

Branner Says State Clays Neglected

Gazette 11-21-37

George C. Branner, state geologist, said yesterday that Arkansas was losing a valuable source of revenue by failure to take advantage of its vast clay deposits.

"Northern states whose deposits are not nearly so extensive as ours are making several millions of dollars each year from them," he said. "About the only use to which Arkansas clays are being put now is in brick manufacturing. There are two or three pottery plants."

Government records show that in 1935 Arkansas clay products were valued at \$525,796.34, most of which was brick and tile.

Other uses which could be made of Arkansas clays, he said, are stoneware, sewer-pipe, additional pottery plants and refractories.

Dr. Branner said the better quality clays in the state lie in southwest Arkansas and in the Crowley's Ridge section of eastern Arkansas.

Clay Development in Arkansas is Essential For Future Growth

Arkansas Capital News - Herald

In Arkansas there is a clay for every purpose, but the clay resources have not yet been touched.

Government records show that in 1935 Arkansas clays were valued at \$525,796.34, the greater portion of which went into the manufacture of brick and tile.

George C. Branner, state geologist, says that Arkansas is losing a valuable source of revenue by failure to take advantage of its vast clay deposits. Mr. Branner further says:

"Northern states whose deposits are not nearly so extensive as ours are making several millions of dollars each year from them. About the only use to which Arkansas clays are being put now is in brick manufacturing. There are two or three pottery plants."

In the development of Arkansas clays, small industries could be located in every part of the state in the manufacture of stoneware, sewer-pipe, pottery and refractories.

clay which have only been used to make paint for chimneys on the farms where this clay is, in many instances, on top of the surface. In this locality one man has enough leases to keep mills running for years and years. Still it is lying as it has for ages untold, undeveloped.

The development of clays in Arkansas alone would go far in the development of all sections of the state.

ARKANSAS IS OUTSTANDING IN CLAYS DEVELOPMENT IS NECESSARY

Gazette 12-16-37

In the Northern part of Arkansas, in and near Mammoth Spring, which is the home of the world's largest natural spring and which is considered the seventh wonder of the United States; lies a vertiable gold mine, yet undeveloped, in Clay, known as Kaolin Clay and is considered next to the highest type of clay: The government analysis is as follows:

"Kaolin is a hydrous silicate of alumina compound of approximately 46 per cent Silicon Oxide (SiO₂), 40 per cent Alluminum Oxide (Al₂O₃), and 14 per cent water (E₂O), while Silica is composed entirely of silicon oxide (SiO₂)."

It is estimated that there are 2,000 acres within a twenty mile radius of Mammoth Spring which is accessible to the best of shipping facilities. This clay lies within one to three feet of the top soil, which eliminates the heavy expense of moving the overhead.

Government records show Kaolin used for the manufacture of white bodied ware, made from white burning clay, art pottery, high grade tile, chemical stoneware, enameling, paper filling, paper coating, rubber, oil cloth or linoleum, paint filler, or extender, paint pigment, architectural terra cotta, asbestos products, plaster and kalsomine; we wish to add here that kalsomine has been manufactured and marketed from this clay for the past three years, in a small way, and the reception on the market is wonderful, known as "Sun-Glow"; artificial abrasives, crayons, chemicals, pencil leads, sappers, pins, stilts, and spurs for potters use, wads, gas retorts, fire brick and block, fire clay mortar, bauxite and high alumnum brick, glass house pots, glass house supplies, blocks, etc., zinc retorts and condensers, clay crucibles graphite crucibles and stoppers, foundries, steel works, etc., clay for bricks,

(building and paving), chimney blocks, copper converters, cosmetics, decolorizing, flower pots, flue lining, furnaces, fuses, hollow building tile, modeling retorts, sewer pipe, shoe and stove poish, soap products, taxidermy, toy marbles, wall paper, water softener; also black burning clay, etc.

In this immediate section the thickness of the clay strata or lense has not been reached at any point, consequently it is impossible to reach the number of tons available, but from the mining which has been done to date, it is believed the supply is adequate for years production. This clay strata reaches over into several adjoining counties to Fulton county.

The development of clays in Arkansas means opening of many small industries, consequently giving employment to thousands of people who are now subjects of charity.

If interested in this type of clay, we would advise writing to A. J. Lewis, 1439 Huntington Ave., Jonesboro, Arkansas, who has developed and manufactured kalsomine from this clay for the past three years.

MAKING OF POTTERY ONE OF ARKANSAS'S OLDEST INDUSTRIES

Gazette 26-37 (Dec.)

By CARUTH S. MOORE.

Evening Shade, Dec. 25.—The different kinds of clays and the development of the industries dependent upon them constitute an important Arkansas resource.

When you say "clay" to the average person, he thinks first of pottery clay.

While these ceramic clays are important, and the pottery output of the state is increasing, there are others. These include shales, found among the coal-bearing rocks in the western part of the state, particularly in Sebastian county, and used in the manufacture of brick; light "blue" clays, suited to the making of drain tile and other commodities, and present in White, Monroe, Lee, Phillips, St. Francis, Poinsett, Clay, Craighead, Greene and Clark counties; "fire" clays, accompanying all lignite beds in eastern and southern Arkansas; and kaolin in white and various colors. These are found in many places in northeastern, central, and southwestern parts of the state.

Dates Back to Chinese.

The history of kaolin, used in the big pottery plants at Benton and Camden, goes back several centuries to the Chinese who are credited with the invention and development of pottery making.

The word "kaolin" is Chinese for "on top a high hill," as it is said the clay was first found in such a locality. Spell the word backwards and you have "Nilok," a famous Arkansas pottery.

The first people to utilize the state's clays for pottery were the Bluff Dwellers. They were, apparently, the forerunners of the Indians. At least they antedated the redskins. Their relics, and even their remains, for they seemed to have possessed in some degree the knowledge of preserving the bodies of their dead, have been found in large numbers in shallow caves and under sheltering cliffs in the Ozark section. Along upper White and Buffalo rivers are these relics especially abundant.

Of the articles left by these aborigines, pottery was best able to resist the ravages of time, erosion and decay. This pottery was for the most part made of a certain red clay, which had been mixed with pulverized mussel shells, and fired in crude kilns. The kilns burned wood, or possibly charcoal. This particular clay was not able to withstand a high degree of heat. The Bluff Dwellers could not obtain any great intensity of heat with the means at their disposal. The shells were pulverized in the same wooden and stone mortars in which they "ground" their corn.

The Potter's Wheel.

It is said by authorities that even these early peoples must have used some crude type of potter's wheel. It is pointed out that without some such implement the small necked, large bodied jugs, water containers and other similar pieces could not have been formed. The potter's wheel has changed very little since it was first used by man. Those in use in the big potteries are solid and some are 30 inches in diameter. They are driven by a perpendicular shaft, the motive power of which is now electricity. Old time wheels were run by foot power.

A lump or mass of clay is laid on the potter's wheel, and the whole begins to whirl. Sticking the forefingers of each hand in the center of the whirling clay, the worker brings them slowly toward the outside. The shell of the jug, vase or whatever piece is to be, leaps up from the wheel like an open pail. Making a circle with the thumb and forefinger of each hand, the potter brings it slowly together around the top of this shell, sloping it, and with a quick motion fashions the neck. If a jug, it requires a handle. So a piece of clay is rolled around in the hands, stuck on the side of the jug.

The old way, when everything was done by hand, was then to place the piece in the kiln and "burn" it. This might require several days. Until recently the burning at the Camark plant was done in two 14-foot pottery kilns, fired by natural gas. They held about 4,000 pieces, and it took eight days to

finish a burning. Now tunnel kilns are used there. These consist of muffled, gas filled tunnels, through which carriers which filled with wares move continually back and forth. Pottery is finished in 20 hours in these.

All wares formerly were turned on the wheel. Now only the pattern is modeled thus. The process today in the big plants runs something like this:

A shape serving for a pattern goes with others to the casting room. It is placed in what is known as a casting box, about twice its size. The space around it is filled with plaster of paris so soft that it is nearly liquid in consistency. This goes to the drying rack, where the moisture is taken from it. The casting box is then dismantled, leaving the pattern in a solid mass of dry plaster. A fine incision which runs two ways is made in the cast. This splits the plaster in two. The halves are taken apart, then placed back together, placed in the casting box and form a perfect matrix of the pattern.

Casting the Pottery.

The casting box is then filled with soft clay, called "slop clay." Soon the dry plaster begins to absorb the moisture from the clay and a dry shell forms next to the cast. When this is thick enough, the rest of the clay is poured out of the casting box, leaving the shell. This shell, still in the box, goes to the racks to dry, and finally comes out in the exact shape of the pattern.

It is then taken to the finishing room, where it is smoothed up, and finally, unless it be made of the many hued kaolins, to the decorating room for painting. The kaolin vase does not need paint, the colors having come out in the burning. No two of the thousands of Nilok or Camark wares, made from these clays, are alike in coloring.

The crude red clays, used by the Bluff Dwellers and Indians, were used also by pioneer settlers in this part of the state for making pottery. A small home plant was maintained near Evening Shade, and others were located in Lawrence and Randolph counties. "Cocks" for milk, churns and flower pots were the chief product turned out.

Arkansas is dotted with these various deposits of pottery clays. Why not capitalize this resource? This has been done by a family living near the Missouri-Arkansas line, and shows what may be worked out in this line.

A Growing Business.

On United States Highway 25, in Stoddard county, Missouri, is a group of log cabins. On the front and sides of these, and even on racks and trees beside the road, hang row on row of pottery.

Children of the present owners of this home pottery plant, Arthur and Randall Evans, constitute the fourth generation of the family to own and operate the pottery.

In the early 1800's Thomas Zimmerman, a descendant of a line of pottery makers in South Carolina and Georgia, emigrated from the latter state, and built the first log cabin. He and his family used the cabin for a home and for a pottery plant as well. The clay taken out of a rise of ground just behind the cabin, laboriously turned into wares on a crude wheel, burned in a home-made kiln which often caved in on its contents, and finally peddled in a slow moving ox wagon over southeast Missouri and northeast Arkansas.

