

THE STORY OF OIL

AT A CENTURY OF PROGRESS ..





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PRESENTED BY THE AMERICAN PETROLEUM INDUSTRY

UNDER THE AUSPICES OF THE

AMERICAN PETROLEUM INSTITUTE

FOREWORD

Under date of December 1st, 1931, the Board of Directors of the American Petroleum Institute approved the participation of the oil industry in A Century of Progress Exposition, Chicago, with a further provision that this exhibit be transferred to the Museum of Science and Industry on November 1st, 1933.

The resolution provided that the following Committee be appointed for the purpose of co-operating with the officials of the two institutions in the preparation and installation of an exhibit: Frank R. Coates, Ralph C. Holmes, Frank A. Leovy, Herbert L. Pratt, Edward G. Seubert, Earl W. Sinclair, Walter C. Teagle, Henry M. Dawes, Chairman.

The plan of exhibit was formulated, and a fund of approximately \$111,000 was raised through contributions of companies listed on the last page.

It seemed desirable that an active Committee be appointed from oil company representatives residing in Chicago, for the purpose of executing the plan drawn by the above Committee. Accordingly, the main Committee appointed the following Committee on execution: Max G. Paulus, R. E. Humphreys, Theron Wasson, E. C. Herthel, L. S. Wescoat, Chairman.

This Committee decided that the primary responsibility for the design and construction of the two sections of the exhibit, namely, Chemistry of Oil, and Geology of Oil, should be divided between representatives of the Standard Oil Company of

Indiana for the Chemistry part, and The Pure Oil Company for the Geology part, as both of these companies have their headquarters and technical staffs in Chicago.

The Standard Oil Company of Indiana employed their staff engineers in the preparation of the Refinery Exhibit plans, and the Committee approved the employment of Dr. T. A. Link of Imperial Oil, Limited, of Canada, who in collaboration with Mr. Theron Wasson assumed active direction of design and construction of the models representing geology, geophysics, drilling, production and transportation. Mr. William B. Plummer of the Standard Oil Company of Indiana staff actively directed the design and construction of the Chemistry Exhibit.

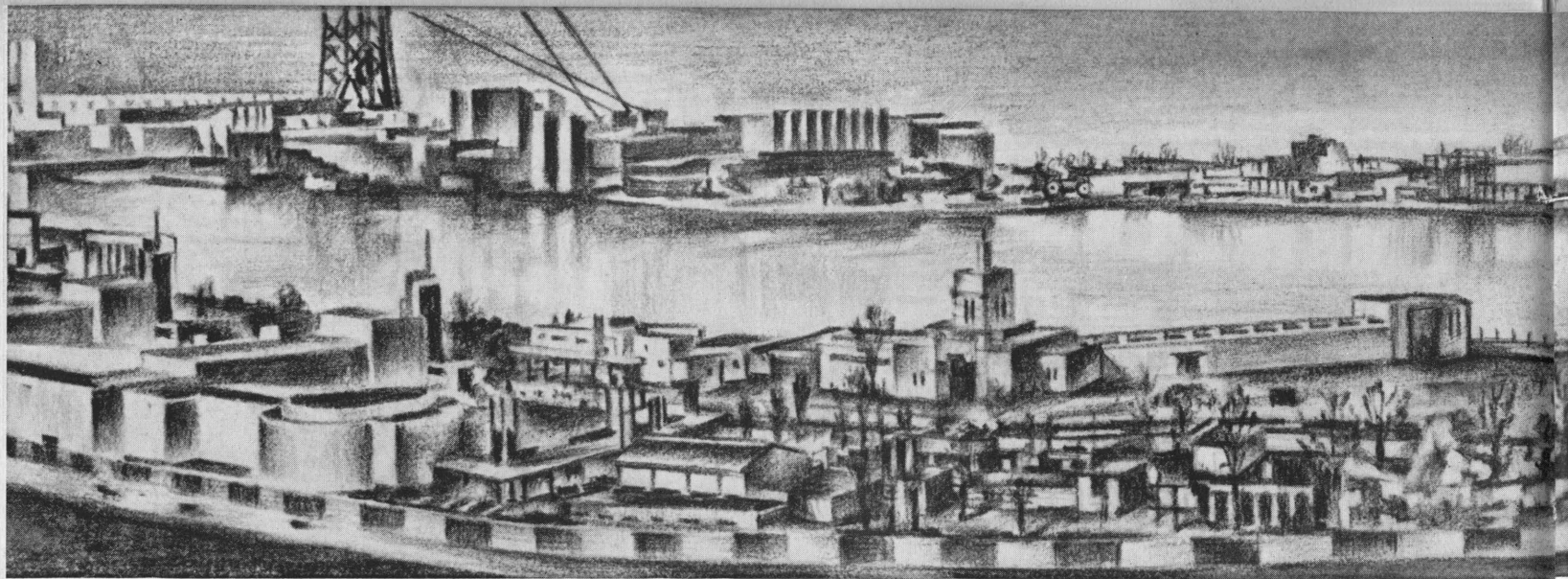
The Committee on execution had as a co-ordinating sub-Committee, Dr. Carey Croneis, head of the Geology Section of A Century of Progress, Dr. Irving Muskat, head of the Chemical Section of A Century of Progress, O. T. Kreusser, Director, and Mr. J. R. Van Pelt, Assistant Director of the Museum of Science and Industry.

The exhibit as originally contemplated has been considerably enlarged as a result of the co-operation of the various accessory manufacturers who have either donated or loaned a substantial amount of equipment to the Committee. The design and construction of the Geophysics Exhibit was assumed by the Colorado School of Mines, under the direction of Dr. C. A. Heiland and his associates.

HALL OF SCIENCE

The petroleum exhibit is located in this unusual structure. It is frequently referred to as the focal point of the exposition, and the exhibits contained in it have been prepared by experts in the great basic sciences. They are designed to meet the requirements of the lay mind as well as those of the scientist. Most of the exhibits are of a nature which would enlighten even the specialists, but through the use of dioramas and working models are understandable and extremely interesting to persons of intelligence who are not informed on the particular subject presented. More perhaps than any other building, the Hall of Science typifies the purpose of A Century of Progress with its popular presentation without compromise of scientific accuracy.

