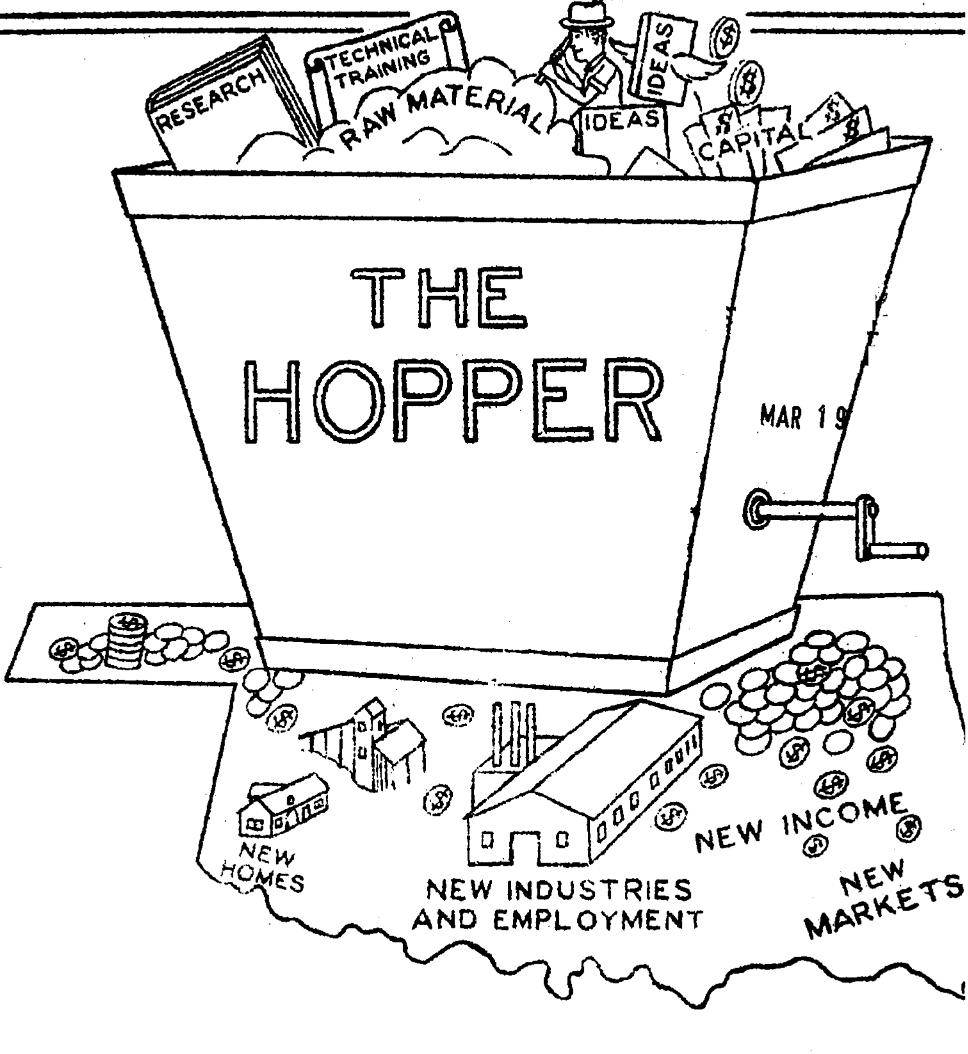
OKLAHOMA MINERAL INDUSTRIES CONFER



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INDUSTRIAL TOUR
AND
OKLAHOMA'S MINERALS

One of the significant sidelights brought back by many of those who made the Oklahoma Industrial Tour is that industrialists of the areas visited were surprised to learn of the many types of industrial minerals we have in Oklahoma. Also, after learning of all the mineral resources Oklahoma has, the eastern industrialists were more surprised to know that we are not utilizing them to a greater extent in manufacturing industries.