The first Evans, being apprenticed to Zimmerman at the age of six, learned the trade, and, incidentally, married the old man's only child. From then on the family simply stayed on there, carrying out the potter's arts. As they were needed, more cabins, all similar in design and construction, were built to house the expanding family and additional equipment.

They still run their wheel by foot. A horse-drawn mill mixes the clay. Coal is used instead of wood to fire the kiln, as it gives a hotter, steadier heat.

Old Pottery Makers Of Hills Recalled

By ZILLAH CROSS PEEL.

Special to the Gazette. 1-16-38

Fayetteville, Jan. 15.—Clay deposits, known as pipe clay, which have not been disturbed for a half century, are located near Strickler, in the extreme part of Washington county, and near Cane Hill, in the west central part of the county.

In 1845, a young man, William S. Crawley, of middle Tennessee, came on horseback into Washington county to visit relatives who lived at Strickler. While there he noticed a clay deposit on the Virgil Guthrie farm like the pipe clay he and his father used in Tennessee for making pottery. In a few weeks he went back to Tennessee, married and brought back to Washington county his young bride, a few household goods and his potter's wheel. Soon he was making pottery, jugs, jars, clay pipes, crocks and churns, for the whole countryside.

Interrupted By War.

From 1846 until 1875, Mr. Crawley made thousands of pieces of pottery, peddling them all over northwest Arkansas. There was a short interval, during the Civil war when his kiln was not used. This was during the winter of 1862, when Gen. Sterling Price with 8,384 Confederate soldiers, was stationed at Strickler, with his headquarters at the Strickler home. The Crawley home was used as a hospital for both Union and Confederate soldiers. Mr. Crawley took his family and went into the hills.

The clay Mr. Crawley used was known as the common earthenware, free from grit and of sufficient plasticity to permit being turned by the potter. This clay made articles when burned a red or cream color, and took a good glaze. This clay deposit comes from what is called a flood plain deposit washed down from adjacent hills.

When Mr. Crawley built his log cabin, parts of which are still standing, he built it the old dog-trot style with a great hall through the center, two large rooms on either side with fireplaces at each end and an attic room. The back part had a lean-to. Just back of the home was built a large kiln, 10 feet across with outside walls over four feet, with a high round beehive shaped dome, with air vents. Under the floor was the furnace.

Son Recalls Industry.

In an interview several years ago, one of the Crawley sons said: "None of my father's children—and he had 21—ever learned the pottery art from him, although we all helped him. We would go to the clay bank for clay in the early spring, but if there happened to be a late freeze it would all have to be dumped and a new supply brought in. No pottery could be made from frozen clay. We would put the clay in a pen, dry it out with a big wheel roller, grind it to a dust then sieve it, put it through a dirt mill, then place it in a box."

"My father's fingers were very nimble and he would use both hands for molding his pieces. He had a treadle on the wheel, which he worked with his feet. When we placed the articles for burning in the kiln we were taught early that no piece could be placed over a vent hole, for that would make the pieces crooked. We would place the large vessels on the bottom then stack the smaller ones on top until they reached as high as a man's head. We would burn about 700 or 800 vessels at a time. The most important thing of all was the firing. The first fire was a slow one then on the third day, which was the last day, blasting wood was used for a hot fire. Salt was used for glazing."

Old Pottery Limited.

From 1849 until 1875, when Mr. Crawley stopped making pottery, thousands of pieces of pottery were sold in northwest Arkansas, but few pieces are known to be in the county now with the exception of six pieces owned by Mr. Crawley's daughter, Mrs. Martha Crawley Strickler, who lives with her daughter near Prairie Grove, a small piece is a grease lamp. Mr. Crawley also made many clay pipes. He received from 8 1-2 to 10 cents a gallon for his crocks, jugs and jars. One might find many of the Crawley pieces, but he had no trade mark on any, the only way to find them would be by the coloring which is different from the Wilbur pottery. Hundreds of broken pieces can be found near the old kiln, which has long since been destroyed. The old home has recently been rebuilt.

Many years before the Crawley kiln

OLD POTTERY PRODUCTS



Jugs, crocks, jars and even a grease lamp made by William S. Crawley, who came to Washington county in 1845, locating on a claim which he bought. For the 26 years he made on an average of 750 pieces of pottery annually which he sold in northwest Arkansas. He died at 93 in 1921.

At a family reunion held in 1931 with one of his children, Mrs. Martha Crawley Strickler at Prairie Grove, these pieces of Crawley pottery were on display. There were six children present whose ages were 78, 76, 74, 72, 70 and 68.

The picture of the pottery was taken by the late W. H. Field, noted artist-photographer of Fayetteville, who has been listed as one of the four best art-photographers in the United States. He received 16 bronze medals for pictures he displayed in United States as well as foreign countries.

was built, there was one located at what was called Boonsboro, near Cane Hill, on the side of a creek called the River Jordan. This kiln was started by a Mr. Caldwell, with J. D. Wilbur as assistant. Caldwell later went to Benton.

Another Potter.

Older citizens at Cane Hill recall the "little old man" Wilbur, who would sit for hours at his wheel at Wilbur Falls on the banks of the creek, watching with intent childish interest the potter "with pin-point eyes," sitting there with one foot on the pedal and a small paddle in his hand moulding his pieces while the water trickled down over the jar, jug or pitcher being shaped. Mr. Wilbur marked all of his pottery not only with the name "Wilbur," but also a star and the name "Boonsboro." There are many pieces owned by Cane Hill residents and several pieces can be found in Fayetteville homes. They are most artistic and beautifully shaped. Most of the Wilbur pottery is a dark dull brown. He made not only crocks, jugs, jars and churns, but also quaint and artistic vases, milk pitchers and lamps. When one walks around the place marked only by a lone tree where the old kiln was located he can find pieces of broken pottery as well as small clay bricks which were placed between the vessels to be burned, for Wilbur would allow no piece while in the kiln to touch another.

During the early days of pottery making in Washington county, the making of whiskey jugs was a big trade.

About 50 feet from where the Wilbur kiln was located is a large cave where it is said Wilbur stored much of his pottery, waiting for it to be sold.

Democrat 1-16-38

Texas, Mississippi and Other States Seeking Markets Throughout South

By WILLIAM JOHNSON.

What would you name, offhand, as the most useful thing in the world to man? Suppose, to avoid argument, that we compromise on a material that Arkansas has in enormous volume. It is clay. Man, himself, was fashioned from clay, you know—which makes him, in one gay wight's opinion, "an earthen jug holding heavenly spirits." So, fittingly enough, it was with clay, molded into cooking utensils, that man took his first toddling steps in civilization. Clay has continued to serve him richly ever since. It plastered the pioneer's cabin, held the stones of his fireplace together. It lines the furnaces for melting iron into countless needs and luxuries. In bricks, it is reared into temples, and in pipes, it drains vast, rich, farmlands, transports water to our cities, carries sewage away from them. Man has come far in working wonders, but he still depends heavily on clay, the material that gave him his first creative triumph.

To all of the old uses of clay, inventive genius is constantly adding new ones. Clay gives us not only bricks, water and drain pipes, tile, table ware and crockery, but electric insulators, crucibles, bathroom fixtures, retorts, bric-a-brac for ornamenting the home, marbles for Junior's play-time and the head of Sister's doll. It enters into the production of endless factory goods, like paper, toilet powder, paint, pencils, dictaphone records and shoe polish.

Clay is even used as a "mud pack" to enhance milady's charms — and can't you hear some skeptic saying, "Yeah, and if mud's so all-fired beautifying, how come the turtle that lives in it ain't handsomer?"

The clay products manufactured in this country now total a value estimated at somewhere around a billion dollars a year. That's money, big money, even in these days when huge sums are mentioned as casually as people used to speak about the turnip crop.

So as an Arkansan who is proud of his, or her, state, you should get a thrill from the map that accompanies this story. Drawn in the office of Dr. George C. Branner, state geologist, the map reveals our possession of an area of clay which spells out vast potential riches.

Here is clay in gigantic beds running as deep as 10,000 feet; clay in an enormous range of kinds and colors; clay for the plainest bricks or the niftiest terra cotta; clay for the humblest stone ware or the daintiest tea service; clay for the mightiest sewer conduit or the smallest pipe stem; clay—oh, well, you get the idea.

Our Industrial Chance.

What it all comes to in simple terms of human interest is that we have in our far-reaching clay beds, a swell chance to build industries, and create pay rolls and wealth.

Clay, when manufactured, calls for a lot of labor, and takes on a tremendous increase of value. Illustrating that point, Dr. Branner cited the production of six Arkansas

plants making bricks, tile, stone ware and art pottery. In normal times, he said, the plants use something like \$15,000 worth of raw clay in a year, for a production worth probably \$1,500,000.

Thus, manufacturing multiplies the value of the raw clay about 100 times, the geologist commented.

Arkansas was centering along at a pleasant gait in clay manufactures when the depression crashed into our midst. The value of our clay products had mounted from a few hundred thousand dollars a year in the early 1900's to well over a million dollars at the time the depression cracked down.

Then, construction work stopped, and most of our clay products — largely bricks and tile—are for that purpose. So the pay rolls in this Arkansas industry shriveled up, and the value of the output slumped back to the small figures of 25 years earlier.

But a revival began in 1933. Last year, the value of our clay goods climbed up to near a million dollars. And though the recession has somewhat dampened enthusiasm in the state's clay-manufacturing industry, it is also feeling the thrill of hope inspired in the entire national range of this line of production by the efforts of the Roosevelt administration to get building and business going at a faster clip.

Observe, though, on the accompanying map how vast are the state's resources in clay compared with our small manufactures of it.