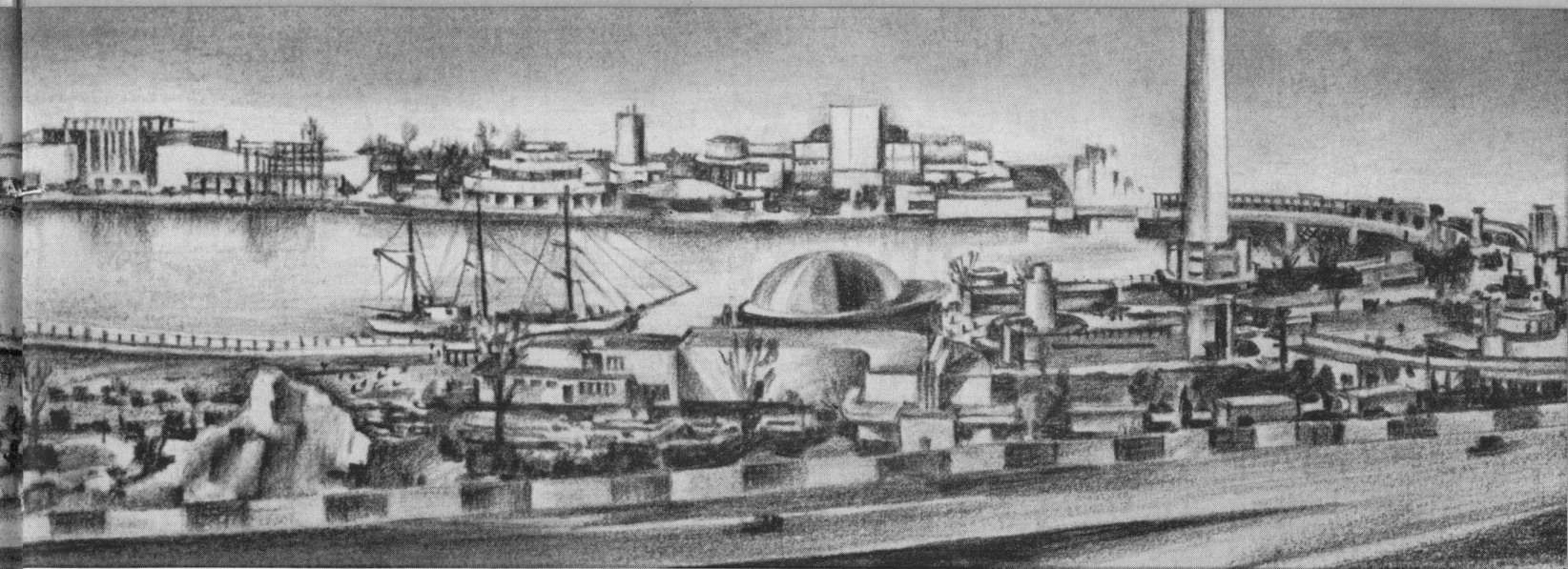




The Century of Progress Exposition presents a story of man's achievement during the past hundred years. Within this important period the Petroleum Industry was born and has grown into a twelve billion dollar industry—second only to agriculture in the United States. Fundamental to this machine age, it is entirely proper that the Petroleum Industry occupy the important place allotted it at A Century of Progress.

The purpose of this booklet is to present to interested persons an illustrated summary of the Oil Industry's Exhibit at this Exposition. Only a limited number of copies are being printed as the booklet is not intended for widespread public distribution. The photographs contained herein cover most of the exhibit subjects.

The Petroleum Industry Exhibit occupies over 6,000 feet of floor space in the Hall



AN ARTIST'S IMPRESSION OF
A CENTURY OF PROGRESS EXPOSITION
CHICAGO, MAY 27 TO
OCTOBER 31, 1933

of Science and is segregated in two sections of the building. Those subjects pertaining to refining and refined products are located in the Chemical Section, while those concerned with geology and geophysics, drilling, production, transportation and storage are situated in the Geological Section.

In the preparation of the exhibit it was necessary to so design the various units that they would lose none of their scientific value, yet would be sufficiently interesting to attract the attention of the layman. Unseen operations were brought to light. Hidden processes were revealed. By following the exhibit from the first geology displays through and including the refinery, the public can obtain a comprehensive idea of the magnitude and problems of the industry.

A TYPICAL

OIL FIELD

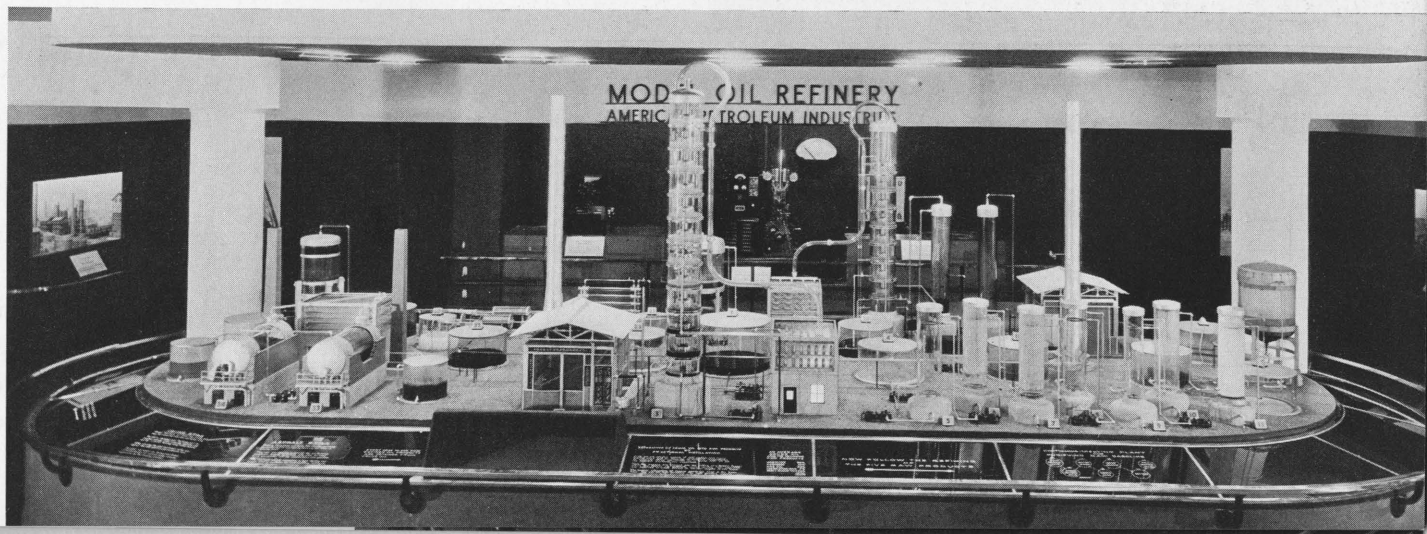


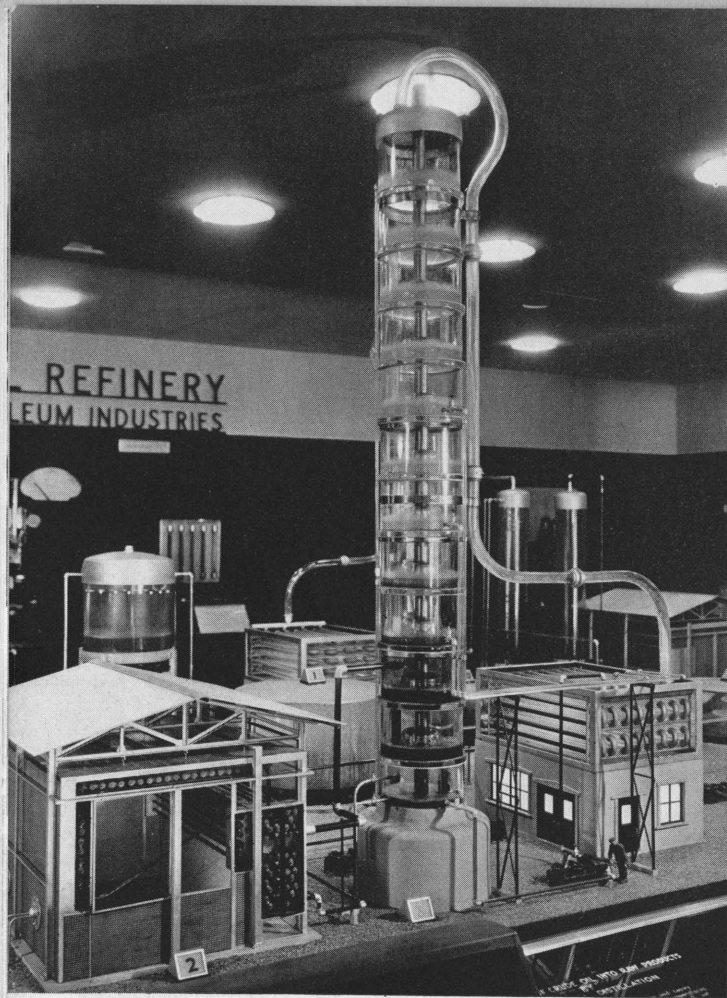
A TYPICAL AMERICAN OIL FIELD

Designed to show the relation of oil, gas, and water in a domed structure, this animated diorama is located at the entrance from the main hall. The migratory nature of oil is stressed, and the modern trend toward conservation by unit operation is illustrated. A recorded voice, which is synchronized with the animation in this exhibit, explains actions as they occur.