The train was taken to several leading industrial centers of the United States, and at each stop attracted much attention. There was a large amount of favorable publicity for Oklahoma--in contrast to the "Dust Bowl" and other types by which the state has been characterized in other sections of the country in the past. The entire exhibit was designed and arranged to show Oklahoma's position in relation to the many factors that affect industrial location. The mineral unit was only a small part of the total exhibit, but press reports indicate that the high quality industrial minerals displayed on this unit aroused the interest of representatives from many manufacturing concerns. Robert H. Dott, Director, and A. L. Burwell, Chemical-Engineer, of the Oklahoma Geological Survey made the tour and are credited with doing a good job of interesting industrialists in the opportunities, based on minerals and fuels, in Oklahoma.

Before the train returned to Oklahoma on July 12, inquiries from industrial firms had started coming into the offices of the Oklahoma Geological Survey. These inquiries are evidence that the Tour achieved the purposes for which it was intended; to let industrially minded people learn that Oklahoma has the basic raw material and fuel resources for many types of industries, and to interest them in the opportunities that Oklahoma has to offer.

The inquiries directed to the Oklahoma Geological Survey are from concerns interested in minerals for raw materials, but reports from other sources indicate that industries using other types of raw materials also have become interested.

After returning to Oklahoma July 12, the exhibit was taken to Tulsa for retouching and then started on a tour of the state. First showing was in Tulsa July 17. Attendance at the showings in various state towns has been beyond all expectation. Literally thousands of people went through the four-car display at each of the stops up to the present time. At most towns visited the exhibit has been open for 12 hours, and in some of these towns there was a continuous flow of people through the cars during most of that time.

The purpose of the state tour, sponsored by the Oklahoma Planning and Resources Board in cooperation with Chambers of Commerce of the cities visited, was to acquaint Oklahomans with something of the potentialities of the state in which they live. From comments and personal observations of the interest shown by most of those visiting the exhibits, it seems safe to say that thousands of Oklahomans will have a better appreciation of Oklahoma and its opportunities, and a better understanding of the state's sources of raw materials from which new wealth can be created by manufacturing.

Because minerals have been the chief contributor of general revenue for the operation of the state government ($9,000,000 from gross production tax alone is the estimate for the fiscal year 1947-48), the importance of minerals to the economy of Oklahoma is obvious. Mineral production has had a higher value than agricultural production in Oklahoma for most years since World War I; but both mining and agriculture have been far ahead of manufacturing in the state in contrast to the average national economy in which value added by manufacturing during normal years is about twice the value of mineral and agricultural production. Also, agricultural production has had about twice the value of mineral production in the nation as a whole.

The present emphasis on industrial expansion for Oklahoma in order to bring the economy of the state more nearly into balance is placing an increasing importance on the industrial minerals of the state. It was these industrial minerals that provide the raw materials for manufacturing industries that attracted so much attention on the Tour. These industrial minerals, combined with a diversified agricultural production, and an abundance of the three types of mineral fuels, give Oklahoma the raw material resources for a diversified manufacturing industry. In the past, Oklahoma's mineral production has consisted for the most part of those minerals which could be produced and sold readily without processing, such as oil, gas, coal, lead, and zinc.

At the present time, Oklahoma is giving promise of becoming a more important glass manufacturing center. New plants have been built, a large plant is under construction, there has been expansion of some of the older plants in the state, and it is reported that announcement of another large plant to be erected in Oklahoma may be made soon. In container glassware Oklahoma already is a leading producer.

Other types of industries could be based upon raw materials available within the state, and with the growing industrial-mindedness of Oklahoma, the need for increasing the rate of geological and laboratory investigations on industrial minerals is becoming more imperative.

MINERALS OF OKLAHOMA MAKE IMPRESSIVE LIST

Many Oklahomans who have visited the Industrial Exhibit train during its tour of the State have been impressed and somewhat surprised to learn that Oklahoma has so much in the way of resources for industrial development. A little "listening in" on the comments of several groups as they leave the exhibit is enough to convince anyone that the state tour has been of educational value to the people of Oklahoma. All phases of the exhibit have come in for attention and comments, including the minerals unit. "I was surprised to see we have so many minerals in Oklahoma", or "I had no idea we have so many minerals in this state" are common remarks one may overhear among groups who have visited the train.