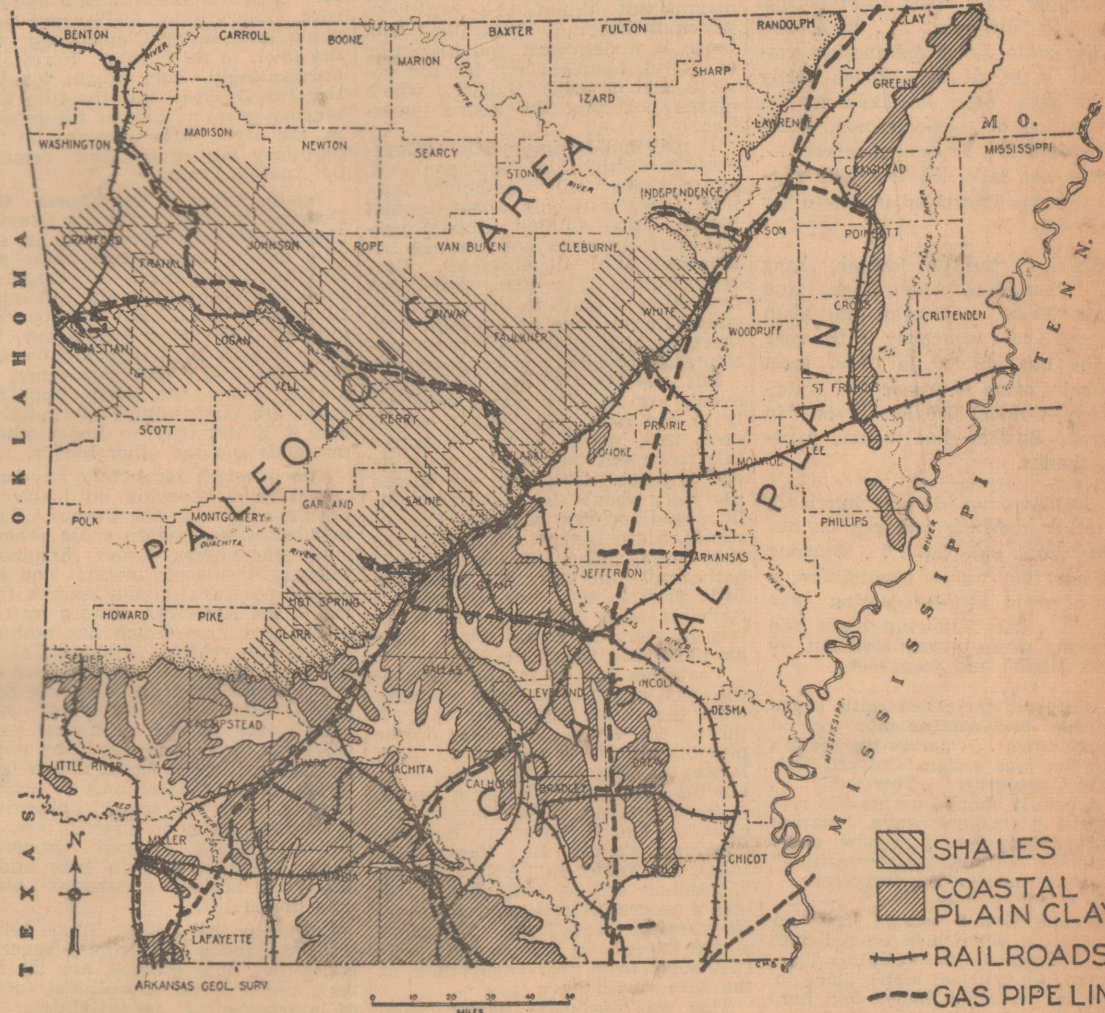
We have brick plants at Fort Smith, Malvern, Hope, Texarkana, Jonesboro, Perla, and a few others that haven't been operating much in recent years; tile plants at Texarkana and Malvern; and pottery plants at Benton and Camden.

In many kinds of clay manufacture, the state has no plants at all.

This situation is a challenge to the old Arkansas spirit. Here we are, living amid a measureless abundance of raw material, having the necessary gas and coal for clay industries, all linked up with transportation facilities, and with an ample

Clay Offers State One of Richest Industrial Opportunities

Manufacture of Products Slowed Down by Competition and High Freight Rates Along With Depression, but Vast Deposits in Arkansas Still Seen as Tremendous Asset.



This map, prepared by the Arkansas Geological Survey, shows the vast clay deposits which the state possesses, and how conveniently to transportation facilities and to gas supplies for fuel, large areas of the clay are located. The shales are clay of a different type from the usual sorts, harder and less plastic, but suited to the manufacture of many clay products.

supply of willing and capable labor at hand. Yet our share in the country's huge, growing clay-products industry is only a wee fraction of the enormous sum it annually pays.

In the boom year of 1929, for instance, the state's clay products amounted to less than one per cent of the national total, compared with 22 per cent for Ohio, Dr. Branner cited.

Touching on the state's opportunities for clay manufactures, the geologist added:

"In western Arkansas, railroad transportation, gas and clay deposits are all to be found together between Little Rock and Clarksville and between Alma and Fort Smith along the Missouri Pacific; in the vicinity of Mansfield along the Rock Island and Frisco; from Fayetteville to Rogers along the Frisco; between Malvern and Hot Springs along the Rock Island; and from Bradford, White county, to Walnut Ridge, along the Missouri Pacific, and on the same line from Biggers to Datto.

"In the Southern, or Coastal Plains area, railroad transportation,

gas and clay deposits are found together between Little Rock and Hope on the Missouri Pacific; between Sheridan and Pine Bluff and between Camden and El Dorado, on the same road; between Lewisville and Magnolia on the Cotton Belt; between Texarkana and the Arkansas line of the Kansas City Southern; between Hope and Stamps on the Louisiana and Arkansas; and between Little Rock and Haskell on

the Rock Island.

"In addition to these, there are immense deposits of lowland clay not supplied by nearby gas mains on the Cotton Belt between Pine Bluff and Texarkana; along the Rock Island between Haskell and El Dorado, and between Malvern and Camden, and in eastern Arkansas at points where railroads cross or run parallel to Crowley's Ridge."

Why isn't Arkansas making more of such opportunities?

There are reasons, of course. For one thing, the clay manufacturing industry is highly competitive, and the state has been at a disadvantage in freight rates, and still is handicapped in that respect.

Freight Problem.

However, the clay industries we have in operation show that the freight problem can be solved. These industries ship a good deal of their production to points outside the state, and they were growing until the depression came along and did to all business what a wallop across the back of the neck will do to a puglist. Now, they're up and shoving forward again.

When you dig into the situation, you find a stronger reason than freight rates for the small development of our clay industries. It's the lack of exact information on the qualities of our clays, and how much we've got of some especially valuable kinds, and where it all is.

As Dr. Branner explained the matter, a clay manufacturer who is seek-

ing a location, isn't satisfied with just clay. He must have a specific type of clay. He wants to know all about the texture and color it will show when fired, how much it will shrink, and other such things. He will have to mix other materials with the clay, and he must have the facts on these ingredients.

One of the more valuable clays is bentonite. This is a yellowish-green clay that looks something like Dutch cheese. It has more uses than a talented farmer of the old school could think up for hay wire.

Bentonite enters into manufactured goods ranging from face creams to heavy lubricating grease, and from soap to glue for pasting labels on metal. One recent value found in it is for absorbing odors in refrigerators before they can be taken up by the milk, butter or ice cubes.

Several deposits of bentonite have been found about 15 miles south of Little Rock. They've interested a number of people who were seeking this material, but, after looking the deposits over, the investigators said the deposits were too small for their purposes.

Bentonite Deposits.

Dr. Branner believes, however, that the state has more bentonite yet to be discovered—perhaps large beds of it. He thinks prospects for finding it are good along a line south from the Lake Forest Club below Little Rock, to Dalark, in Dallas county.

An exploration made by boring holes and coring out the earth would be required to locate any deposits

of bentonite hidden in the promising area.

Dr. Branner's department hasn't had money enough to permit adding a thorough study of our clays to its other activities. Limited funds have been spent where it seemed they would pay the best immediate returns.

But, realizing the importance of the state's clay to our industrial development, the geologist attempted some little time back to get a study of this useful material financed by private sources, his department to do the scientific work. This plan was on the point of going over when for some reason it fell through.

A complete exploration, including the necessary burning tests, would cost \$10,000 to \$14,000, Dr. Branner estimates. It ought to pay dividends of many times that sum. Maybe business organizations of the state could figure out a way to get the job done. Down in Texas, the San Antonio Chamber of Commerce dug up the wherewith for such a study.

We've got to act if we're going to have the clay industries our resources entitle us to. First thing we know, Arkansas will be ringed around with clay-manufacturing plants in neighboring states, which will be flooding their products into the state and into all of its possible markets. That's the handwriting on the economic wall.

Everywhere, people are waking up to the possibilities in clay manufactures—and it's a far-flung material.

Mississippi Studies Clays. Mississippi, for instance, which is going after industries hammer and tongs, has launched a thoroughgoing study of its clays, with a view to encouraging their manufacture.

The study, financed by the state, is going forward under the co-operative efforts of the Mississippi Geological Survey and the geology and chemistry departments of the state university. Clays from every section of Mississippi are being analyzed and tested, in a laboratory and work-room arranged in the basement of one of the university buildings, an expert potter is trying out Mississippi clays in all sorts of wares.

Dr. William C. Morse, head of the Mississippi Geological Survey, says the purpose of the study is not only to locate the state's clays and determine how they can best be used, but to lend every possible aid to clay-manufacturing industries of Mississippi in solving their problems and helping them create new clay products.

If Mississippi can carry out a program like that, why can't Arkansas? What has Mississippi got in wealth, resources or human ability, that Arkansas hasn't got?

In Texas, too, clay as a promising basis for industries is getting livelier attention. Here's some advice handed to Texans by the Texas Weekly, which Arkansas folks might ponder with no harm:

"One of the most important lessons brought home to Texas is the fact that a plenitude of natural resources alone, no matter how valuable, does not result automatically in marked industrial expansion. . . . Industrial expansion in Texas depends to a very great extent on what Texans themselves do about the opportunities staring them in the face. . . . In other words, unless Texans demonstrate that they possess enough initiative to take advantage of the opportunities for 'home-made' industries, they need not expect an abundance of outside capital to be rushed this way."

