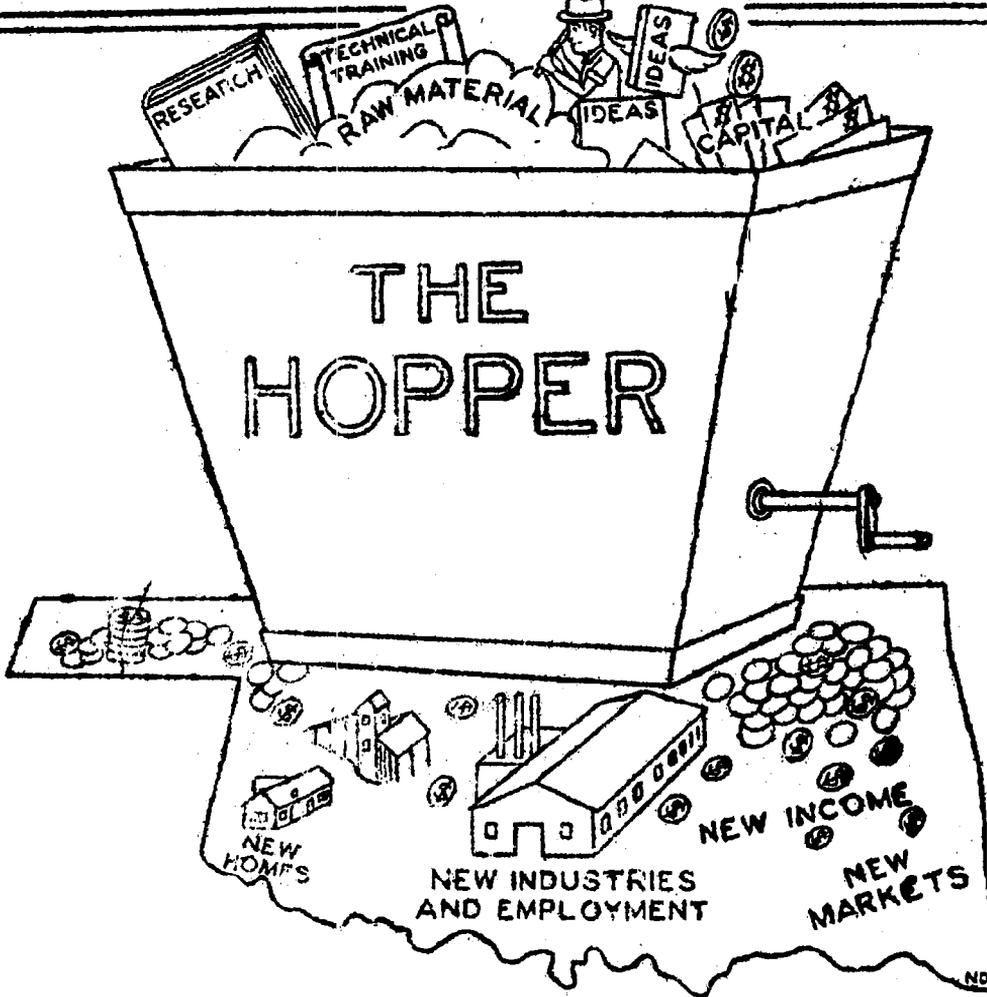


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NEW DEVELOPMENTS AND NEW USES
OF OKLAHOMA MINERALS

By

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The most important new development affecting Oklahoma minerals has nothing whatever to do with minerals, as such. It is the development of an industrial state of mind. It is manifest by official actions of the State, and by activities of private groups, notably by the Oklahoma Industrial Tour.

The development of this state of mind is important because greater industrialization will create increased demands for raw materials and fuels from Oklahoma farms, forests, wells, and mines. Minerals play an important role in Oklahoma's present manufacturing, and are destined to attain still greater importance in the future.

The number of recent announcements of construction of new, or expansion of old manufacturing establishments are encouraging. Investments in plants that will produce or process mineral raw materials bulk very large, and taken together, make an impressive total.

The number of inquiries being received in Oklahoma indicates clearly that more national manufacturers are looking in this direction, with plant expansions or re-locations on their minds. These developments are of additional importance to Oklahoma minerals because these new units will require large volumes of Oklahoma mineral fuels—principally natural gas.