A MODERN OPERATING OIL REFINERY

Major refining operations from the fractional distillation of crude oil to the final treating of the five basic products, including the cracking process, are demonstrated in this "miniature" refinery which is 30 feet long and 10 feet wide. Towers, stills, tanks, and pipe connections are constructed of glass so that the visitor can watch reactions as they occur, and follow them progressively. A recorded voice explains each operation. Dozens of motors, pumps, and other automatic apparatus are concealed beneath the base structure.



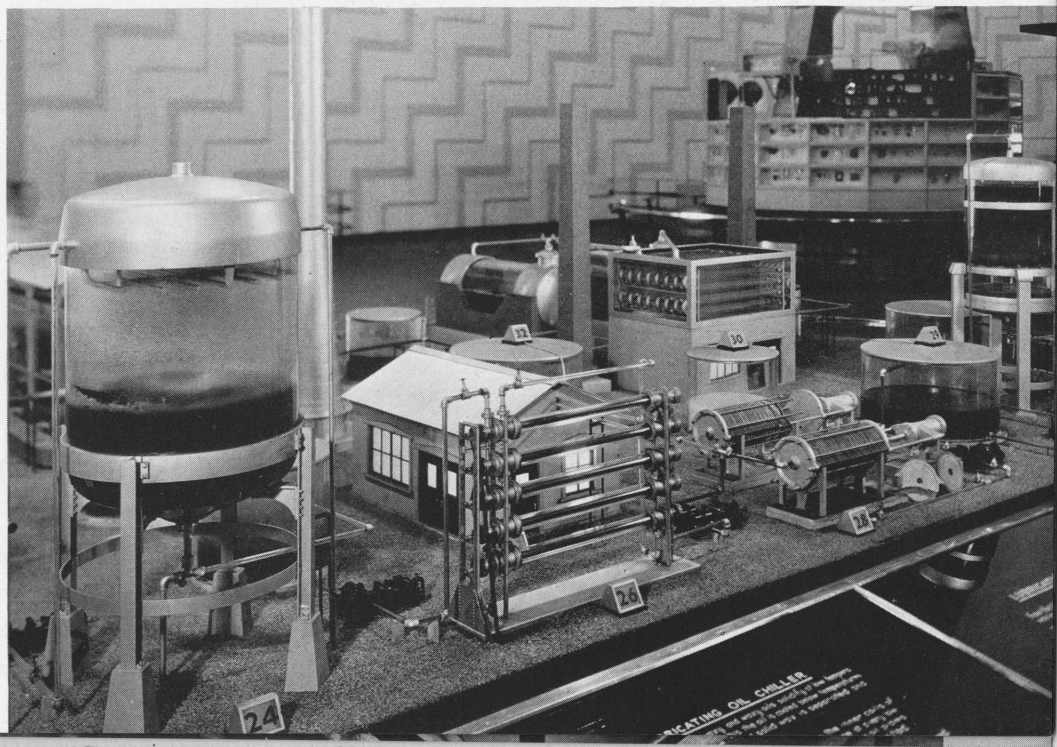


SECTIONAL VIEW OF MODEL OIL REFINERY

Close up of crude oil still and bubble tower which mark the starting point of the Model Refinery Exhibit. The separation and collection of crude oil vapors of different weight is graphically portrayed by bubbling liquid within the transparent tower, which is approximately 10 feet high.

TREATING OF LUBRICATING OILS IN MODEL REFINERY

The treatment, chilling, and dewaxing of lubricating oils is illustrated in this section of the Model Refinery. To the rear of the model can be seen asphalt and coking stills, which are the final operations demonstrated in this interesting exhibit.



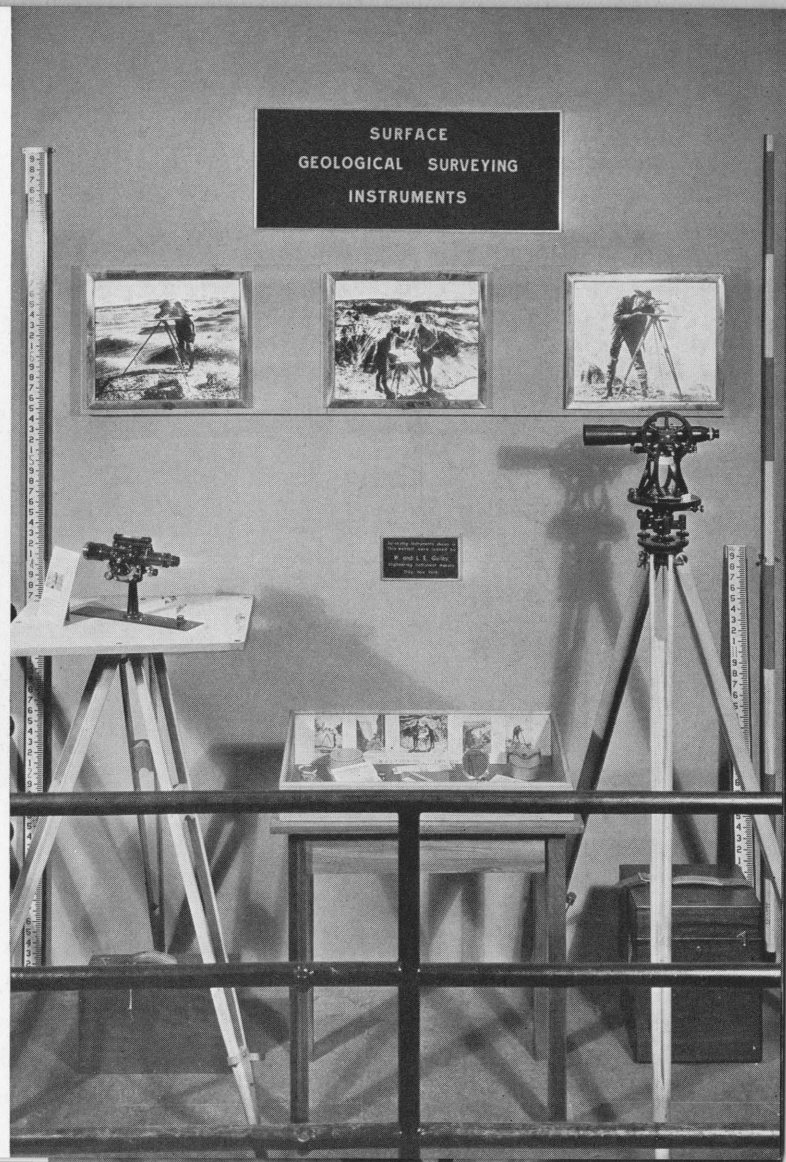


AN OIL SEEPAGE

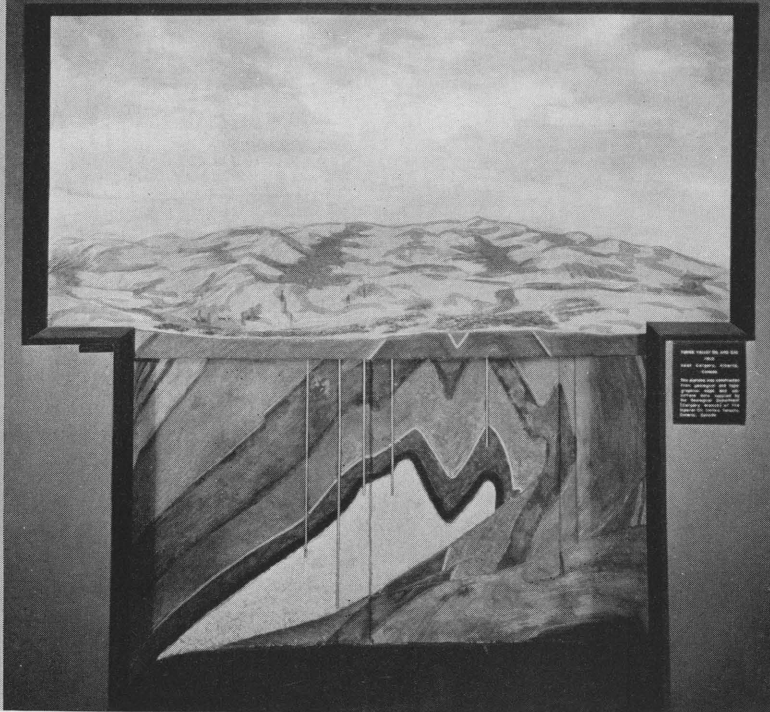
In some parts of the world, oil comes to the surface from the underlying oil-bearing rocks and forms seepages. This interesting diorama shows a seepage in Mexico, with its background of tropical vegetation. In this accurate reproduction, "gas" is seen bubbling up through the black asphaltic oil which has accumulated in the foreground.