"For too many years we had the idea that our immense natural resources were enough to attract sufficient outside capital and brains to issue sound industrialization. That idea turned out to be a delusion."

"Some of the state's greatest industrial potentialities remain unrealized simply because we have said, in effect: 'Here is the opportunity—and then waited for someone else to do something with the opportunity . . ."

"Of all the many opportunities for industrial development in Texas, few, if any, are more promising than that offered to the clay manufacturer, the maker of all kinds of pottery, vitreous plumbing fixtures, table chinaware and the like . . . Big Market Awaits."

"There is a large and growing market in the Southwest for these products. There is an opportunity to sell Texas-made ceramic products at prices substantially below those Southwesterners must pay for such products when they are shipped in from other sections of the country."

The article then points out that Texas has a large and growing "natural" market for clay products within its own borders, and in Oklahoma, Louisiana and Arkansas.

Why should Arkansas be a "natural" market for outside clay products? We ought to make a wide variety of our own—and help to supply the regions of the Southwest, and elsewhere, which are less richly endowed than Arkansas is in the essentials for this type of manufacturing.

tant factors in manufacturing products of high quality . . .

"Texas has not yet really begun to take full advantage of its clay products . . . Texas is too big to wait always for help from outside; it can do a great deal from within. Indeed it must do a great deal even though actual capital does come from without the borders of the state."

"Texas has the raw material, the market, the transportation facilities, the fuel and labor needed for a ceramic industry. Valuable as these are, they are not enough. To them must be added the kind of 'git up and git' that Texans are traditionally supposed to have."

Arkansas, too, has all of those resources. It's up to us to decide whether we put them to work, or let our share of the clay-manufacturing opportunity go to Texas, Mississippi, and other states.

Valuable clay deposits in the El Dorado region are capable of profitable industrial exploitation. To some extent, progress has been made along this line. Brick manufacturing is one of El Dorado's industries.

Great Advance Seen in Brick Making Art

Gazette 3-20-38

Cheaper and better brick and tile, more attractive textures and colors and a better knowledge of the art of using them have resulted in considerable increase recently in the use of "burned clay." B. F. Chamblin, sales manager of the Malvern Brick and Tile Company, said yesterday.

Historically, he argued, brick was developed slowly until the kiln, making possible harder, more impervious and more durable brick was devised.

"Further advances produced new surfaces and new finishes on brick and tile, including many decorative textures and new colors and enduring glazes unknown to the ancients," he said.

"Today the methods and means of science have brought to the making of these burned clay products a precision and control which, even a short time ago, would have seemed unimaginable."

NEW TILE PLANT
Gazette 8-12-38
Mountain View, June 10.—John R. Brewer and Lee Hopper have opened a concrete tile plant here. They are manufacturing tile for road and other drainage purposes. Their product is sold locally to a general trade and to the county for road purposes.

Malvern Brick & Tile Company Changes Hands.

Gazette 7-11-38

Special to the Gazette.
Malvern, July 10.—The Malvern Brick and Tile Company has been bought by E. B. Cook and George B. Cox of Malvern. The company, with a capital stock of \$100,000, was organized in 1925 by A. B. Cook, G. A. Callahan of Hot Springs and C. A. Bryan. Mr. Cook was president and general manager until his death in 1934. New officers of the company are: E. B. Cook, president and treasurer, and George B. Cox, vice president, secretary and general manager. The directors are E. B. Cook, George B. Cox, V. C. Alexander and D. C. Guillot.

Huge Deposit Of Kaolin Reported

Gazette 8-7-38

Special to the Gazette.
Hot Springs, Aug. 6.—The Arkansas Geologic Survey, a WPA project sponsored by the Arkansas state Geological Department, under direction of Dr. George C. Branner, state geologist, has discovered "millions of tons of kaolin," varying in colors from white, pink, light and dark red, in Howard county, it was reported here today.

So important was the find considered that a company has been formed the past week with a capital stock of \$25,000 to mine and manufacture the by-products of kaolin. Mr. Mhoon said the plant will be built at Nashville.

Kaolin Has Many Uses.
Mr. Mhoon said that the new deposit means much to the state. He said that aluminum is the major by-product of kaolin, and from it come three grades of aluminum, iron-free, pure aluminum and sodium aluminates.

"The latter is used extensively," Mr. Mhoon said, for water purification purposes and by textile industries. Arkansas is making an effort to obtain textile and other industries, and now the state has a new inducement to offer.

"From kaolin we also get a dust, which is the carrying base for orchard

spray and also a base for arsenic in cotton sprays. From kaolin also comes olate, used in the manufacture of lubricating oil and greases, and in the paint industry as a dryer.
I have been informed by officials of the new company that the plant to be erected at Nashville will be equipped to produce aluminum hydrates and aluminum phosphates."

Mr. Mhoon said "there appears to be no end to the quantity of kaolin." He said that the deposit had every indication of aggregating "millions of tons," and that he had heard that the state Highway Commission has placed an order for several thousand tons to be used in road construction.

Bentonite Also Discovered.
Mr. Mhoon said a deposit of Bentonite had been found in Howard county. Its quality and quantity remain to be determined.

Bentonite is used by major oil companies for filtration purposes, Mr. Mhoon said.

"It is my understanding that Colonel Barton, president of the Lion Oil Company, El Dorado, wrote Dr. Branner asking if any deposit of Bentonite had been found in the state," he continued. "It is said to be highly regarded by oil companies. They have found Bentonite in Howard county, and it appears as if it is a big deposit. Its quantity and quality will be determined within a few days."

Acme Brick Perfects New Manufacture

Gazette 9-11-38

The Refractories Division of the Acme Brick Company, 208 Louisiana street, has in the past year perfected its manufacture to an extent that its products are now equal in quality to those of Northern manufacturers, Martin Borchert, who is in charge of refractories sales in this division, said yesterday.

Mr. Borchert said that because of the high quality of its refractories products, the Acme company is now furnishing the requirements of some of the largest industrial plants in the South and Southwest. The firm's efforts are now centered mainly on this territory, but new territories are constantly being opened, and much sales progress has been accomplished.

Blended Product.
The Acme company refractories plant is located at Malvern. Flint clays from the Missouri fields are being imported for blending with Arkansas plastic clays to produce a product that is fast becoming known and used throughout this territory.

L. J. Franz, graduate ceramic engineer of Ohio University, is in charge of manufacture. Mr. Franz, before coming to the Acme company four years

ago, had a number of years' experience in refractories plants of Missouri.

The company is constantly striving to enlarge its lime and better its quality, Mr. Borchert said.

New Type Of Brick Finding Many Uses

Gazette 2-14-38

Hot Springs, Jan. 28.—Another Arkansas product will soon be doing its "bit" in advertising Arkansas. Specially made bricks, manufactured in Malvern, will soon be on their way to states as far north as Wisconsin and east as New Jersey. The bricks are used in constructing an air-cooled wall for boilers, which, engineers claim, solves the smoke problem.

The new brick was perfected over a year ago by Ray Bell, Hot Springs bricklayer. Bell has been a resident of this city since 1913. He is a World War veteran, having served with the Tenth Construction Company of the Air Service. Asked how he came to perfect his idea of a smokeless boiler, Bell said he had helped install brick walls of so many boilers, noted their heat, the waste in fuel and efficiency that he went to work one night on plans and kept at it until he got what he wanted. Briefly, he said, the success of the invention was bringing about almost perfect combustion.

A Hot Springs laundry was the first to install Bell's invention. Engineers from state institutions of Illinois and New Jersey tried to make smoke come out of the smokestack without success. Excessive heat was produced in the boiler, yet the exterior of it was cool. The Eastman hotel, to cut costs, installed Bell's invention, which now is controlled by the Bel-Ray Company, East St. Louis, Ill. Only four persons are interested in the company, which is not selling stock and at present has more contracts than it can fill quickly. Representatives of the company are in Michigan. The Detroit Board of Control is considering using the product in its schools.

The specially-designed, patented brick is made for the company by the Refractories Division of the Acme Brick Company at Malvern.

Clark County Shale For Hope Brick Plant.

Gazette 2-18-40

Arkadelphia, Feb. 17.—Nathan O'Neal, proprietor of the brick factory at Hope, has bought 60 acres near Highway 67 in Clark county, 10 miles northeast of Arkadelphia and is hauling shale from the land to his factory at Hope. There are many fine deposits of this shale in Clark county not far from Arkadelphia.

Mike Foley Spring Hill

Plies Ancient Craft

By C. WESTERMAN Democrat

Hope—Oldest of all arts, pottery flourished in Hempstead county from the day first settlers landed on the Red river shore, had existed before their time for untold centuries among the original Indians—and is carried on today with little change.

But if its methods seem primitive, it should be remembered that pottery is an art rather than an industry, and depends on a man rather than a machine.

In all lands and all times the making of pottery has been a craft handed down in the family line, or through carefully trained apprentices.

Practically every household in Hempstead county knows the name of Mike Foley of Spring Hill, who resides about 8 miles from Hope. For a generation he has made churns, jugs, cream jars, common stoneware, flower-pots and novelties, and sold them to housewives all over the country. He makes good pottery, and he should—for he is the son of a potter, born in, and apprenticed to, the art.

Pottery in His Blood.
Mike Foley, more than 75 years old, came to Hempstead county with his father in 1879. A full-blooded Irishman, he was born in Kirkcaldy, Scotland, where his father, John Fo-

ley, had served his own apprenticeship in the famous Mephins pottery works. Father and son came to the United States and settled first at Beaver Falls, Pa., thence moving to Arkansas. The elder Foley, with Mike as apprentice, came here in 1879, and rented the pottery operated by Oliver C. Hanson, between Hope and Spring Hill.

Back in those days the county had three well-known potteries—two at Spring Hill, run by Teddy O'Neal and Hal Leopard, and the third—the Hanson place—which Foley father and son took over. All but the Foley plant are gone now.

In 1917 Mike Foley moved to Spring Hill, from where he has served the county ever since—last survivor of a famous local art, last exponent of a native home-craft.