Developments in Fuels

The Mineral exhibit of the Tour, asked the question: "Where else can you find such a combination of abundant, high-quality industrial minerals, and abundant, low-cost fuel?" This is a good question to keep in our sales kits as we go about the land seeking new industries.

All through the late summer and fall, trade journals and the general press carried news items reflecting serious shortages of natural gas available to glass plants and other manufacturers in eastern states. These shortages caused serious disruptions of production. Eastern industrialists are being reminded of this situation. The first of the Oklahoma Planning and Resources Board's excellent series of advertisements directed toward the glass industry made a big point of gas shortages in the east and the abundance of natural gas in Oklahoma.

Can we doubt that part of the present interest in plant locations in Oklahoma results from gas shortages in eastern industrial areas? Let's look into this a little deeper.

At the Oklahoma Mineral Industries Conference in 1945, Mr. Hugh D. Miser, then head of the Section of Mineral Fuels, United States Geological Survey, made the following statement in a speech discussing Oklahoma's fuel resources:

"I cannot foresee the time when...local supplies (of natural gas) will fail, but when that time comes, as it inevitably will, the widespread network of gathering and distribution lines throughout Oklahoma, and reaching into adjacent states of Texas, Louisiana, and Kansas, can supply gas for as long as any industry cares to look ahead..."

To back up that statement, Mr. Miser quoted estimates showing over 80 percent of the nation's

natural gas reserves in 1945 to be located in the area comprising the four states mentioned, with Oklahoma at the center. Not until everybody's gas is gone will news items like those of this summer and fall be applicable to industrial customers in Oklahoma. Also bear in mind that Oklahoma has substantial reserves of petroleum and coal.

Most mineral processing requires fuel, and success and survival of such industries depends on reliable supplies of fuel at costs no greater than in competing areas. Therefore, dependability of supply and lower costs are likely to determine in which areas plants can succeed. One of the Tour exhibits stated: "Oklahoma, where success comes SOONER." This slogan should be modified to read: "Oklahoma, where success comes sooner, and will last longer."

The press of October 30, 1947, carried the following item relative to a development in coal:

"Oklahoma coal is firing the Daingerfield, Texas, blast furnace to start what may become one of the most important industries in the southwest. George W. Anderson, Vice-President of the Lone Star Steel Company, which has leased the Daingerfield furnace, said...."the furnace turned out its first pig iron this week....(Oklahoma) coal mines....are producing at the rate of 1,400 tons of coal per day to supply the Daingerfield furnace."

Technological Developments in Minerals

The most interesting new developments are in the field of technology, for research is constantly showing new uses, or, I might say, uses for materials we've known about for many years. Some of the new uses have been worked out in the Survey's laboratories, but for most of the ideas, we can claim credit only for alertness in perceiving their application to Oklahoma.

Inertia is a strong force in manufacturing techniques and raw materials. Once a particular procedure is worked out, or a particular raw material is found satisfactory, either or both are likely to continue in use, and manufacturers develop strong sales resistance to change. Generally, failure of supply or embarrassing competition have been the only forces strong enough to overcome this inertia.

At the present time there is some modification of this attitude. The value of research is being recognized more and more, with the result that more efficient processes are being developed, and new raw materials are getting consideration. Another factor affecting raw materials is the migration of plants away from their traditional locations, and from traditional sources of supply, making it economically desirable for them to seek satisfactory materials available in the new locations.

Because Oklahoma has fuels and other factors that are attractive to many industries processing mineral materials, it behooves us to learn more and more about our mineral raw materials, and the uses to which they may be put. These two fields of activity that must be accelerated are the responsibility of the Oklahoma Geological Survey.

An example of changes through technology has to do with a mineral found in southwestern Oklahoma and believed to be there in commercial quantities. I refer to titaniferous magnetite which mineralogically is magnetic iron ore mixed with the iron-titanium mineral ilmenite. Until very recent years, titaniferous magnetite was held in low regard, and was practically worthless.