SURFACE GEOLOGICAL SURVEYING INSTRUMENTS

This display of the instruments used in surface geological surveying includes the following: plane table outfit, 12-foot level rod, transit, alidade, hand level, and other small field instruments.



TURNER VALLEY FIELD ALBERTA CANADA



THE TURNER VALLEY FIELD

This diorama is an example of a highly folded overthrust structure, near Calgary, Canada. Built under the personal direction of Dr. Theodore A. Link, it is based upon drilling records and maps furnished by Imperial Oil, Limited, of Canada. A day view of the snow-covered landscape is followed by a night view, showing the "burning gas flares." Explanation of the action is given by a recorded voice.

MODEL OF AN ASYMMETRICAL ANTICLINE

Structures of this kind are found in the Rocky Mountain region. This model represents the Grass Creek, Wyoming, field. The reverse dips are clearly shown by means of a cross section which is raised and lowered automatically. Explanation is given on printed signs about the base. (Horizontal and vertical scales are 12 inches to 1 mile.)





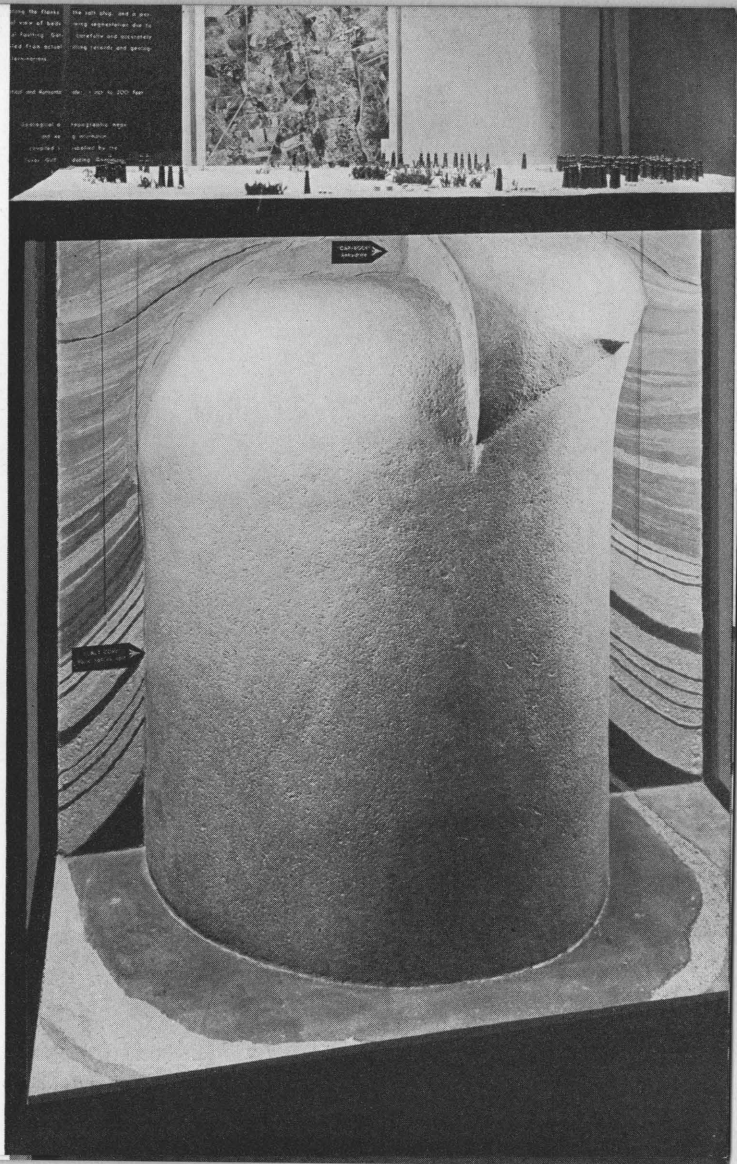
SUB-SURFACE

GEOLOGICAL WORK

Samples of cores and cuttings, fossils, and surface rock exposures are included in this display. They were prepared by the Geological Societies of Tulsa, Oklahoma, and Fort Worth, Texas. Microscopes are provided for examination of the more minute fossils. A set of diamond drill cores showing all formations drilled in East Texas forms a part of this exhibit. The layers of rock in the cross section show how these formations, as indicated by the well on the right, outcrop at the surface miles away.

A SALT DOME MODEL

A model of the Barbers Hill Salt Dome, in the Gulf Coast of Texas. This well-known field illustrates the occurrence of oil on the flanks and beneath the overhanging salt and cap. Colored pictures shown in connection with this model illustrate the origin and growth of these deep-seated salt structures. Information for the construction of this dome was furnished by the Texas Gulf Producing Company, Houston.





SYMMETRICAL ANTICLINE MODEL

A well-known Wyoming field furnished the subject for this model of an almost symmetrical anticline. The illuminated cut-out shows the structural rise of the oil sand and an ideal relationship between oil, gas, and water. (Horizontal and vertical scales are 12 inches to 1 mile.)

AERIAL PHOTOGRAPHY

IN GEOLOGICAL MAPPING

Through the floor of a model aeroplane, which "flies" back and forth, a projected light indicates each section of landscape successively photographed by the aerial camera. A synchronized recorded voice explains the procedure. In the foreground is a mosaic map of Kettleman Hills (California) field, made from aerial photographs. Supplementing this exhibit is a stereoscope in which typical aerial photographs may be viewed by the visitor.





GEOPHYSICAL INSTRUMENTS USED IN OIL FIELD EXPLORATION

The application of geophysical methods to the problems of the oil geologist has made a century of progress in about ten years. There is an element of romance in this development which has taken delicate physical apparatus from the cloistered halls of our scientific schools and adapted it to the needs of oil field exploration, at the same time developing a technique suitable to large scale operations. All types of geophysical instruments in common use are shown, actually or in model form, and their operation explained. The entire geophysical exhibit was designed and built under the able direction of Dr. C. A. Heiland of the Colorado School of Mines.

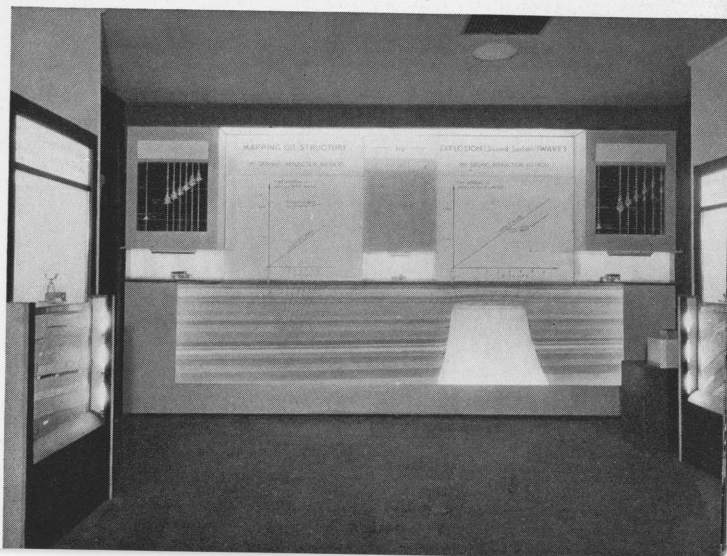


THE TORSION BALANCE AND ITS USE

The torsion balance has had extensive use, particularly in the search for Salt Domes, where differences in density are measured by this sensitive instrument. The Torsion Balance on display here was furnished and installed by the American Askania Corporation.