Nothing Modern Here.
You come upon his pottery plant with a strange feeling. The great brick kiln, towering over the wooden building of the pottery plant proper, is a striking mark against the sky. But the rest of the plant leaves you puzzled. Good pottery, you realize, for the second time, doesn't come out of chromium-plated machines even in this automobile age. You look in vain through the wooden building for one solitary thing that resembles a modern factory.

Yes, Mike has his pottery hauled around the country and sold in a motor truck—this product of the modern assembling line hauls pottery that bears no mark other than the print of the craftsman's own hand.

Describing how Mike Foley does it makes the process appear simple. But doing it means a life-long apprenticeship.

From several miles away they bring a choice clay to Spring Hill and soak it in a pit at the plant. When the clay is properly conditioned it is taken out of the pit and put through a grinder. It is then ready to be modeled on the potter's wheel. The modeling process is incredibly fast, and after the potter has completed fashioning the churn he takes it off the wheel and

carries it to a rack, where it stands until thoroughly dried. Several days later the churn is ready for the glazing process. It is this that gives pottery its high shine. Ordinary brick and terra cotta are examples of unglazed baked clay. But pottery for household use is doused in a solution of lead glaze. Glazing keeps pottery from scratching too easily.

Baked for Week.
It is then ready for the big kiln where the "burning in" process takes place—the last step in the making of pottery. Our freshly-glazed churn, along with hundreds of other pieces, is stacked inside the big kiln; wood is piled in after it—and a fierce fire is started and kept burning for a week. When the kiln has cooled off the completed pottery is removed, and it is ready for marketing.

The art of pottery was known to the Indians long before the coming of the white man. Baked earthenware is found in many of the burial mounds of the American tribes. But it is an unglazed pottery. Some of the mound builders painted it—but the art of glazing was not nearly so universally known as the mere baking of clay.

History of Pottery.
The greatest pottery glazers were the Chinese, pottery of the Ming dynasties being the object of collec-

tors' searches for centuries, due to the fabulous skill of old China's artists in clay.

Except for the unglazed Indian ware, the first pottery made in the United States dates from 1684, when white ware was introduced, an unglazed product. Clay pipes followed in 1690, terra cotta tile in 1740, decorated earthenware in 1760, and the first partly-glazed white ware at Philadelphia in 1770.

And so the coming of the glazed pottery art to Hempstead county with the first settlers here about 1800, was not much behind its coming to the United States itself—only 30 years before.



At the upper right he fashions a churn at the potter's wheel. Some of his products are shown at the lower left.

Testing Arkansas Clays

Valuable Native Clays Now Are Analyzed By the State Geological Survey as an Aid to the State's Industrial Growth.

Feb. 4, 1940

By Diana Sherwood.

Photographs by the State Publicity Department.

Arkansas has taken another step forward—a step which many consider the most important in several years.

Actual work was begun recently in testing thousands of samples of Arkansas minerals and clays in the new laboratory which has been for so long needed by the state Geological Survey. It is predicted that this service will prove of inestimable value to Arkansas in soliciting future commercial and industrial development.

Heretofore much of the state's clay testing has been done outside Arkansas, the clays having been sent to the College of Ceramic Engineering in the state universities of Illinois and Ohio. The clays of Arkansas, like those of Georgia, Pennsylvania, South Carolina and Missouri, are among the state's greatest assets.

This mineral of so many varieties, qualities and uses is found in abundance—perhaps millions of tons—in the south central and southwestern counties of Arkansas. The best qualities in commercial quantities are found in Pulaski, Dallas, Saline, Clark, Ouachita, Hot Spring, Nevada, Hempstead and Miller counties. The clays of the eastern part of the state are best suited to brick making, with the exception of those in Crowley's Ridge, which are of the same grade as those in the southwestern region.

With the exception of laboratories connected with privately owned ceramic plants and one conducted by the Mineral Survey at Oxford, Miss., the only clay testing laboratories in the South, besides the new Arkansas laboratory, are Georgia School of Technology, at the Universities of North Carolina and Alabama, and at the Missouri School of Mines and Metallurgy at Rolla.

Much credit for obtaining the new laboratory, which is at the site of "The Walls," former state penitentiary, on Roosevelt Road in the southwestern part of Little Rock, is due George C. Branner, state geologist, whose department, the State Geological Survey, is

sponsoring a state mineral survey as a WPA project. This has been in operation since January, 1933.

The WPA's part in the work is under the direction of E. E. Castleberry, project supervisor; R. C. Limerick, director of operations; R. E. Vandruff, project engineer, and Raymond J. Wismer, co-ordinator between the WPA and the state Geological Survey. Through the work of the mineral survey the metallic and non-metallic minerals of proved commercial value known to exist in 35 or more counties are being investigated by field workers with instructions to make a record of all deposits found. These reports will cover the thickness, quality, color, hardness and an estimated amount of each mineral catalogued. The exact location of each deposit is mapped according to section, township and range and a sample is sent to the laboratory. The counties in which the mineral survey is being made share the expense with the other sponsors.

The State Highway Department, which owns the old penitentiary plant, has co-operated with the Geological Survey in acquiring the laboratory and it gave the brick from the walls which surround the old buildings for the construction of the new laboratory. The work of recovering the brick and of building the new structure was accomplished by WPA labor. The new building is just outside the west wall; in fact, a part of the wall, left intact, has been used as the back side of the building.

The laboratory consists of two connected buildings divided into five departments in one of which analyses are made of minerals other than clays, and of samples of waters sent from all counties in which the survey is being conducted. In the ceramic building are housed the office, the storerooms for thousands of samples sent in by the field workers, the kiln, the modulus machines and slaking paraphernalia, the molds for forming the test bars and the equipment for grinding, crush-

Pottery being molded at the potter's wheel of an Arkansas plant.

ing and screening the clays. Added interest is given the kiln when it is known that its construction is of fire brick made from Arkansas clay given by an Arkansas industry, the Acme Brick Company. The furnace is of the down-draft type, fired by gas and using compressed air.

Each sample to be tested is divided into two parts, one of which is retained in its natural state, together with the information which came with it from the field worker. A number is attached to this unused portion. The other half is prepared for testing and given a duplicate number. After the bars (into which the second half have been molded) have been submitted to the required number of tests they are placed with the original material and the data of laboratory findings are placed with the field notes covering this particular specimen. Thus a complete index is made.

The process by which clays are tested is comparatively simple and is of interest even to those who have little or no knowledge of ceramics. Samples for testing are selected according to the prescribed standard, which is 100 pounds. After they have been seasoned

in the dryer to eliminate all moisture they are crushed, screened and pulverized to a consistency which will form a plastic substance when mixed with water. A temperature of 2,500 degrees F. is used in the firing and the test bars remain in the kiln for about 20 hours. At each firing tests are made on 102 bars, all from the same sample of clay. These bars are of two sizes, 72 being six inches long, and 30 being of two inches in length. The plant is capable of testing five samples daily, the work being under the direction of technically trained and experienced ceramists.

Tests are made for shrinkage, warping, color, strength, absorption, porosity, specific gravity, hardness, dehydration, screen analysis and chemical analysis. From these tests may be adequately determined the uses for which each variety of clay is best suited.

Among the clays of Arkansas are found those in demand for industrial consumption at this time, ranging in quality from the fine kaolins (china clays) to those used for making drain and sewer pipe and hollow tile. Besides fine china and porcelain, kaolin is made into hotel china, sanitary appliances, floor and wall tiles, and is used as a component of numerous manufactured articles.

Fire clays are used for lining kilns, for crucibles, for refractory vessels, for yellow ware and for fire brick.

Pottery clay is utilized in the manufacture of common pottery, jugs, churns, earthenware, flower pots and the less expensive art pottery.

The brick clays produce various types of brick for specific purposes, including the common red building brick, paving brick, pressed brick and fire brick.

Fuller's earth, in addition to being a bleaching clay for refining the fats and oils of vegetables, animal and mineral substances, also is used in the manufacture of some toilet preparations and drugs, and in making soap, and it is used as a softener for hard water. It was John Olsen, an Arkansan, who first discovered the mineral known as fuller's earth in the United States. In 1891 he recognized it at a place near Alexander, Ark. In 1894 Olsen built and operated a plant at Olsen's Switch in Saline county, seven miles from Benton. Between 1904 and 1907 Arkansas was second largest producer of fuller's earth in the United States. Later the Olsen leases were acquired by the American Fuller's Earth Refining Company.

Other uses to which clay is put in

today's manufacturing are as gloss producing agents and filler for paper, for making lineoleum and oilcloth, in kalsomine and cement and as a filler for paint. Clay enters into the manufacture of plaster and plaster products, chemicals, artificial abrasives and for retorts and condensers. Distinctly American are the "rubber clays"—those semi-soft products including sound recording and sound transmitting apparatus; rubber heels on footwear may contain as high as 40 per cent or more clay by weight.

A type of clay known as "bentonite" is used extensively in the oil fields where it is called "drilling mud." This fluid which is used to flush away the cuttings and bring them to the surface, is pumped through the inner tube. Bentonite is used in foundries as a core wash and is used at dams to stop seepage and to plug leaks. The spraying material used by agriculturalists contains bentonite; it is added to concrete mixture to increase the flow and workability. It is said that Indians

used this clay as soap. The full extent of bentonite deposits in Arkansas has not as yet been determined.

The report on Arkansas clays by the United States Bureau of Mines shows that, beginning in 1894, the value of products was \$212,000 and that it increased steadily for the next 30 years until the value amounted to approximately \$1,000,000.

In the manufacturing plants of the state the various types of clay are represented in the fine pottery of kaolin, in the brick of the different grades and uses and in the tile making industries. The Army and Navy hospital at Hot Springs National Park is one of the largest structures made of Arkansas materials.

Reports from the field indicate that a large percentage of the clays inspected by the mineral survey is easily accessible for removing from the earth and conveniently reached by railroad and highway. Water supply is ample in all localities; gas and oil for fuel are within easy range. There are several towns immediately within the clay bearing sections, any one of which might prove a logical point for a clay products plant. Larger cities are within a radius of 50 miles of the clay beds.