As an example of the variety of mineral materials found in Oklahoma, the following list is taken from a compilation of annual mineral production figures. All the natural and processed mineral materials listed have not been produced in Oklahoma every year, but have been produced in Oklahoma at some time. The list is essentially from annual statistical reports of the U. S. Geological Survey, 1882 to 1931; and from Minerals Yearbooks of the U. S. Bureau of Mines, 1932 to date.

Mineral Materials That Have Been Produced in Oklahoma

Processed materials shown thus (*)

Asphalt, including both sand and limestone rock asphalt, and some liquid asphalt from wells.

Asphaltite, mostly grahamite, but also some impsonite which is a variety of asphaltic pyrobitumen. Much of the impsonite was mined as a source of vanadium contained in the ash.

Bentonitic clay
Cadmium, obtained from zinc smelting.
*Carbon black, from natural gas.
*Carbon dioxide, as a byproduct from a cement plant.
*Cement
Chats, rock waste from milling zinc-lead ore.
Clay
Coal
*Coal tar
*Coke
Copper
Crushed stone
Glass sand
Granite
Gypsum
Indium
Iron ore
Lead
Lime
Limestone
Manganese
Marble
Mineral waters
Natural gas
Natural (casinghead) gasoline
Liquefied petroleum gases
Ochre
Petroleum
Pyrite
Salt
Sand and gravel
Sandstone
Silver
*Sulfuric acid
Tripoli
Volcanic ash
Zinc
Zircon (No production figures given, but a 1911 list of mineral producers lists one operator in the Wichita Mountains)
*Several other chemical products

Additional industrial minerals known to occur in Oklahoma, but which have not been given in past statistical reports, include:

Dolomite
Anorthosite (recently became important as a source of aluminum and portland cement)
Alabaster
Graphitic shales
Woolrock (now being mined and used in Oklahoma)
Caliche (has been used to some extent for road surfacing in northwestern counties)
Novaculite (including beds of porous novaculite)
Tuff (rock formed from volcanic ash)
Vein quartz

Technological changes and future exploration and research by the Oklahoma Geological Survey will lengthen both lists in the years ahead.

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OKLAHOMA LEADS IN GLASS CONTAINERS

The attainment of one Oklahoma industry--the glass industry--in making certain types of products is an example of what could be done by other industries by utilizing industrial mineral raw materials in combination with abundant low-cost fuel. In glass manufacturing, Oklahoma has more plants making pressed ware, fruit jars and jelly glasses (packers' ware and home-pack) than any other state, according to the 1939 Census of Manufactures: the last normal year for which detail statistics are available.

Other types of glass products are made in the Oklahoma glass plants, including other classes of container ware. In the classification listed above, Oklahoma produces over 22 percent of the national output in both quantity and value. Five of the 21 plants producing this type of ware are in Oklahoma.

GROUND-WATER STORAGE INCREASES IN TILLMAN COUNTY, OKLAHOMA

By
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More water was stored underground in terrace deposits in western Tillman County, near Tipton, at the end of May than at any time since records of water levels in wells were begun on August 1, 1940.

This statement is based on records of water level in the irrigation well at the Southwestern Cotton Substation, which are maintained in Norman as part of the cooperative ground-water projects of the Oklahoma Geological Survey and the Ground Water Division of the United States Geological Survey.

The water-level measurements are made about once a week by C. L. Fox through the courtesy of I. M. Parrott, superintendent of the Substation, and are mailed to the Survey at the end of the month. The fluctuations of water level are considered to be representative of the changes in ground-water storage in the terrace deposits that underlie about 180 square miles in western Tillman County, T. 1 N., Rs. 18 and 19 W., and Ts. 1-4 S., Rs. 18 and 19 W. They reflect the balance between recharge caused by precipitation and discharge by springs, streams, evaporation, plant use (transpiration) and pumping.

The changes occur slowly, and the rise in water level lags appreciably behind the rain that causes it. This lag may be partly due to the interval between water-level measurements, but it seems more likely to be due to a layer of relatively impervious caliche between the land surface and the water table, the presence of which was discovered when holes were sunk in conjunction with a pumping test of the well in November 1944. Hence recharge is doubtless uneven over the area, depending on the extent of the caliche.