MAPPING OIL STRUCTURE BY EXPLOSION WAVES

A few years ago test wells were started on blocks of leases without any questions in regard to underground conditions. Today before company officials approve a test well on a new prospect they ask, "has it been shot?" The exhibit illustrated here explains the seismic reflection and refraction methods. Flasher lights indicate the course of sound waves thru the sub-structure. A seismograph model was furnished by Geophysical Service, Inc.



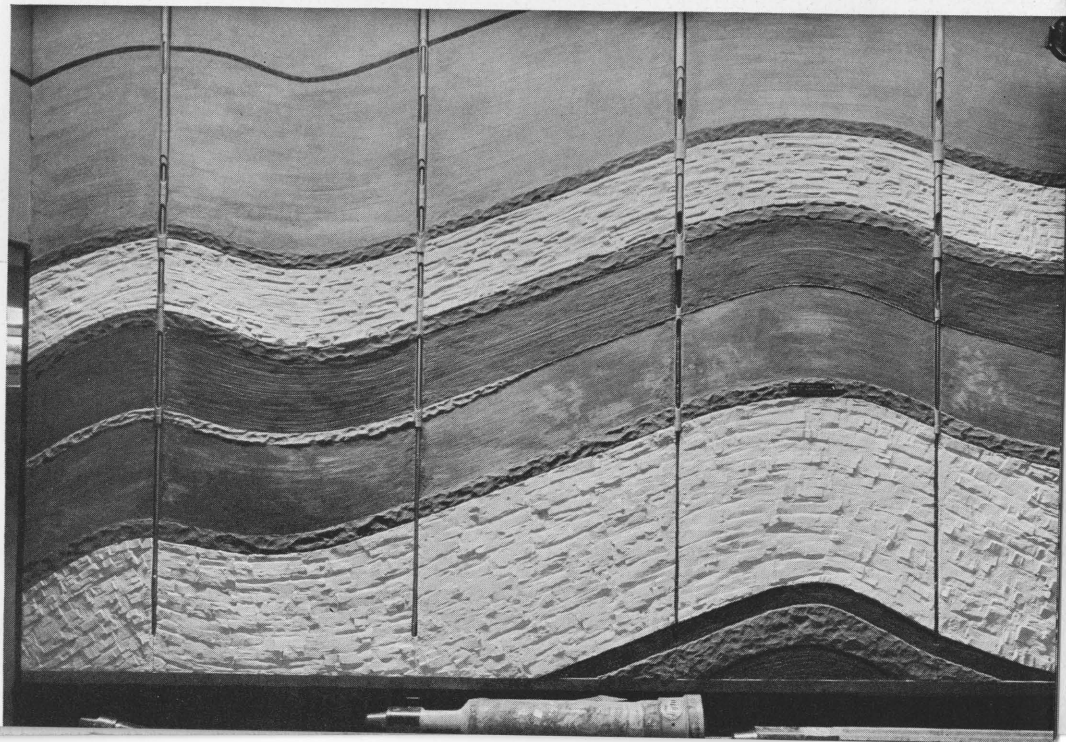


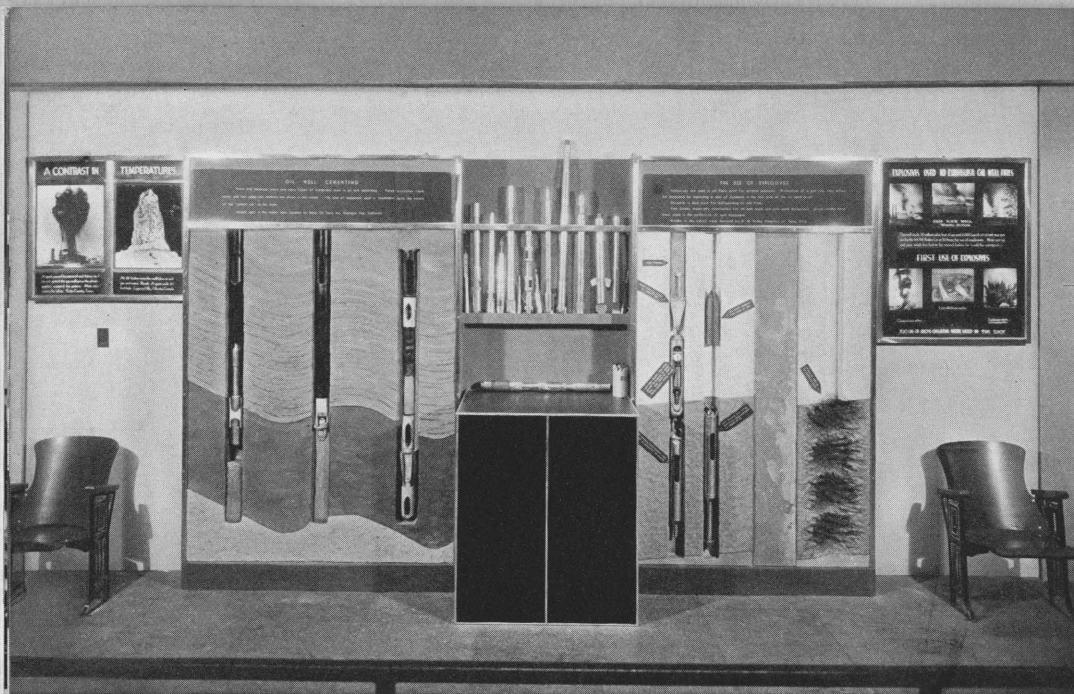
DRILLING FOR OIL AND SUB-SURFACE GEOLOGY

The visitor in this section may observe through moving models the construction and action of drilling equipment, derricks, rigs, etc., and can also see how the tools function beneath the earth's surface. Various phases of sub-surface geological work are also presented in this section.

DRILLING AND FISHING TOOLS

This cross section covers 300 square feet of wall space. Rotary and cable-tool drilling are demonstrated to visitors by moving models in the two middle test holes. The hole on the extreme left shows a rotary fishing method and on the extreme right, a cable-tool method. These miniature tools are actually functioning. Some of the full-sized tools are displayed at the base of the exhibit.