Arkansas's potential markets for clay products are the entire West and Southwest, as little or no clay is found in Texas and the states of the prairie regions.

As the chemical content of the water available is of vital importance and a leading factor in the choice of location for certain types of industrial plants, the water analyses made at the laboratory are from a commercial viewpoint only. Tests are made for alkalinity, iron, aluminum, calcium, magnesium, manganese, total solids, nitrate, zinc, lead and several other qualities.

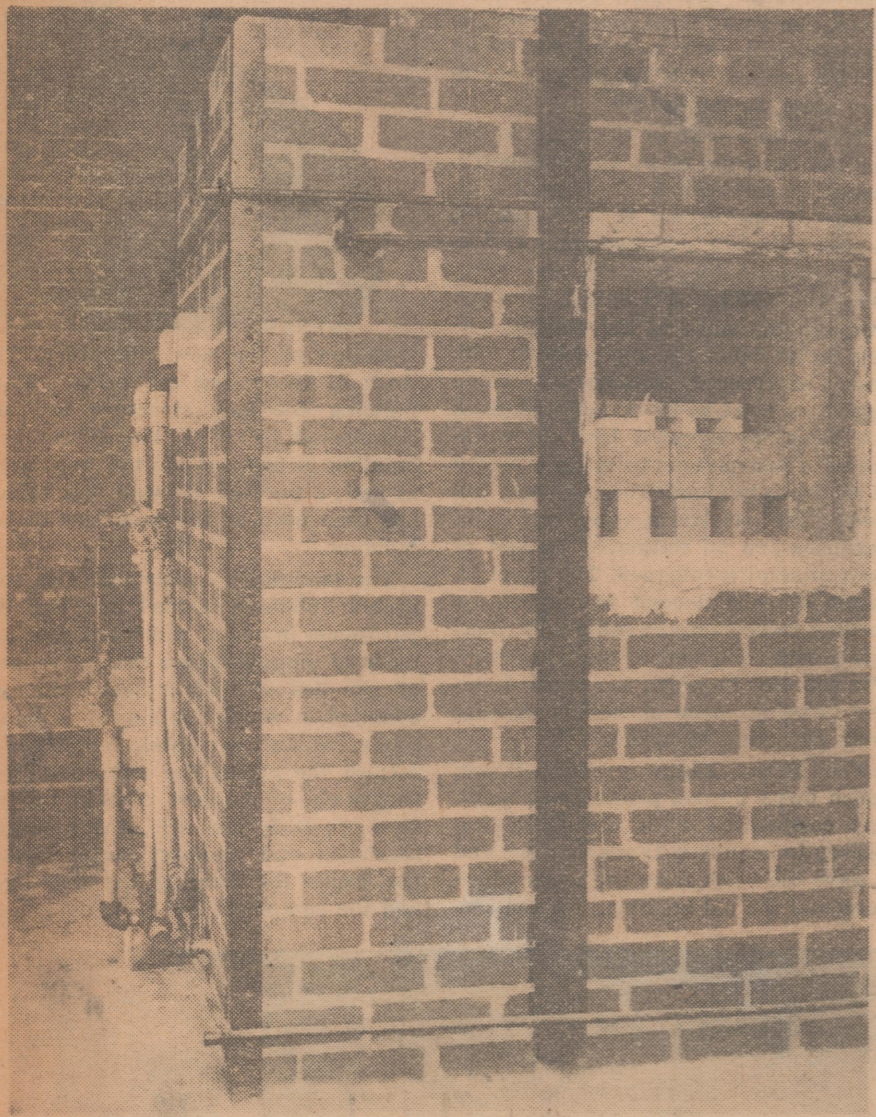
Keith Harrison and H. E. Carroll, chemists, are in charge of the water testing department of the laboratory. Mineral tests are conducted by Peter G. Cei, chief chemist, and H. B. Grace, ceramic engineer. Miss Koleta Walker and Arlington Waggoner are the mineralogists.



Boris Trifonoff, White Russian designer of pottery manufactured in Arkansas, at his work bench.



Miss Marion Griffiths, art student at Little Rock Junior College, is shown above doing a water color study of Arkansas pottery. At the left is a clay kiln in the research plant of the Arkansas State Mineral Survey, adjoining the old penitentiary "Walls." At the left below is the clay room in the research plant of the Arkansas State Mineral Survey. Arkansas clay specimens receive various types of tests here.



PRODUCTION OF MALVERN MILLS AT HIGH MARK

Barium Refinery To Open Soon.

May 5, 1940

Special to the Gazette.

Malvern, May 4.—Seventy-nine cars of lumber and 67 cars of brick were shipped from Malvern last week, a daily average of 13 cars of lumber and 11 cars of brick.

The five lumber mills, A. B. Cook Lumber Company, Sturgis Lumber Company, two mills of R. L. Payne & Son, J. H. House Lumber Company, and the three brick plants, Malvern Brick and Tile, and the Acme Brick Plant at Malvern, are all running full force to fill orders. These concerns are employing 875 men at the plants and more than 250 in the woods.

Malvern is doing more business than it had for many years. With a large supply of raw material behind it, good business will continue for a long time if the demand and the prices continue to grow.

The Sheldon handle factory here is running full time, employing 30 men at the plant and furnishing a vast amount of labor for the men who supply the hickory and ash timber.

The Van Veneering Company is employing 50 men on full time schedule, with a large force cutting and hauling gum timber.

The International Shoe Company textile mill employs 220 persons in three shifts.

Orders Piling Up At Barium Plant.

The first unit of the new \$200,000 barium refinery is nearing completion and will begin operation soon, employing about 60 men, running three shifts to catch up with orders already on hand. More ground is being prepared for the expansion of the plant as rapidly as possible. Two large buildings have been removed in the past three weeks and another will be torn down next week.

Malvern Brick Company

Expands Field GAZETTE 5-12-40

Shipment of a large consignment of face brick to Davenport, Ia., the past week marked the extension of the Malvern Brick Company's sales territory into another state, George B. McDonald, sales manager, reported yesterday.

Iowa was added to a sales field which already included Louisiana, Texas, Oklahoma, Kansas, Missouri, Mississippi, Tennessee and New Mexico.

The expanding field reflects the stamp of approval which builders have placed on the company's products, Mr. McDonald said.

"The brick and hollow building tile manufactured at the Malvern Brick Company have been accepted throughout the territory where they have been used as superior clay products for permanent construction," he asserted.

Mr. McDonald was named sales manager of the Malvern Brick Company in November, 1939. He has been connected with the company since 1928, breaking in as a shipping clerk at the company's plant at Malvern. He served three years as sales representative in Louisiana before his promotion to sales manager. His headquarters now are the company's sales offices, 218 West Second street, here.

Mr. McDonald anticipates the increased use of brick in home construction.

"I believe that if prospective home builders would investigate the cost of brick and frame construction, they would find the cost of brick veneer would not exceed by more than 10 per cent the initial cost of frame construction," he declared.

"Over a period of a few years the added cost of upkeep of the frame construction would more than pay the added cost of brick construction."

Arkansas Has White Clays For Alumina

Gazette 9-22-40

White clays from which TVA engineers have developed a new source of aluminum, one of the world's most important industrial and defense materials, are found in abundance in Arkansas, engineers acquainted with the prospective development, said yesterday. They said aluminous clays are the ordinary clays found in all sections of the state.

Koalin, a pure aluminous clay, is used to make pottery.

The new process was perfected after four years of secret experiments by TVA chemists. The TVA said the discovery may take equal rank in importance with the development of synthetic rubber.

Bauxite Is Exclusive Source.

The exclusive source of aluminum has been bauxite, the principal domestic source of which comes from Arkansas mines. Much of the ore is imported from Dutch and British Guiana.

Aluminum Company of America is the only producer in the country, although many of its basic patents have expired. The company controls extensive sources of bauxite.

The TVA announced as soon as patents are obtained on the new chemical process, the formula would be released to private industry. It is possible, they pointed out, a competitive condition may arise in the aluminum fabricating industry as a result.

Might Be Expensive.

A geologist said the process would be more expensive than the one used at present in reducing bauxite to alumina, the source of aluminum. He said the bauxite was easier to break into component parts than other aluminous clays.

The Reynolds Metal Company of Richmond, Va., is negotiating with state officials for the possible location of an aluminum and paper mill in the state. Some officials said the new process, when it is made available to the public, might assure the company of an adequate supply of raw materials.

Beauty FROM ARKANSAS CLAY



IN THE SKILLFUL HANDS OF THE POTTER, Arkansas' clay is transformed into a work of art. Here, the wet clay on the potter's wheel begins to assume graceful form.



WHEN THE POTTER IS DONE WITH THE PIECE, there is yet needed an all-over smoothing with a wet sponge. That is what the "finisher" here is doing.



A FINAL DELICATE SCRAPE AND THE POTTER'S JOB IS COMPLETED as the vase assumes its graceful form. Note its perfect symmetrical proportions in which the potter's art takes pride.

