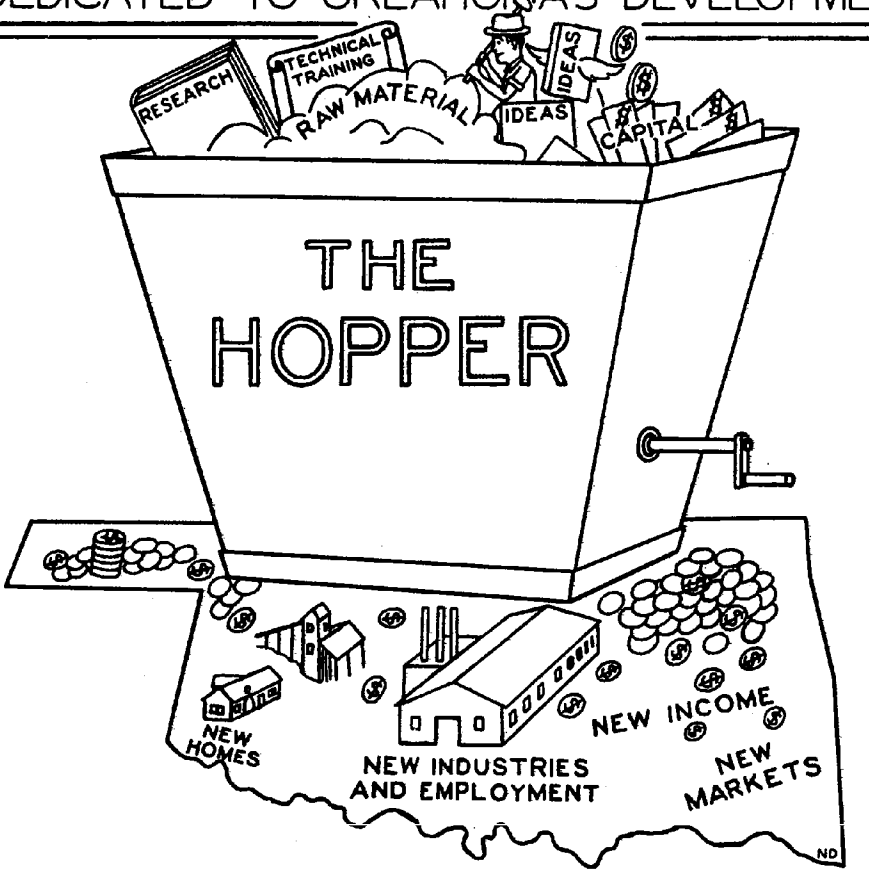
DEDICATED TO OKLAHOMA'S DEVELOPMENT



PUBLISHED IN THE OFFICE OF THE
OKLAHOMA GEOLOGICAL SURVEY
NORMAN, OKLA.

Vol. 14
No. 6

June, 1954.

THE TISHOMINGO AREA

by
A. L. Burwell
Industrial Chemist
OKLAHOMA GEOLOGICAL SURVEY

Tishomingo is the county seat of Johnston County. Not a large city as measured by population, it is one of the most favored spots in Oklahoma from the standpoint of natural mineral resources. Within a radius of 15 miles are deposits of granite, silica sand, limestone, dolomite, shales, clays, and other mineral materials of commercial importance. Fuel in the form of natural gas and bituminous coal are being produced within a 20 mile radius. Power generating plants, both hydroelectric and steam, are in operation in close proximity to Tishomingo. This area is one of great mineral wealth, located as it is on an arm of Lake Texhoma there should be no water problem.

What is meant by the term mineral wealth? Is there any such thing as mineral wealth? Surprising as it may seem much of the mineral material composing the earth's crust is virtually worthless, that is, it has little or no monetary value so long as it remains "in place" where Nature put it. Mineral material begins to possess monetary value just as soon as Man attempts to make use of it, and not until then. Certainly, a mineral material has no real dollars and cents value if its presence is unknown, but let a trained geologist or a prospector discover and disclose the presence of a desired material, then there is created a certain kind of value, - potential value, but no actual wealth is created. However, the moment this mineral material is removed from its age-long resting place a start has been made toward the creation of actual wealth, a process known in the vernacular as "making money"

Many illustrations of this phenomenon will come to mind. As an example, the geology of the Mill Creek area in Johnston County, Oklahoma, was the subject of research study prior to 1949 by William E. Ham, geologist on the staff of the Oklahoma Geological Survey. The results were published in 1949 as Oklahoma Geological Survey Circular 26.