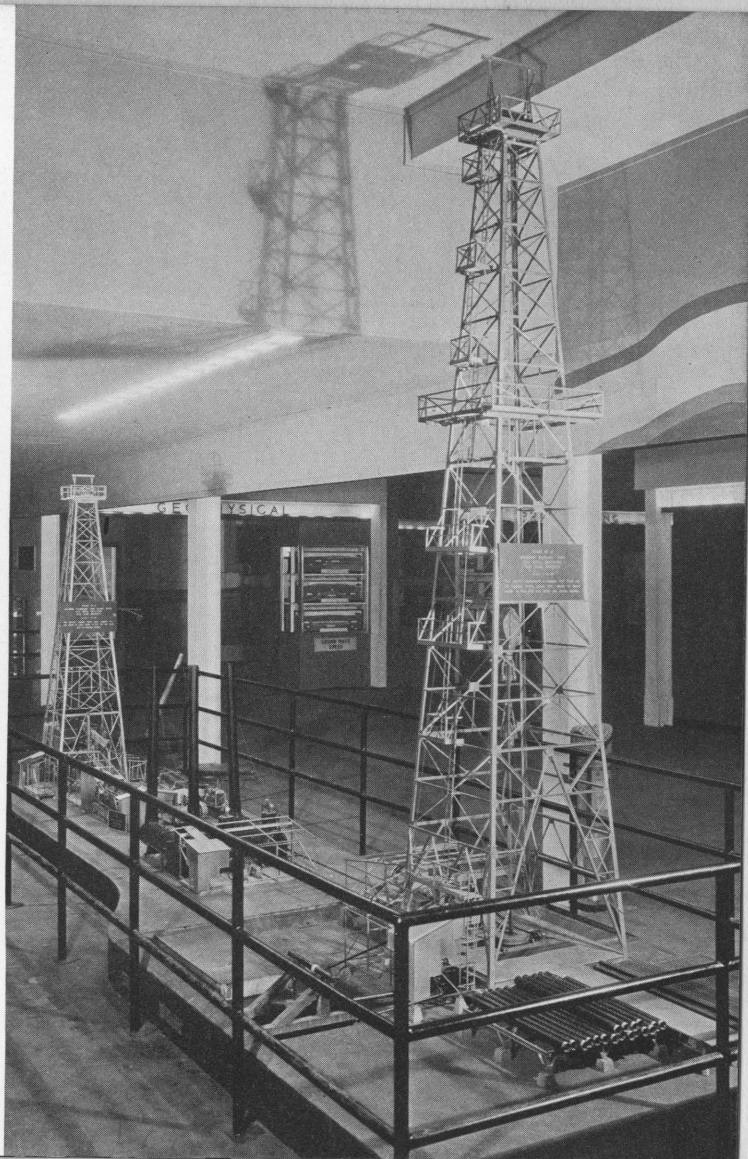


CEMENTING EQUIPMENT, DRILL BITS AND EXPLOSIVES IN OIL FIELD OPERATIONS

Miniature equipment illustrating the devices used to cement casing in the depths of the well holes is shown in the sub-surface section on the left. The middle section of this exhibit displays various kinds of drill bits. The equipment in the sub-surface section on the right pertains to the use of explosives to increase the flow of wells, extinguish fires, etc.

ROTARY AND CABLE-TOOL DRILLING

Here the visitor sees a moving presentation of rotary (front) and cable-tool rigs and derricks with complete equipment. No detail is missing from these "huge miniatures" which are actually operating. Everything is constructed to scale, even the miniature casing. The completeness of this exhibit typifies the thorough attention to detail and accuracy throughout the Petroleum Industry exhibit.



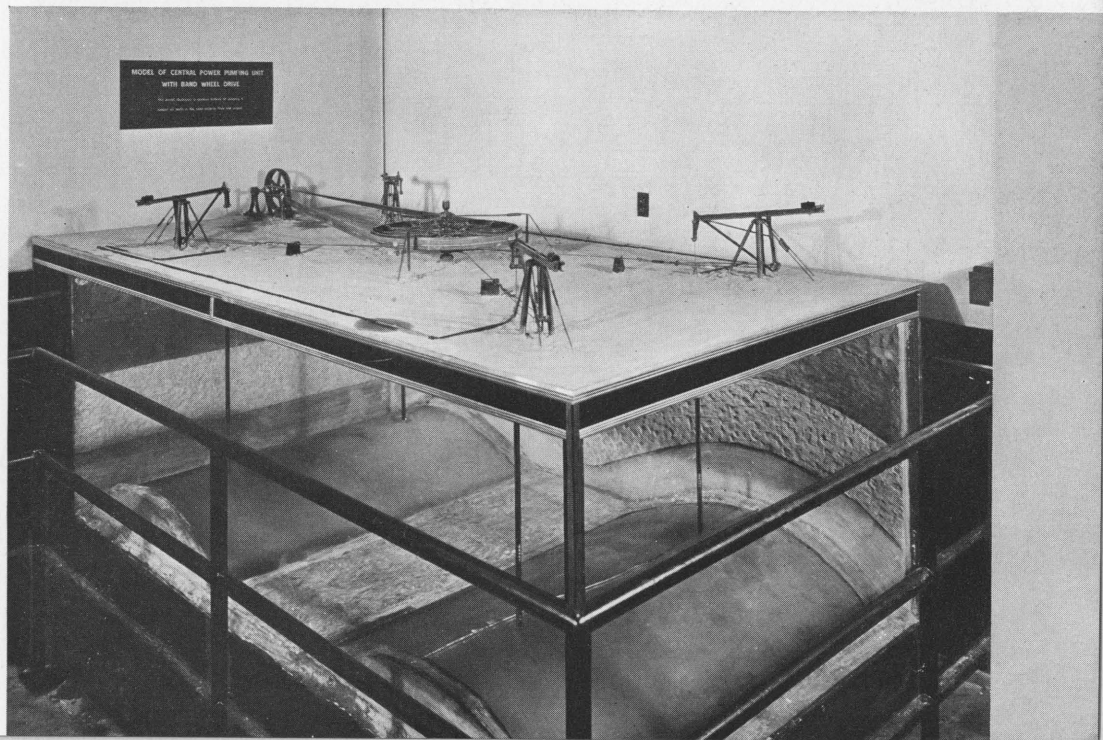


CROOKED HOLE SURVEYING

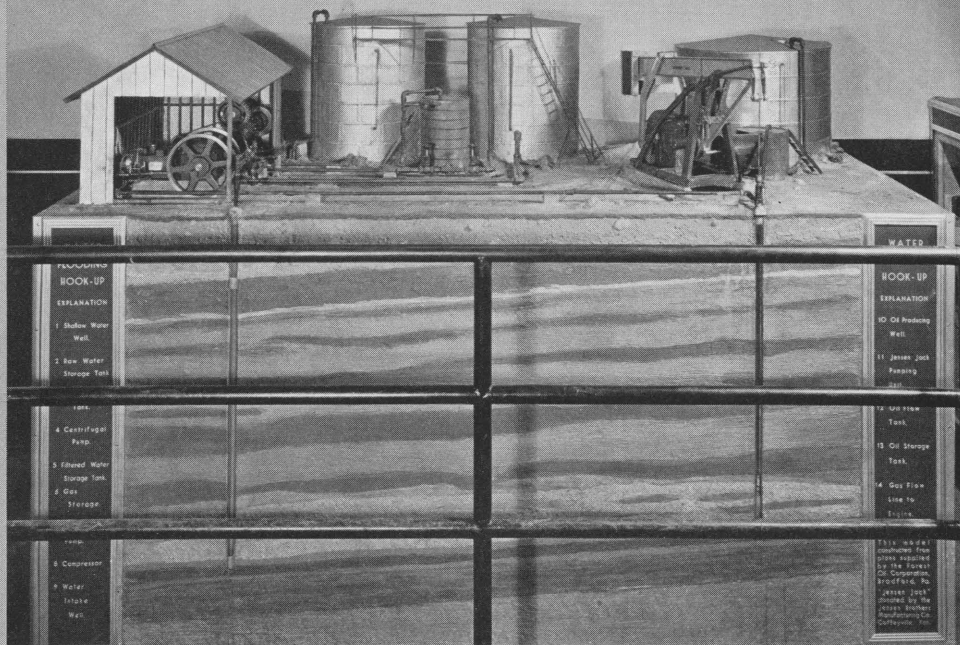
Methods by which the course of drill holes is surveyed, and the instruments used to make these surveys, form the principal subjects of this exhibit. A Syfo clinograph and a Surwell gyroscopic clinograph are shown. The sub-surface display on the extreme left of the illustration is devoted to showing the causes of crooked holes.

CENTRAL PUMPING EQUIPMENT

A central power pumping unit with band wheel drive is shown in this operating model. Four wells are connected to the central power. Through transparent casing the visitor can see the pumping of the oil from the pay sand.