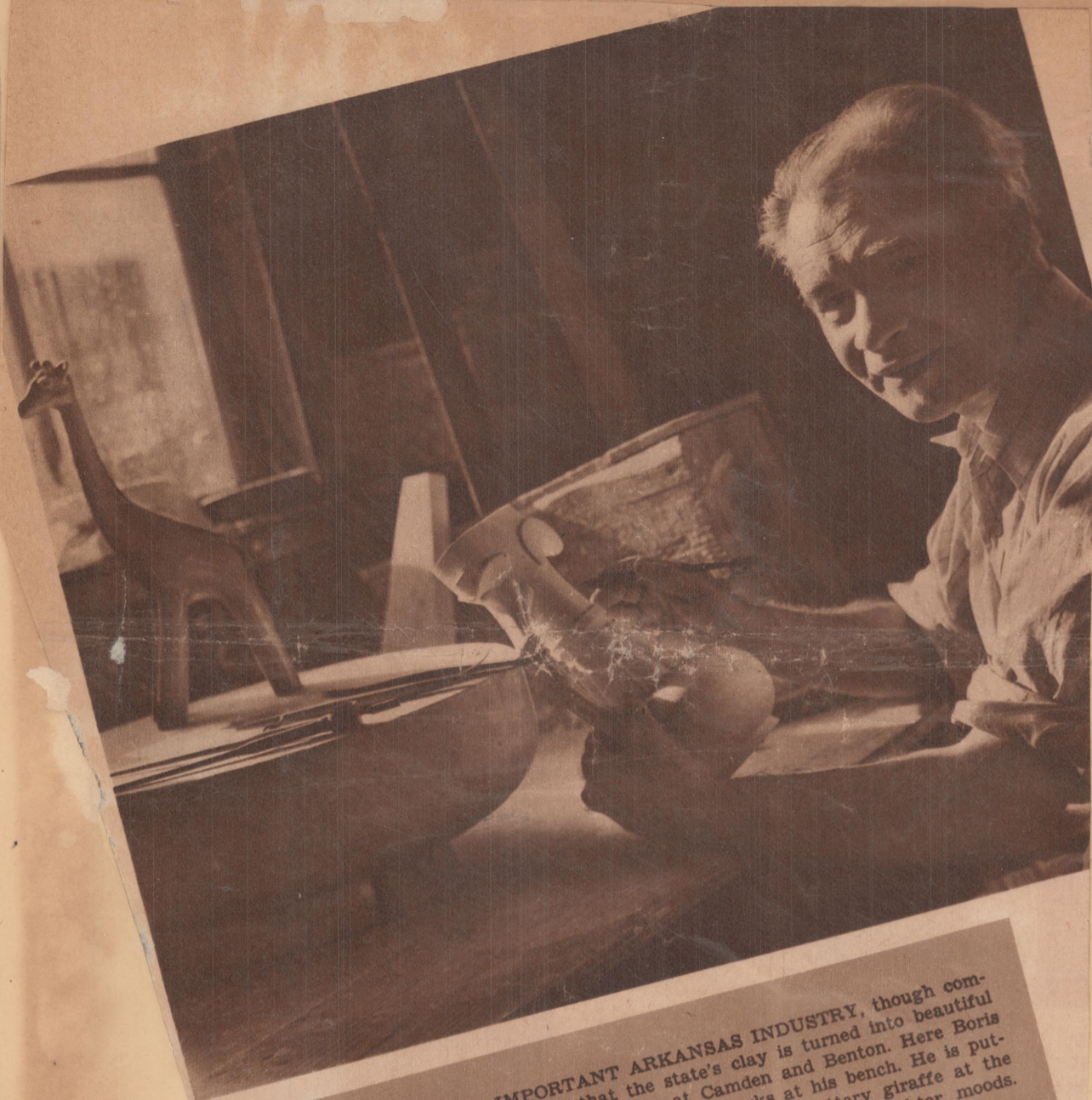


GRACEFUL BEAUTY FROM UGLY CLAY IS THE FINAL RESULT, as this closeup shows. Arkansas' pottery products are sold all over the world—at least, they were until the European war disrupted things.

Clay Deposit May Be Used For
Fire Brick.

Gazette 11-23-40
A newly discovered deposit of commercial clay in Pike and Howard counties may be used by the Acme Brick Company of Malvern for the manufacture of fire brick, State Geologist George C. Branner said yesterday. A survey of the deposit will be made by agents of the state Mineral Survey, he said.

The company imports clay from Missouri for making fire brick, using domestic clay only in the manufacture of facing and construction brick. The clay will be tested to determine if it can withstand the usage to which fire brick is subjected.



CERAMICS IS AN IMPORTANT ARKANSAS INDUSTRY, though comparatively few people know that the state's clay is turned into beautiful works of art at large pottery plants at Camden and Benton. Here Boris Trifonoff, white Russian pottery designer, works at his bench. He is putting the finishing touches on a classical urn; the pottery giraffe at the window represents the ceramics industry in one of its lighter moods. —Photos by Arthur Halliburton.



TOURISTS ARE GREAT POTTERY BUYERS, and display rooms along the highways mean sales. This one is on a highway near Little Rock



CLAY SAMPLES FROM VARIOUS SECTIONS OF THE STATE are tested by the Arkansas State Geological Survey. This picture shows the sample receiving room of the mineral survey, housed in specially built quarters at the western edge of Little Rock. Kilns and a chemical laboratory are in other parts of the building.

Arkansas Pottery

Gazette 12-8-40

Arkansas is justly famous for its pottery. Niloak and Camark wares have gained worldwide fame, because of their originality and beauty of design, but they are by no means the first to attract attention. Hundreds of years before, Indian women in our state had made pots which were the envy of visiting squaws.

When Father Marquette came down the Mississippi as far as the mouth of the Arkansas and stopped at the Quapaw village in 1673, he wrote that they cooked corn in well made jars. Another missionary, Father St. Cosme, who was at Arkansas Post in 1699, also mentioned the "large earthen pots and kettles."

Archaeologists agree with the early French travelers that Arkansas Indian pottery is unsurpassed in the Southern and Eastern United States. In some respects it is even superior to modern productions. The vessels obtained from ancient graves by Prof. S. C. Dellinger for the University of Arkansas Museum and those found by Federal Judge Harry J. Lemley of Hope, exhibit a high quality of workmanship.

All of the Indian pottery was hand-made, for the wheel was unknown in America prior to the arrival of the whites. Nevertheless, the potters manufactured symmetrical vessels, and decorated them so skilfully that modern duplication would be difficult.

In making pottery, the Indian women would first go to a neighboring clay bank and dig up chunks of it. This clay was next thoroughly dried, then pounded and winnowed in a basket to free it from all grit. The clay itself was not sufficient, however, for it would crack during the process of baking if some binder was not added. This temper varied according to locality. Along the Mississippi and Arkansas rivers powdered mussel shells were used. In south Arkansas powdered fragments of broken pots, or even volcanic ash from the Ouachita mountains sufficed. Ordinarily, about one-third of the binder was mixed with two-thirds clay and some water to form a sticky paste. After this had been well kneaded, it was rolled into strips or ropes.

The potter formed the base of her vessel by coiling the clay ropes in spiral fashion within a basket or an old bowl. When this had been completed she added other strips, placing one on top of another, just as a coil of rope is arranged. Each strip was carefully pressed to the one below it. When the pot had been shaped, the Indian added a wash of finer clay, sometimes colored red, and then smoothed it down with a fine grained pebble. Occasionally, she would accidentally leave marks of her fingers on the inside of the vessel, and when the piece had been fired they became permanent. These have been studied by archaeologists as carefully as detectives examine fingerprints of some criminal.

The pot was next put into the shade to dry. After about 24 hours the vessel was ready to be baked. The Indians had no covered kilns or oven as we do. Instead, they built a large fire, allowed it to burn down, and then placed the pots in the embers. If necessary, additional fires were built around the pots. This depended, though, on the coloring the potter wanted. If she desired a cinnamon or reddish effect she increased the heat, but if a deep brown or black was preferred she smudged the fire, generally by adding buffalo dung. After being baked for about two days the pots were removed from the fire, allowed to cool, and then were greased with bear fat. This gave them a bright finish. Some of those that have been dug up still bear a high polish, which is occasionally mistaken for a glaze. Glazes, however, were unknown in the Arkansas until the Europeans arrived.

The pottery was used in many ways. Foremost, of course, were the cooking and storage vessels, but there was also a large class of ceremonial ware. According to early French accounts, trav-

By S. D. Dic



Eighteenth century water bottle made by Caddo Indians of northwestern Arkansas and eastern Texas. It is taken from the author's collection.

lers were met by Indians who carried bowls of water with which to wash their face, hands and feet. Moreover, beautiful vessels containing food were offered to the gods. Then, both kitchenware and ritual pottery were put in the graves so the dead might be properly equipped in the world of souls. It seems that some pots, notably those made to resemble human heads, were molded especially for burial.

Pottery more than any other thing enables archaeologists to identify vanished Indian tribes who left no written records. Fashion was just as strong then as it now is. All the women in one tribe would make pottery more or less alike. Consequently, by carefully studying types of workmanship and decoration an archaeologist can identify the tribe that made a pot, though a fragment of it is found hundreds of miles from the place where it was originally made. Also, the designs may be symbolic and will give some clue to the type of religion the Indians had.

On the basis of pottery, archaeologists have divided Arkansas into several large areas occupied by separate tribes. In northeast Arkansas a heavy gray ware frequently modeled to represent animals or humans is found. It is believed that these pots were made by the Pacaha and Casqui Indians who were living in that region when the De Soto expedition arrived.

Just southward along the Arkansas, red painted vessels have been discovered in graves which also contained brass objects and glass beads which were obviously traced to the Indians by the Frenchmen in the Seventeenth and Eighteenth centuries. This pottery is probably Quapaw, for they were the only tribe living in that area after the French settled Arkansas Post.

Down in southwest Arkansas, where the Caddo Indians were living in 1600, the typical pottery is blackish brown with designs scratched on after the vessels had been baked. This must have been especially hard to decorate, for if the potter made a mistake she could not remedy it after the firing.

The baking process made the pots so durable, that though they were later broken, fragments remained. Fortunately for science, Indian women were rather clean about the house and threw the broken pots with other rubbish into a garbage heap in the back yard. Careful digging through these dumps, and separation of pot fragments at different levels show the varied fashions in

Castles may come into fashion want to do their day's work with from raiders and robbers, just as the town protected peaceable peasants bulent times of the Middle Ages

By Dr. Frank A. Ceramist and Clay Industries For Arkansas.

What need has Arkansas for a ceramist and what could he do to earn the salary for which State Geologist George C. Branner has asked the Budget Committee to approve a \$2,100 annual allowance?

A ceramist might be called a clay engineer. He is a technical specialist who examines and tests raw clays to determine their characteristics and properties and thus ascertain their commercial value and the industrial uses to which they are adapted.

Exposed clay deposits cover several thousand square miles in Arkansas, and extensive additional deposits only wait to be uncovered. Clay, processed and burned, has a multitude of industrial uses. From different Arkansas clays, according to their particular characteristics, can be made brick of various types, including firebrick; sanitary fittings, stoneware, drain and other pipe, pottery, decorative tile and many other products.