Prior to November 1944 the water-level measurements were made infrequently. In 1945 the water level rose about 0.5 foot from the beginning of the year until the middle of May, despite the fact that precipitation was slight. During this period temperatures were low and plant life was dormant, and therefore evaporation and transpiration took only light toll from the precipitation, leaving a significant fraction of it to seep down to the water table. During late May and early June 1945, however, evaporation and transpiration increased whereas precipitation was negligible, and the water table declined. Heavy rains in late June, continuing through July and August, caused a rise in water level of more than a foot, followed by a decline of nearly 0.5 foot in the first half of September when there was no precipitation of consequence. Rains in the latter part of September brought the water level above the August high stage and it remained high until the end of the year, although very little rain fell in the last 3 months.

In 1946, normal or near-normal precipitation through March sufficed to maintain a high water level during the first quarter. In the latter part of March the well was pumped 97.25 hours at an estimated rate of 180 gallons per minute, to produce about 1,050,000 gallons of water for irrigation. This withdrawal caused an immediate decline in the water level during pumping, but at the end of the month the static water level was less than 0.5 foot lower than when pumping was started. During the first week in April the well was again pumped to yield about 583,000 gallons, the water level declining during pumping but rising afterward to within 0.25 foot of the starting level.

Lack of rain prior to April 22, 1946, caused a slight natural decline of water level in the latter part of the month, continuing until rains late in May resulted in rise to a low peak recorded on June 3. Low precipitation in June brought a decline of more than 0.5 foot for the month, which was accelerated by dry weather in July until on July 22 the water level was almost 3 feet lower than at the beginning of 1946. The well was pumped during the periods July 24--August 1 and August 14--18, sometimes as much as 24 hours per day, a total of 3,272,000 gallons of water being withdrawn. Rains near the end of August initiated an upward trend that was sustained by nearly normal precipitation through the last 4 months of the year. With diminishing evaporation and transpiration during these months, recharge was appreciable but at the end of 1946 the water level was about 1.75 feet lower than at the beginning.

Precipitation was slight during the first quarter of 1947, but as the ground-water losses were also small the water level remained fairly constant until heavy rains in April caused a rise of nearly a foot, followed by a slight decline lasting through the first week of May. Then very heavy rains brought about a sharp rise of water level to the highest recorded stage, on May 26. The total rise during April and May exceeded 4 feet, but considering the amount of rain in these 2 months, 14.65 inches, it is not phenomenal.

Study of the past water-level records indicates that irrigation as practiced to date at the Southwestern Cotton Substation is not exceeding the safe yield of the ground-water reservoir. Although the trend of the water level both before and after the periods of pumping in 1946 was downward, the decline does not appear to have been accelerated by the withdrawals, which totaled about 4,905,000 gallons. Instead, the decline after pumping is a continuation of the trend that set in before pumping was begun, indicating that natural losses due to evaporation, use by plants, and discharge from springs and into streams had more effect on ground-water storage than use for irrigation.

The pumping test by geological survey personnel in November 1944 showed the terrace deposits at the Southwestern Cotton Substation to be one of the most permeable water-bearing formations in Oklahoma. The test was conducted by pumping the irrigation well continuously for 24 hours while repeated water-level measurements were made in six augur holes sunk especially for the purpose. These holes were approximately in a straight line, three on each side of the irrigation well, spaced at distances of 10, 20, and 40 feet. Several measurements of the discharge of the well were made during the test, the average for the 24 hours being 188 gallons per minute. Computations based on the test showed the transmissibility of the water-bearing bed to be about 40,000 gallons per day per foot, which is about 10 times the transmissibility of the Garber-Wellington sandstones tapped by wells at Norman and Oklahoma City and considered a good source of water.

The experiments at the Substation indicate that irrigation with ground water from the terrace deposit could be developed further, but in each case test drilling will be necessary.

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In the June issue of The Hopper on page 54 it was stated that sea-water bittern is the raw material from which magnesium compounds are produced by a California manufacturer whose advertisement we quoted. This was a misstatement of fact. This advertiser produces magnesium compounds directly from sea water. We are sorry for the misstatement and glad to correct it. Another concern in the San Francisco area, however, does produce commercial magnesium compounds from the residual bittern resulting from solar evaporation of sea water for the production of crystallized salt.