The following quotation from a report of the Division of Commerce of the State of New York, published 1943, indicates an interesting change of viewpoint brought about by the development of new

uses: "The titaniferous magnetites (of the Adirondack area) have attracted intermittent attention over a period of one century, mainly because of the immense size of the ore bodies.....Interest centered on their possible value as iron-ore resources. During the past few years the deposits have come into the limelight again, this time because of their content of titanium, compounds of which are used in much greater volume and in increasingly diverse ways." The report goes on to list some of these ways, which include white and light tinted paints and paint products which are outstanding because of their whiteness, brightness, and hiding power. Other demands are in making white and light colored rubber products, for better grades of paper; shoe cleaners, leather finishing, vitreous enamels, etc.

Several pigment producers who visited the Oklahoma Industrial Train in the northeastern United States expressed surprise and very great interest in our Oklahoma deposits, and requests for samples are coming in. The Survey has not had a chance to examine the area in detail, but we have enough data to believe that a large tonnage of titaniferous magnetite is present in the stream beds and soils, in parts of southern Kiowa and northwestern Comanche Counties.

Plant Developments in Oklahoma

The glass industry accounts for the largest recent developments in Oklahoma. The Brockway Glass Co., Inc. plant at Muskogee, established in 1945, is still recent enough to be called "new", and demands attention in this connection because it marks the beginning of an era.

Manufacture of glass products started in Oklahoma in 1905, attracted to the state by newly-discovered, abundant natural gas, and by 1913 the number of plants had increased to six. Publication of

an Oklahoma Geological Survey Bulletin on Glass Sands, in 1913, stimulated production of sand, and the number of glass plants increased to sixteen by 1919. Ten years later the number had declined to ten, and became stabilized at about that number, with nine in 1937, and ten in 1945.

This year is seeing construction of a large, new plant by Corning Glass Company, at Muskogee; large expansion of the Liberty Glass Company's plant at Sapulpa; and announcement of re-vamping and expansion of an old plant at Okmulgee, by the American Window Glass Company. Including plants in process of construction, there are now at least fourteen active glass factories in Oklahoma.

The increase in glass-making capacity calls for a large increase in glass sand production, and it is interesting to note that the Pennsylvania Glass Sand Company has recently acquired the plant of the Mill Creek Sand Company, in the Arbuckle Mountains, and is now engaged in greatly enlarging its capacity, with plans for future expansions as rapidly as necessary to take care of demands of the glass industry in this area.

Semi-processed Ideas

I have listed a few general developments in technology and new manufacturing plants established in Oklahoma. I shall now list a few developments that have come out of our work at the Geological Survey, which we believe have interesting possibilities. A few of them, we feel, are ready for commercial exploitation, though some require the intermediate pilot-plant experimental stage. Others may be called semi-processed ideas, requiring either more field information, or more laboratory experimentation before they become full-fledged, bona-fide possibilities ready for the salesmen to market.

All of you who went on the Tour, and all who read THE HOPPER know of the work with volcanic ash, which can be bloated or expanded to make light, cellular products which should be applicable for light-weight building materials of high insulating properties. One has satisfactory structural strength for use as blocks or slabs, in walls, roofs, and even floors. The other offers possibilities as accoustical tile for sound insulation. Considerable experimenting on pilot plant scale will be necessary to determine cost factors and plant design.

A report on the distribution of volcanic ash deposits, and their bloating characteristics will be sent to the printer in the near future. Volcanic ash is available in twenty-five counties, distributed from the Panhandle to Haskell County, and as far south as Garvin and Kiowa Counties. Many of these counties are abundantly supplied with natural gas, and, we believe, with capital enough to undertake the necessary pilot plant work.

Another idea ready to sell is the utilization of our oil field brine. Here's a raw material with a number of industrial possibilities that is now an expensive waste product, and a big headache of the oil producer. Starting with Oklahoma oil field brine and Oklahoma dolomite, and processing under certain conditions, you will come out with precipitated chalk (an extremely finely divided calcium carbonate), crystallized salt (sodium chloride), and magnesium chloride. Chalk is used as a filler, pigment, and extender. The salt may be electrolyzed to yield caustic soda and chlorine. The magnesium chloride may be electrolyzed to yield metallic magnesium, or treated with soda ash to yield basic magnesium carbonate which is used extensively for pipe and boiler insulation.