This circular deals, in particular, with the Royer dolomite. The area was mapped, many samples representing the outcrops were taken, a large number of chemical and petrographic analyses were made, and estimate of reserves calculated. Before this study was undertaken the land under investigation was valued solely as range or pasture land. An offer of $35.00 per acre might have been attractive to the owners. As a result of the disclosures made in Circular 26, a sizable portion of this land was acquired by the Rock Products Manufacturing Co., which paid about $75.00 per acre. This company opened a quarry, installed tracks, built a processing plant, and began shipping lump dolomite for blast-furnace fluxing stone and granular stone for the glass manufacturer.

The description of the Royer dolomite gives the thickness as about 550 feet, the outcrop extending in a belt 9 miles long and from 700 to 3,000 feet in width, with a surface exposure of about 1,400 acres. Using these figures as the basis, it is estimated "that there is slightly more than 150,000,000 tons of dolomite readily accessible for quarrying," with an additional 2,600,000,000 tons if the quarrying is carried to a depth of 60 feet.

A bit of calculation shows that the work of the geologist raised the value of the land on which the dolomite outcrops from $49,000 to $105,000, or $56,000. On a tonnage basis, the value of the dolomite "in place" increased from slightly more

than 3/100 of a cent per ton to 7/100 of a cent per ton. There is no way of computing exactly what it cost the State of Oklahoma to acquire the information published in Circular 26 but it may well have been as much or more than the enhancement in value of the land due to the report. If the profit of $56,000 received by one ranch owner is the total benefit to the received by the people of Oklahoma in exchange for their tax monies, it would have been far better to have left the land for cattle to range and to have made cowpokes of the geologists. chemists, and other Survey employees.

It is fortunate, indeed, that a certain portion of the people of this country have the desire to make use of our natural mineral resources, - that a few still retain that eagerness, courage, and perserverance so necessary in the establishment of new business and new industry. Their incentive or stimulus may be self-betterment, self-satisfaction, self-responsibility, self-respect or what not. In any event, there are far too few of them, but in the case of the Royer dolomite, Oklahoma may be thankful for a W. E. Ryder who saw and acted upon the opportunity. Mr. Ryder and his sons made certain that the "enhancement in value" due to the geologic work was the beginning and not the end of the story.

50-ton cars of 20-mesh dolomite, with a carbonate content of about 99 percent and iron content, figured as $Fe2O_3$, of less than 0.15 percent leave the Frisco R.R. siding of the Rock Products Mfg. Co. plant near Troy regularly for the glass manufacturers of Oklahoma and Texas. Others grades and granulations move to the fertilizer blenders. The "fines" go for soil sweetening and soil conditioning, even as far as the Louisiana delta country. The several grades of dolomite currently sell in the price range from $2.00 to $2.50 per ton, FOB the mill. Does this increase in value from 7/100 of a cent per ton

to $2.00 and better represent mineral wealth? Definitely not. This increase represents wealth created by human ingenuity and human effort together with financial risk by human beings. Mineral materials through their known presence merely offer an opportunity for some person or persons to use them. Use creates the value. It is the expenditure of time, energy, and money that is responsible for generation of wealth from dolomite, limestone, iron ore, petroleum, or any other mineral material.