Along with its abundant and varied clay deposits, Arkansas has a plentiful supply of the cheap fuels, especially natural gas, needed for the economical production of burnt clay products. But utilization of these resources has lagged. Until recently there has been no systematic effort to find out what the Arkansas clays are good for as industrial materials. Thanks to WPA collaboration with the state Geology Department in a mineral survey, there is now in operation a clay testing and firing laboratory at the old penitentiary "walls," in charge of a trained ceramic engineer. But this scientific exploration of Arkansas's clay wealth has hardly more than begun, and the mineral survey project of which it constitutes a part will, like other WPA projects, be of temporary duration.

The return for the expenditure would come in the form of new or expanded and diversified industry, promoted by the information which the state would be in position to give manufacturers of clay products. What this return would amount to in dollars and cents, added pay rolls, greater volume of business and enlarged sources of taxation, of course could not be known in advance. It may be noted, however, that the value of Ohio's clay industry output is placed at more than \$17,600,000 a year. Nor would Arkansas be embarking on any pioneer experiment by employing a ceramist. One whole department of the Georgia School of Technology is devoted to ceramics, with a clay products laboratory playing a vital part in the program. And the University of Illinois maintains a clay testing laboratory under a ceramic engineer.

Simple Test to Determine Clay Value Explained.

Gazette 2-20-41

New York, Feb. 19 (AP).—The oil industry spends millions of dollars annually for special muds—mostly heavy clays—which it uses in wells to prevent the escape of gas. Dr. George A. Stern, Bureau of Mines chemical engineer, disclosed a simple test to show the valuable type. He described the test today before the American Institute of Mining and Metallurgical Engineers' meeting. Take a lump of clay, he said, and pour on it a solution of one part benzidine (any drugstore has it) and 200 parts water. If the clay turns a brilliant blue color, it's bentonite and worth upwards of \$40 a ton. If the clay stays its original color, it's good for slowing down automobiles on a wet road.

Geologist Reports on Sample Of Clay From 12 Counties.

Gazette 3-6-41

A progress report of 83 samples of clay from 12 counties, submitted to Dr. George C. Branner, state geologist, by J. S. Lewis Jr., state Mineral Survey ceramic engineer, shows that they are valuable for the following uses, some of which are duplications:

Face brick 56, common brick 25, common brick tile one, drain tile one, hollow tile four, roofing tile one, stoneware 11, earthenware four, whitewares seven, porcelain one, pottery 33, terra cotta eight, bond clay one, refractories seven.

The number of samples by counties:

Dallas	22
Grant	21
Saline	19
Greene	6
Pike	5
Clark	2
Sevier	2
Garland	2
Ouachita	1
Hempstead	1
Sebastian	1
Washington	1

The Mineral Survey, sponsored by the state Geological Survey, is continuing the testing program at the Geological Survey's ceramic laboratory at the west end of the old penitentiary.

New Brick Made By Bassett Firm.

Special to the Gazette. 4-27-41

Blytheville, April 27.—Much interest is being shown in the new product of the Bassett Dunbrik Company, that of a sand and cement brick with patented features.

In addition to this brick, the firm also is manufacturing roof tile designed to take the place of short-lived roofing materials.

A unique feature of the concern is that the masonry foundation for the equipment is constructed, machinery set up and materials for walls and roof of the plant are being manufactured on the plant site.

The new industry is housed at Bassett, 30 miles south of Blytheville, with the corporate offices in Blytheville.

For the Testing of the Clays Of Arkansas.

Gazette 1-6-45

Clay is an important and abundant raw material, but the industries that use it don't purchase it haphazardly. They buy types of clay which they know possess certain definite characteristics that are dependable. Each stage in ceramics processing depends on the nature of the clay, and because clays vary a great deal a ceramist needs to know beforehand exactly how his material will react. One clay may be stronger than another, shrink more or less, become hard at a different temperature and turn a different color on firing.

Ceramics is today regarded not merely as a craft but as a technology. To advance studies of Arkansas clays the Niloak Pottery Company has established a research laboratory which will be operated on a non-profit basis. Technicians will analyze clays that are sent to them, and charges will be made only for time and the materials used for the analyses. William E. Crockett, ceramic engineer from the University of Missouri, is in charge of the laboratory, and he is assisted by Mrs. E. S. Amos, who is an Ohio State University graduate in ceramics engineering. The laboratory is equipped for determining the solubility, firing and fusing temperatures, strength, shrinkage and other characteristics of clays. It is cooperating with the Arkansas Geological Survey, the United States Geological Survey and the United States Bureau of Mines.

Knowledge of chemistry, physics and geology helps to standardize ceramic manufacturing. Scientific research gives the industry more controls over processing clay and opens new fields for activity.



Eighteenth century vase of the type made by the Caddo Indians of northwestern Arkansas and eastern Texas. The vase is from the author's collection.

Arkansas Clay Goes to War

(Continued from Page 1.)

with "slip." This young girl, who says, "I like this work, it's fun," must work fast, because if either the mug or the handle become too dry the sticking process fails. The finished product is of graceful shape and light weight, and it can take a lot of hard usage.

When asked how Niloak was able to convert to war work, when most of the clay plants of the state had been closed, Mr. Winburn replied, "I should say that in our case it was flexibility; it was having an organization able to produce what is most needed from what is available * * * in being able to meet almost daily changes in raw materials, personnel and products. * * In having a broad knowledge of ceramic materials and of processes, and in highly specialized teamwork. * * * To me, it seems evidence of the value of adequate technical training and experience as the basis for industrial development and operation. All these factors have been combined with a determination to serve where training best fits; it is our idea of democracy at work in this generation of Americans."

The problem was how to accomplish the conversion with no possibility of expansion. Niloak company is technically prepared to handle any order, but is lacking in workmen and space and the necessary equipment for expanding production to meet wartime orders. An organization necessary for producing war orders on a large scale must include skilled kiln men, glazers, body men, expert clay men and those familiar with other raw materials.

Problems which at first seemed insurmountable have been solved. To be technically prepared means to have the necessary scientific knowledge and understanding of clays through ceramic technology. It was in being able to determine the properties of the different Arkansas clays, combined with the scientific knowledge of properly blending them for government requirements, that made possible this plant's war production program.

Modern warfare has learned and

profited from the warfare of ancient times. Historians of those times show that often the downfall of a great civilization came through the collapse of its civilian life. Agriculture and the numerous small civilian occupations on which depended the life of the home were blindly sacrificed.

Perhaps less exciting than military war needs, but of no less importance today, are the products for agricultural war needs. The Food for Victory program must be bolstered by the production plants behind the plows. Here Niloak is doing all possible to increase the available supply of items already in production. Supplies for dairymen, farmers, poultry raisers, fruit growers, truck gardeners, which have been made of metal are no longer available and Niloak has been instructed to rush the changes necessary to provide them in clay—the "good substitute for metal."

A partial list of these substitutes include chicken feeders and chicken fountains, milk buckets and cans, cream cans, lard buckets, butter crocks; large containers for processing and preserving meat, kraut and all vegetables as directed by the Department of Agriculture. There are supplies for the nurseryman, and for breeders of small stock, such as rabbits, now being grown for the meat as well as the fur. Dozens of items of household equipment for the farm home formerly of metal are now being turned out in attractive pottery, durable and sanitary; and not only for the home, but for schools, hospitals and institutions. The fact that these products are approved for use in land base military establishments should be guarantee of their quality for use anywhere.

A somewhat startling change made necessary by metal shortage is the use of porcelain "flasks" for shipping quicksilver. As this mineral is very heavy, it has always been the custom to ship it in steel flasks, about the size of a pint milk bottle, each holding 75 pounds. The porcelain flasks, made to hold five pounds each,



Metal-free dairy churns, poultry fountains and coolers are being produced to replace metal farm supplies in wartime.



Designer Alley, craftsman in artware during peacetime, produces chemical ware and supplies for war use.



Pieces to be fired to 2,000 degrees by gradual heating, followed by gradual cooling, are being placed in the kiln. Exact temperature control, plus skill and knowledge, make this ware uniform to conform to rigid government specifications.

are about five inches high and look like little jugs without handles. They are designed to hold the quicksilver while in transportation between the refinery and the ordnance works. The material is reinforced porcelain made from Arkansas clays, and the container is used only one time.

Niloak is distributing equally its fast diminishing supply of civilian ware to help ease some of the shortages growing daily more acute on the home front. With the 15 per cent of equipment from manufacture of home needs, which it was not possible to convert, the work of replacement in such essentials as food jars, covered pans and dishes, coffee makers, casseroles and other home necessities continues. "While we have no time to give to art pottery now," says Mr. Winburn, "it seems that war conditions have accelerated the demand for certain articles of gift pottery; the boy in service remembers Mom's birthday; his buddy is in the hospital. The demand is heavy for flower holders and flower pots to send as cheer to patients in hospitals and shut-ins at home; to carry a message of sympathy to the bereaved and to brighten the dark hours of the lonely. If these remembrances were considered necessary to stabilize morale in peacetime, how much more necessary

during the dark hours of war. * * * By using non-essential materials an effort will be made to continue manufacture of this giftware, using equipment which is not convertible for war demands."

The ability of this plant to convert to war production should encourage others engaged in industrial pursuits to get into war production effort; indications point to expanding usefulness for the remainder of the war years and in the post-war era.

To have done these things, and to hope to do the jobs of 1943 and 1944, Niloak must rely upon its young and highly trained management and a nucleus of experienced employees who study their individual jobs and who believe in the place their company is filling in war production today.

WOULD CURB CANINE APPETITES.

Jefferson City, Mo. (AP).—Have you noted the dearth of "funny legislation" among laws enacted by America's 1943 legislatures?

In Missouri, where the legislature only a couple of years ago debated a bill making it illegal for women to wear open-toed shoes, the closest thing to humor this year was a measure to make dog owners responsible for every bite their pets might take after regular eating hours.