The mineral exhibit of the Oklahoma Industrial Tour contained some specimens of grahamite, a hard,

black substance that most people thought was hard coal. Grahamite, a dry, asphaltic material, occurs in veins in the Ouachita Mountains, in Atoka, Pushmataha, Pittsburg, and southern Le Flore Counties, southeastern Oklahoma. Some mining was done about forty years ago, and a total of about 18,000 tons was shipped, part of it to Fort Smith, Arkansas, for use in making roofing, the remainder to Germany, the use not known. A fatal mine explosion, and loss of market to competing material put grahamite back into the class of worthless materials.

The Geological Survey, and residents of the area interested in reviving mining operations, have been seeking for several years to find uses and users for grahamite, and the samples were included in the Tour exhibit in the hope that someone might see possibilities. We were not disappointed, for research workers representing a surprising number and variety of industries, requested more information and samples for their own experimentation.

For several years, inquiries have been coming into the state for information on clays. An inventory of clays and shales was made in the late 1920's, in cooperation between the Oklahoma A. and M. College and the Geological Survey. The report, published by the College, is an excellent guide to brick and tile-making materials.

Recent and current inquiries are for clays to serve special purposes such as buff-colored face brick, pottery, dishware, decorative tile, refractories, and the like. Exploration for, and testing of clays, are complicated business, because there is little correlation between the appearance of a clay or shale in the ground, and its behavior when fired. Red shales, we may even say most shales, generally produce red brick, but some others, even black shales may burn light cream to buff. Chemical analysis is only a slight guide, and the mineralogy of clay materials is so complex, and the

particle size so small, that only an expert, working with specialized equipment can make much of a prediction about them.

The Survey, at present, lacks both specialized personnel and equipment, so that the efforts we have put forth to seek materials that may answer present inquiries, of necessity have been a cut-and-try procedure. However, samples have been collected from many parts of the state, which, when subjected to routine firing tests, have produced pieces with colors and other physical characteristics which seem to offer possibilities. Many of these materials are extremely unorthodox, so far as present practices of the clay products industry are concerned. One of the most interesting is a shale from McCurtain County containing a large amount of the mica variety called sericite. Some of this material burns to a slightly off-white, and shows little warping. Quite apart from its ceramic properties, a certain variety of this material attracted interest during the Tour because of the possibility it might prove to be a low-cost material that could take the place of mica and talc, in the tire and rubber business.

We are desperately handicapped in study of clays. It is almost imperative that the Survey be provided the means to undertake a comprehensive study of these important materials.

All these industrial minerals are literally cheap as dirt. Unlike gold, silver, lead, zinc, or petroleum, they have very little raw material value, and take on value only after being dug out of the ground and manufactured into something for which there is a market. They will give the landowner a nice supplement to his normal income, and will make a satisfactory return on the investment to the man who digs them out, but will not make either of them rich.

Their full development will insure an important measure of prosperity to the state as a whole, through increase in employment, increase in business for wholesale and retail store, increase in markets for higher-value farm products, and increase in the State's revenues.

The abundance, quality, and diversity of materials and the variety of industries that can use them, make minerals stand out in bold relief in any consideration of increased industrialization in our state.

Technological developments are important for they are changing the outlook of whole industries, or at least important segments thereof. Such changes in outlook, in turn, are bringing into view of the nation's industries such mineral-rich areas as Oklahoma, whose resources either have been unknown, or totally ignored because they did not meet precisely the established specifications of traditional processes and products. Necessities born of the war have broken down industrial traditions of long standing. Industry, as never before, is on the move, both geographically and technologically.

Never before has Oklahoma had such an opportunity to sell its resources and its advantages to national manufacturers, and it behooves us to make the most of it. An excellent start has been made in such activities as those of the industrial departments of the Tulsa and Oklahoma City Chambers of Commerce and of the railroads serving the state; the Oklahoma Industrial Tour; the promotional and advertising program of the Oklahoma Planning and Resources Board; and the activities of the alert Chambers of Commerce of the smaller cities of the state. But there is still more work to do, and it is to be hoped that all these groups, and still others, can devise still other ways effectively and energetically to supplement and accelerate this campaign.