As already observed, the acquisition of information and its publication cost the people of Oklahoma several thousands of dollars. Just where is the justification. The justification for this type of work by the Oklahoma Geological Survey lies, in part, in its ability to show the way for commercial and industrial uses for the mineral resources which leads to increased payrolls, increase in overall well being through rise in living standards, and increase in taxable property. This has been demonstrated in the case of the St. Clair limestone, in the case of the high-purity glass sands, and now in the case of the Royer dolomite. What source of income could possibly replace that presently had from Oklahoma glass manufacturing plants? Consider the payrolls and the tax monies received from these plants. With a plant investment of around $700.000 at Troy, who do you suppose is the largest tax payer in Johnston County? The presence of the Rock Products Co. plant means more to Johnston County than appears on the surface. If the Oklahoma Geological Survey can pull more rabbits like this one out of the hat, it needs no further justification; but it can not subsist on past performance.

What other industries in the Tishomingo area are mineral industries, and what prospects are there for others? A relatively new one is the quarry of

the Century Granite Co. (old operators in the Snyder area of the Wichita Mountains) who are producing a light gray stone from the Troy granite for monumental purposes. Not so new but highly important is the plant of the Pennsylvania Glass Sand Corporation at Mill Creek, producing from the Oil Creek formation. Sand and gravel for construction purposes is being produced, and there are large reserves distributed over many parts of the area. In surveying possibilities for new industries, the mineral materials that warrant investigation are the granites with the idea of separating their feldspar content, the altered and decomposed granites with the idea of separating feldspars and kaolin, the Goodland and Daum limestones as potential sources of chemical-grade limestone, the Trinity sand as a source of silica for glass and other products, and the shales and clays which might be acceptable in ceramic industries.

Tishomingo granite from the "Ten-Acre Rock" exposure has received some attention in the Industrial Laboratory of the Survey. This granite is coarsely crystalline, the feldspar crystals being relatively large and perthitic in type. The cost of crushing and grinding this granite is very high and the separation or parting of the several mineral constituents is not satisfactory. However, it was found that by heating the rock to relatively high temperatures and cooling, the rock disintergrated readily into the minerals, which may be parted simply by passing through rolls. Granular material prepared in this manner was processed in a Dings High-Intensity Cross-Belt Separator whereby heavy-minerals were obtained in one fraction, mica flakes in another, and the balance was a mixture of quartz and feldspar. This mixture should be of interest to the enamel and chinaware makers, to glass manufacturers including producers of sheet, bottle, foam, and fibre glass, and to any industry

that uses or could use the so-called "Cornwall stone", "Carolina stone" or the Kaw River blend of Kansas. The recovered mica, too, should have commercial value.

The Baum limestone has been the subject of recent research the results of which will be published soon by the Survey. This limestone crops out west of Ravia, and some parts, at least, are of chemical grade as indicated by analyses of representative samples. A typical analysis follows:

SiO_2	2.83 %
Al_2O_3	0.42 %
Fe_2O_3	0.17 %
CaO	53.59 %
MgO	0.46 %
S	0.004 %
P	nil %
LOI	42.49 %

This analysis indicates a composition of approximately 96.6% carbonates, of which slightly less than 1.0% is magnesium carbonate. This is not the "best limestone in the world" but it should prove satisfactory for many purposes.

If quarries should be opened in the granites and limestones of the Tishomingo area, payrolls would be created. That would be good news but not necessarily surprising. What would be a most welcome surprise would be to have new industry locate in the area to utilize the products of the quarries and mineral processing plants, - industry that would use the

high-quality silica sand, the feldspars, the limestones, and the dolomite. It is not impossible. Tishomingo should be looking for another W. E. Ryder and others of that kind. Occasionally such a man is found right "among local folks". Tishomingo people might well hunt out and read that old sermon entitled "Acres of Diamonds".

Oklahoma Sixth Nationally in Production of Glass Sand in 1952

According to data recently released by the U.S. Bureau of Mines, sales of glass sand in the United States in 1952 were 5,227,927 short tons valued at $2.56 per ton, a decrease of 5 percent from 1951. Oklahoma ranked sixth in production, ahead of California, Texas, and Arkansas, but behind Illinois, West Virginia, Pennsylvania, Missouri, and New Jersey.