MODEL OF
BRADFORD WATER FLOODING
BRADFORD PENN. OIL FIELD
ILLUSTRATING WATER FLOODING METHOD OF
RECOVERING OIL FROM A DEPLETED SAND

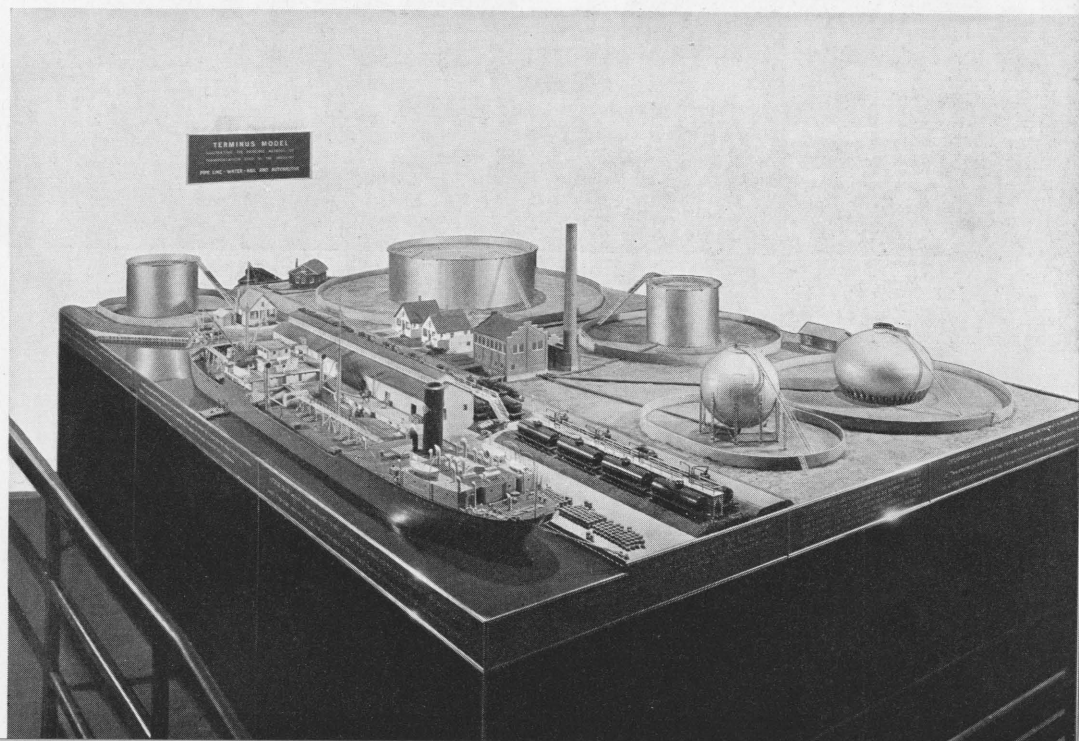


RECOVERY OF OIL BY WATER FLOODING

Recovery of oil by water flooding of fields which have been depleted beyond the ordinary pumping stage provides an interesting exhibit. It illustrates the project inaugurated in the Bradford, Pennsylvania, field where the potential recovery by this method is estimated to equal the original recovery during the area's "productive" period.

OCEAN, RAIL AND PIPE LINE TERMINAL

The inter-woven nature of pipe line, water and rail transportation is shown by this model. It also includes the latest types of storage facilities for both crude oil and gasoline. Of unusual interest is the 9½-foot ocean tanker model, complete in every detail, and the tank cars and locomotive along the miniature loading rack. The other terminal facilities include docks, warehouse and auxiliary structures, pump station, pipe lines and trucks.



PETROLEUM TRANSPORTATION

PAST AND PRESENT



Early Tank Wagon - 1854



Closed Cab Type



Transportation by Teams



First Boat Days
1863



Wooden Tank Cars - 1865



Early
Boiler Types



First Pipe Line Pump - 1861



Second Pipeline and
Early Pipe Line Terminal



Shade to Lessen
Evaporation



Northern Sled Type



Early Tank Truck - 1910



1921 Model



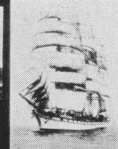
Modern
Local Delivery Type



Modern Transport Type



Cargo Sailing Ship



Sailing Tanker - 1903



Modern
Ocean Tanker



Island Refining Tower



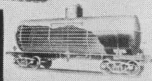
In the Year 1900



Modern
10,000 Gallon Car



Insulated Type for
Liquefied Petroleum Gas



Modern Pump in Asphalt Car



Today, Welding Joints of
Gasoline Line



Joining by Machine



Machine Also Methods



Modern Electric Pump Station



Modern Electric Pump Station

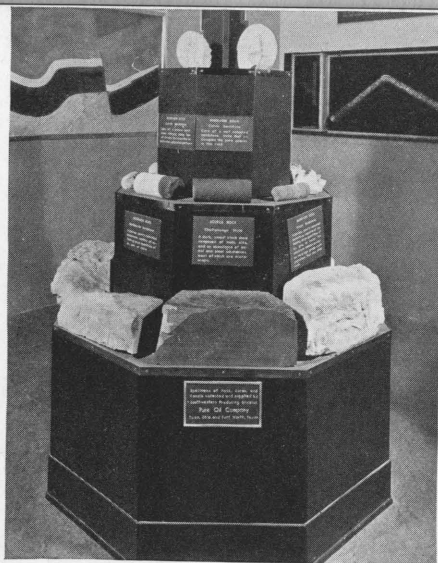
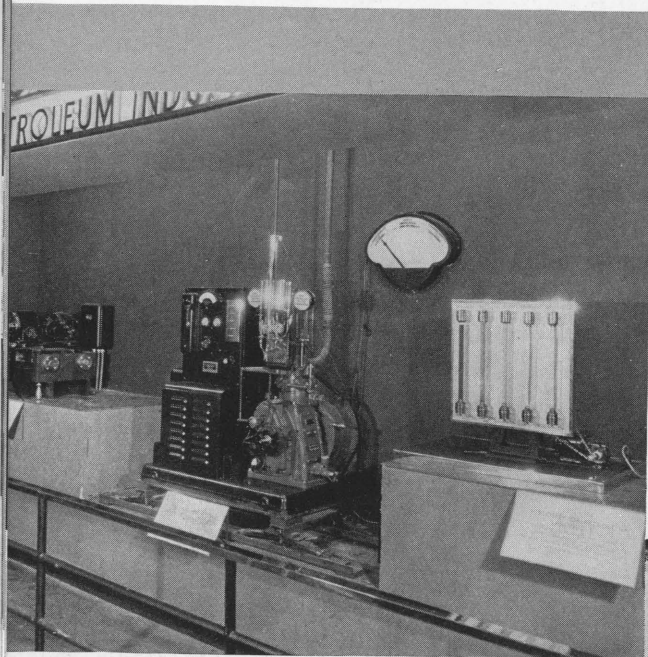
THE HISTORY OF PETROLEUM TRANSPORTATION

This collection of translights traces the development of petroleum transportation from the early days and includes the following subjects: tank wagon and truck, tank car, marine, and pipe line transportation. It also illustrates hauling of crude oil in barrels by the teamsters of the Pennsylvania oil region seventy years ago.

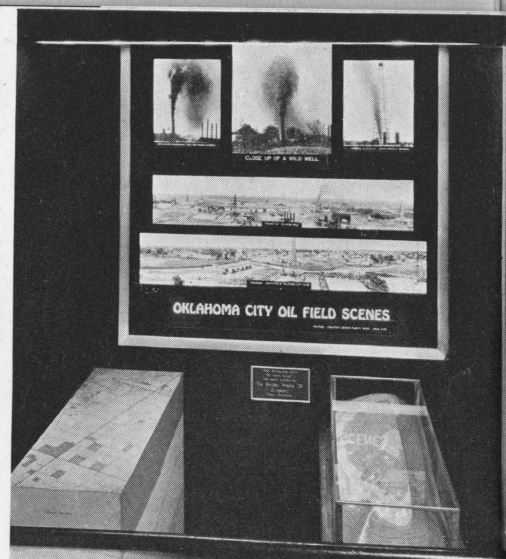
GEOGRAPHY OF PETROLEUM

The translite map to the left shows the oil fields, and oil and gasoline pipe lines of the United States; the center map, the oil and gas fields of the world and principal pipe lines; the map to the right shows the gas fields and gas pipe lines of the United States.





