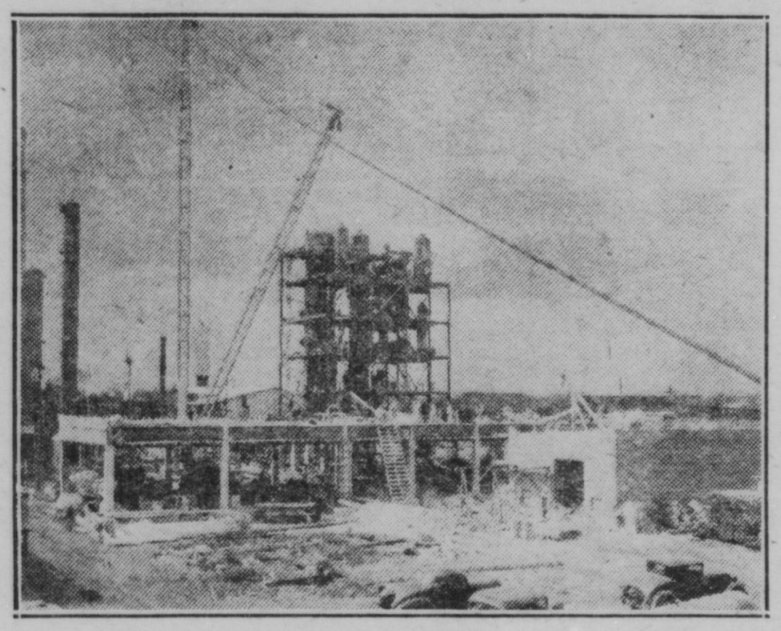
# PETROLEUM SCIENTISTS
## *Lessening Drain on Nation's*
# OIL RESERVE

TO THE RESEARCH SCIENTIST working indefatigably in his laboratory, is due a major share of the credit for the progress that is steadily being made in conserving our crude petroleum resources. Through the advances science is making in the refining of crude petroleum and its extraction from the ground, the day when the nation's oil supply will be exhausted is constantly being postponed.

Conservation does not only mean, as many assume, the preservation, the stoppage of use, or the hoarding of the resource. It is true that petroleum, like other natural resources—our coal, our iron, our copper—is irreplaceable. Nature will not refill with oil the sands that have been drained. But it is also true that the nation's prosperity,


CORE DRILLS WERE DEVISED THAT PROBED THE SUBTERRANEAN SANDS AND BROUGHT UP SPECIMENS TO BE ANALYSED IN THE LABORATORY



Thermal polymerization plant being built by The Atlantic Refining Company a its Point Breeze Refinery, Philadelphia, to produce gasoline from refinery gases. With a daily capacity of 62,500 gallons of gasoline, the plant will be the largest of its type in the world, and the first to be built in the eastern United States.

security and comfort necessitate the wide use of products derived from crude petroleum. With this in mind, conservation must be taken to mean that our oil resources must be drawn upon, refined and used without waste, in orderly response to economic requirements.

### *MOTOR FUEL FROM WASTE GASES*

Polymerization, a staggering word to the layman, is the term used to describe the latest triumph of science in the elimination of waste during the refining process. Briefly, polymerization involves the production of high-grade gasoline from refinery gases hitherto wasted or used as fuel. Marking recognition of the importance of this new process, The Atlantic Refining Company has built a new refinery at Atreco, Texas, which includes a polymerization unit, while at its Point Breeze refinery, Philadelphia, it is erecting what will be the largest thermal polymerization plant in the world. From gases generated during the refining of crude petroleum, the Point Breeze plant will produce 62,500 gallons of gasoline daily. In other words the process will make possible to produce every day 62,500 more gallons of gasoline than it would otherwise be possible to produce from the amount of crude run through the refinery.

Gasoline produced from refinery gases by polymerization is particularly well adapted to use in modern high-compression engines according to The Atlantic Refining Company's engineers, who point out that the possibilities of the process in relation to future motor fuel production are truly startling. If polymerization were adopted generally by the petroleum refining industry it is estimated that it would increase by over 1,000,000,000 gallons the amount of gasoline now being obtained from the crude petroleum refined annually by the industry. This additional 1,000,000,000 gallons would supply the annual requirements of some 2,000,000 motorists without imposing any additional drain on the nation's oil reserve.

### *"CRACKED" GASOLINE*

Polymerization is still in its infancy but the cracking process, another triumph of the research scientist, has already been in general use long enough to demonstrate both its potentialities and its results. About 25 years ago, although the fullest possible yield from straight-run refining had been secured, the demand for gasoline began to mount rapidly, due to the increasing use of the automobile. In producing gasoline by straight-run refining, no change in chemical composition is involved. The constituent products are simply separated out of the crude oil. "Cracked" gasoline is obtained by taking the heavier constitutents of crude oil obtained along with gasoline in straight-run refining, and subjecting them to high temperatures in specially designed stills.

What "cracking" does is to break up or crack the heavy constitutents of crude oil into oils that boil over a wide range from very low to very high. The gasoline, or the lighter and lower boiling material, is separated out by subjecting it to much the same refining process as the original straight-run refining.

Approximately 8,500,000,000 barrels of crude petroleum have been conserved in the United States in the last 17 years by using the cracking process in the manufacture of motor fuel. Had it not been for cracking it would have been necessary to run nearly 22,000,000,000 barrels of crude oil to stills between January 1, 1920, and December 31, 1936, to produce the more than 5,000,000,000 barrels of gasoline required. Use of the cracking process made it possible to produce this amount of motor fuel from a little over 13,000,000,000 barrels of crude. The amount of crude oil conserved by the cracking process represents nearly two-thirds of the currently estimated reserve. Cracking has undoubtedly been the greatest single contribution to the conservation of our petroleum supply.

### *REJUVENATION OF OLD POOLS*

The third outstanding contribution to petroleum conservation that scientists have made lies in increasing the percentage of oil extracted from the nation's oil pools, and in producing a second crop of oil from pools previously considered exhausted. Under the ordinary flowing and pumping method of producing oil, a good part of the oil in the underground reservoir cannot be brought to the surface. The oil obstinately clings to the sands which hold it, defying the most powerful pump.

Petroleum scientists set themselves to the solution of the problem of how to recover this "irrecoverable" oil. The first necessity was to obtain specimens of the petroleum bearing sands, thousands of feet below the surface. Only when the structure of these sands was definitely known would it be possible to determine how they might be forced to release their store of oil. Core drills were devised that probed the subterranean sands and brought up specimens to be analysed in the laboratory. According to the results of the analysis, water, air or natural gas was introduced under pressure. Reservoirs long given up as exhausted began to produce oil again.

Nobody knows just how much petroleum that would otherwise have remained in the ground and forever unusable has been recovered by such "secondary recovery" methods, but the Pennsylvania oil fields, the oldest in the world, provide a vivid example of what has been accomplished. For 78 years these Pennsylvania fields have been producing high-grade oil, but a quarter of a century ago the old timers were predicting the certain exhaustion of the fields in another 25 or 30 years.

Today, thanks largely to "secondary recovery" methods, Pennsylvania has boosted its annual oil production to almost the 16,000,000-barrel peak.

Where it once cost $2.00 to lift a barrel of oil to the surface the job is now being done for around 35 cents. Millions of dollars are being spent for new machinery. The landscape is dotted with new drilling wells. One of the greatest upsurges of oil field activity during the last half century has grown out of the rejuvenation process born and bred in the science laboratory.