Sales of glass sand from Oklahoma deposits have been steadily increasing since the end of World War II, partly as the result of construction of new glass plants in the state and partly because new export markets have been developed. Three glass sand plants, all in the Arbuckle Mountain region of south-central Oklahoma, are currently processing high-purity sand for the manufacture of glass and sodium silicate, and for other industrial uses. The plant of the Mid-Continent Glass Sand Co. at Roff was established in 1913; the Pennsylvania Glass Sand Corporation of Oklahoma at Mill Creek began modernized, full-scale operation in 1947; and the Oklahoma Glass Sand Company at Hickory began shipments of sand in 1952, after the plant of the Oklahoma Silica-Sand Company at the same site had burned in 1947.

Accompanying the great increase in production of glass sand has been the production of new commod -

ity--high purity ground silica--from Oklahoma deposits. The Pennsylvania Glass Sand Corp. of Oklahoma began producing ground silica in 1949 by grinding glass sand in pebble mills at its plant near Mill Creek. It is now available in all standard specifications and is widely sold as a filler, as an abrasive, and for ceramic use.

New Carbon Black Plant Opened at Ponca City

Ceremonies for the official opening of the $2,750,000 high abrasion carbon black plant at Ponca City were held May 26, 1954, according to a recent publication of the Continental Oil Company.

The plant, constructed by Continental Blacks, Inc., is located one miles outh of Ponca City on Oklahoma Highway 40. Conoco, Robert I. Wishrick of New York City, and the Shamrock Oil and Gas Corp. of Amarillo, Texas, are joint owners of the plant.

High abrasion carbon black is used in the manufacture of rubber tires, other rubber products and plastics, and as black pigment to color inks.

This new plant is the second producer currently in operation in Oklahoma. The other plant, operated by the Cabot Carbon Co. at Guymon, Texas County, makes carbon black from natural gas.

GRANITE AS A SOURCE OF ROOFING GRANULES

by

G. W. Chase

The Wichita Mountains, located in southwestern Oklahoma, are composed primarily of granite and gabbro rocks. This range of mountains extends from near Lawton in Comanche County to a few miles west of the town of Granite in Greer County.

The granite rocks range from light green through pink to red, and have a medium to coarse grained texture. In all but a few areas, the feldspar in the granite is intergrown with quartz and cannot be separated by normal crushing methods.

The granite hills around the city of Granite Oklahoma, are composed of coarse pink granite which is quarried for monument stone. This granite has been named the Reformatory granite, and it is medium to coarse grained rock containing only a small percentage of iron and magnesium bearing minerals. The feldspar and quartz are not intergrown and the crystals range in diameter from 3 to 10 mm. and average 5 mm. The feldspar in the granite has a thin coating of ferrous iron enclosed in the outer portion of the crystal. This iron in the feldspar is partially oxidized, giving the crystal a pink color, and upon heating the feldspar becomes dark pink to red. The granite on a weight basis contains 58 percent feldspar and 40 percent quartz, with the remaining 2 percent consists of hornblende and magnetite. The chemical analysis made by A. L. Burwell, Industrial Chemist, Oklahoma Geological Survey shows this feldspar to contain:

SiO_2	66.07%	MgO	0.05%
Al_2O_3	19.22%	K_2O	7.48%
Fe_2O_3	0.85%	Na_2O	5.93%
CaO	0.56%	H_2O	0.41%
	T O T A L		100.16%

The ferric iron in the feldspar is too high to permit its use in the ceramic industry, where normally a white or buff colored product is required. The feldspar may be suitable as a source of dark pink to red roofing granules. The cleavage fragments of the feldspar give bright reflections in sunlight giving the material a brick red apparent color.

CLAY AND PAY ROLLS IN SAPULPA

by

Malcolm C. Oakes, Geologist

It may seem a far cry from structural brick and tile to artistic pottery, but both are made largely from clay, or from its near relative shale, and both are fired in kilns that are essentially alike. In Sapulpa, brick and pottery operations provide a combined annual pay roll of three hundred and fifty thousand dollars.

The Sapulpa Brick Plant and the Frankoma Pottery are essentially family affairs. They have had their ups and downs and at times have had to struggle for survival, but each is still managed by its original founding family, and each is still very much a going concern.