Display of rocks, cores and fossils.

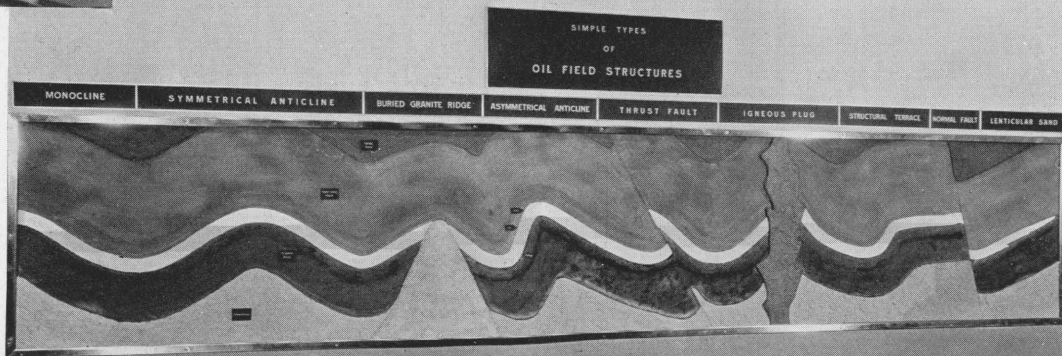


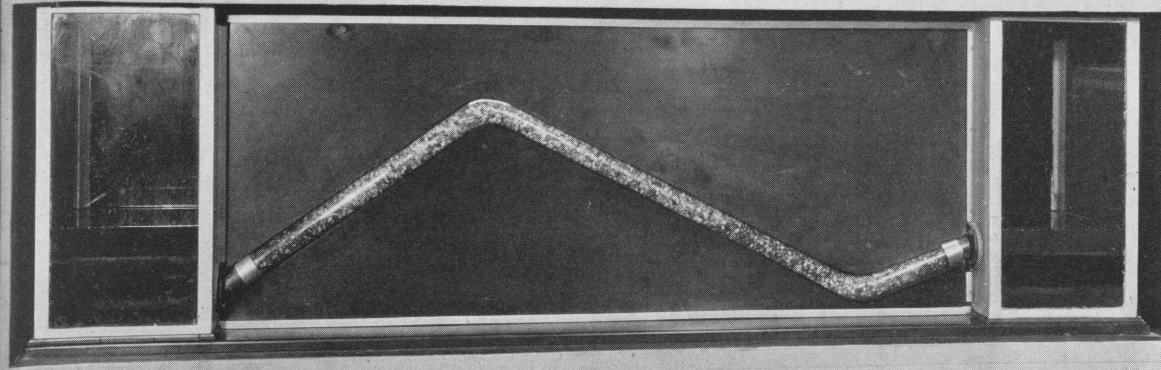
Model of Oklahoma City oil field.

MISCELLANEOUS EXHIBITS

Above—Operating gasoline anti-knock test engine.

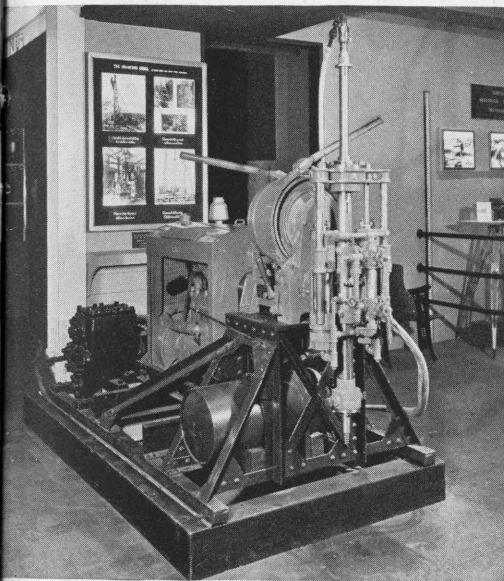
Right—Simple types of oil field structure.



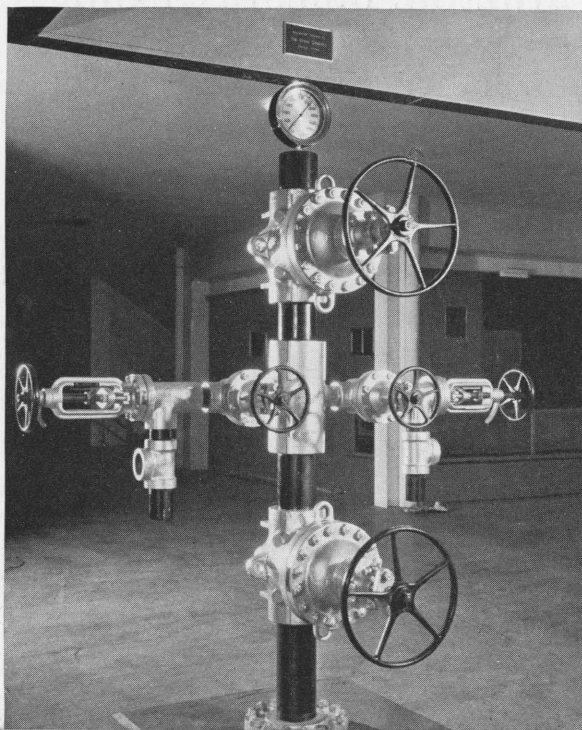


Left—Illustrating the movement of gas, oil and water in bed rock.

Below—Device to demonstrate constant relative position of gas, oil and water.



Above—Full size portable Diamond Drill included in exhibit.



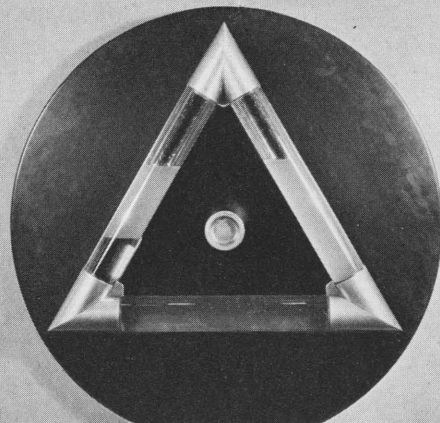
Right—"Christmas Tree" in full size is shown.

RELATIONSHIP between GAS, OIL AND WATER

INSTRUCTIONS

Turn the triangle, by the center knob and let it come to rest.

Note that the Gas (white), Oil (brown) and Water (blue) always assume the same relative positions.



THE FOLLOWING COMPANIES
CONTRIBUTED TO THE FUND WHICH MADE POSSIBLE
THE OIL INDUSTRY EXHIBIT AT
A CENTURY OF PROGRESS EXPOSITION

THE ATLANTIC REFINING Co.
BARNSDALL OIL CORPORATION
CONSOLIDATED OIL CORPORATION
CONTINENTAL OIL COMPANY
ETHYL GASOLINE CORPORATION
FOREST OIL CORPORATION
GULF OIL CORPORATION
HENRY L. DOHERTY Co.
OHIO OIL COMPANY
THE PENNZOIL Co.

THE PURE OIL COMPANY
SHELL UNION OIL CORPORATION
SOCONY-VACUUM CORPORATION
STANDARD OIL COMPANY OF CALIFORNIA
STANDARD OIL COMPANY OF INDIANA
STANDARD OIL COMPANY OF OHIO
STANDARD OIL COMPANY OF NEW JERSEY
SUN OIL CORPORATION
THE TEXAS COMPANY
UNION TANK CAR Co.