Brick has been made at the site of the Sapulpa

Brick Plant since 1898. Mr. Nicholas Hermes acquired the property in 1925 and established the Sapulpa Brick and Tile Company. Nicholas Hermes came of a long line of brick makers and was not the last of his line. His son, Earl Hermes, is the present head of the business. His daughter, Mrs. Whittlesey, manages the office and pinch-hits for her brother, Earl. She says that it is traditional for each member of the family, girls included, to work, for a time at least, at the brick plant. Her son Wess Whittlesey, now a student at the University of Oklahoma, works at the plant during summer vacations.

The Sapulpa Brick Plant is easily found. It is in the west edge of Sapulpa, on the south side of U. S. Highway No. 66. "You can't miss it." The raw material is a local shale from the Coffeyville formation, of Pennsylvanian age. The shale is dug in an open pit in the side of a hill adjacent to the plant. The reserve is sufficient for many years to come. The products are structural tile, common brick, and face brick.

The Frankoma Pottery had its beginnings in Norman in 1933. John Frank, a professor in the Art Department of the University of Oklahoma, wanted to do more with clay than just to teach others how to manipulate it into the artistic form. He really launched himself into the pottery business, with all its heartbreaks and thrills, when he decided to use an Oklahoma clay to make Oklahoma pottery.

While Mr. Frank was teaching at the University of Oklahoma, he worked with the Oklahoma Geological Survey in a state wide search for clay suitable for ceramic work. Of the many clays that were brought to the laboratory and tested, one was found to be THE CLAY. It comes from a small deposit about sev-

en miles southeast of Ada. The Frankoma Pottery still uses clay from that deposit. Mr. Frank says that it is not really a pottery clay, in the accepted sense of the term, but more nearly a brick clay. In fact, it has been used to make buff brick at the Ada Brick Plant. However, it has some exceptional properties and Mr. Frank has learned how to make from it a unique line of pottery; pottery that is not duplicated anywhere else in the world.

For a time Mr. and Mrs. Frank operated a small pottery in the north edge of Norman, known as the Frankoma Pottery. In 1938 the Frankoma Pottery was moved to Sapulpa, where it has survived and grown in spite of a disastrous fire and World War II. The present plant with its continuous tunnel kiln is a great advance from the small plant in the north edge of Norman with its one small, intermittent kiln. When the Frankoma Pottery was moved to Sapulpa it had five employees; now it has more than eighty.

The new pottery was built north of Sapulpa on the east side of U. S. Highway No. 66 where, like the Sapulpa Brick Plant, "You can't miss it." The display and sales room managed by Mrs. Frank, at the plant, is an important factor in the success of the business. In recent years the Turner Turnpike has been built past the plant a short distance to the south, and U. S. Highway No. 66. has been rerouted to parallel the Turnpike. Frankoma Pottery has been left on a mere country road. But it has not fallen a casualty to these changes because the product is well and favorably known far and near and the management has persistently pushed its publicity. Tourists detour to visit the plant and larger buyers seek it out, or are reached by correspondence and personal calls. One can easily find the plant by leaving U. S. Highway No. 66 where it turns east toward Tulsa, in the north edge of Sapulpa, and going seven-tenths of a mile north, through the underpass-

beneath the Turner Turnpike.

Frankoma pottery is sold around the world and Sapulpa bricks have been shipped as far as the Atlantic and Gulf coasts and to Canada. Sapulpa may be justly proud of both plants and of the families that have persistently and faithfully kept them going. They are inspiring to other mineral industries of the State.

LIMESTONE PRODUCTION INCREASES IN 1952

The U. S. Bureau of Mines Mineral Market Report number 2285 states that 9,636,475 tons of crushed limestone were produced in Oklahoma during 1952. The value of the crushed stone produced in 1952 was $8,974,334. This represents an increase in production of 38 percent and an increase in value of 29 percent over 1951 when 6,966,676 tons of crushed stone with a value of $6,917,548 were produced.