# U. S. Authority Sees Ample Motor Fuel for Long Future

HARRY H. HILL
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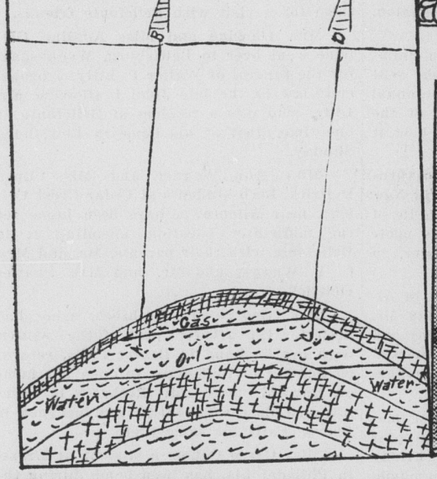
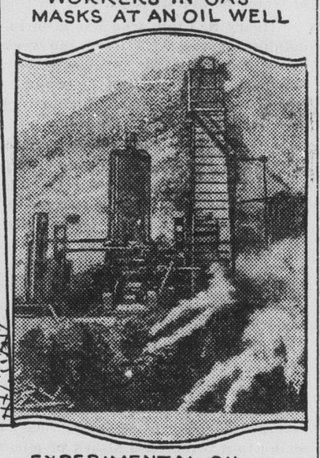
WORKERS IN GAS MASKS AT AN OIL WELL




MR. HILLS IMPROMPTU SKETCH OF AN OIL DOME



EXPERIMENTAL OIL SHALE REDUCTION PLANT

*The U. S. Bureau of Mines is confident that motor fuel supplies will be ample for many years to meet all needs of the country's millions of automobiles. Harry H. Hill, chief petroleum engineer of the Bureau, here tells the reasons for this conviction, and sketches the advances in industrial methods which justify his opinions.*

**By HARRY H. HILL**
**Chief Petroleum Engineer, United States Bureau of Mines.**

ONE reason why there is no reason to worry greatly about motor fuel for a long time ahead is that people are worrying about it. Interest in such a question at the right time, is the best insurance against disaster. The President and the Federal Oil Corporation Board have done what was needed, at the right time.

We know that most petroleum has come from rather limited areas and that even from these only a small proportion has been taken out. Oil produced by gas pressure capable of lifting it to the surface when we drill holes is but a small proportion of all the oil contained in the sands Even from the best pools recovery by the old methods is small, perhaps one-half in the most favorable conditions, oftener one-sixth, or one-seventh, or one-tenth. But a considerable part of what still remains in the ground can be recovered by methods now established as technically and economically practicable.

Producing oil from coal and shales and by mining the oil bearing sands is entirely possible. Experiments are going on in these directions, and if we ever have to fall back on these resources we will be ready. For a long time, however, the present methods of exploration and drilling, with improving processes to assure larger recoveries, are likely to suffice.

### An Oil Dome Illustrated

I am no draughtsman, but maybe I can draw something that will help explain. Here's a rough drawing of an oil dome. The shaded part at the bottom is a deposit of oil bearing sands—with an impervious rock stratum above. A wild-catter drilled the hole A-B and gas pressure caused oil and gas to flow. After a while the gas pressure wasn't sufficient to keep up the flow and they pumped until ultimately even this ceased producing.

Nevertheless, most of the oil was still left sticking to the sand grains. Then the operator drilled the well C-D, which flowed for a time, but most of the oil was still down there in the sand. If the gas pressure could be restored more would flow. So the operator injects gas into one well, restoring the pressure and causing the oil to resume flowing from the other. After a time the flow will stop again, but still much of the oil will be left. In some fields it has been possible to obtain additional amounts of oil by introducing water in some of the wells and forcing the oil to others. The addition of a chemical such as soda ash to the water may assist in removing the oil from the sand grains, but neither plain water nor water containing chemicals should be introduced into an oil sand except as a last resort, for it is likely that the water, which travels faster through the sand, will get to the open wells ahead of the oil and when the flow is resumed under pressure water will come out.

### Everything Saved Nowadays

The gas escaping from an oil well carries with it a proportion of gasoline, which in the old days was lost. Nowadays it is extracted from the gas and saved, while the dry gas can be forced back into the ground to maintain pressure.

One of the menaces to most oil pools is the inflow of subterranean water. Water flows through the oil sands faster than oil, and by surrounding the bottom of the well keeps the oil out. How to shut off the water and permit the oil to run out is a problem with which the engineers have long worked. They have made great progress and so increased recoveries.

In earlier times most oil producers carefully guarded all information about their wells and experiences, but latterly there is co-operation in these matters. Geologists and petroleum engineers, once derided by the "practical" oil men, are more and more accepted as guides and mentors. New knowledge is constantly increasing recoveries.

### As to Mining for Oil

In Lorraine they have dug shafts down to the oil sands and actually brought the sands out, like coal from a mine. But it's costly.

Another mining process is to sink a shaft to the oil sands and from its bottom drive tunnels in all directions through the sands. From these tunnels small perforated pipes are driven into the sands, which drain the oil out of the sands. It flows to larger pipes back at the foot of the shaft and thence is pumped out. This requires installing an expensive plant, but in some fields the high recovery that is assured might justify the cost. I understand the process is about to be intsalled in a few fields in this country, some companies being convinced it is practicable and profitable.

Oil can be distilled from coal, and much work is now being done along this line. But more appeal has been made by the plan of extracting oil from shale. The shales of Scotland have been worked for three-quarters of a century, and they are almost unlimited in this country, richer in oil than those of Scotland. Kentucky, Ohio, Colorado, Utah, Nevada, Wyoming and California are particularly rich in shales. It is just a question of the cost of extracting the oil. Congress has given $180,000, with which the Bureau has installed a plant near Rulison, Colorado, to distill oil from the Colorado River Shales. It is calculated that the shales mined at Rulison will produce about a barrel of oil to the ton.

### The Use of Oil Shales

In Scotland they are working shales that produce about twenty-five gallons of oil per ton. The seams are from three-and-a-half to eight or ten feet thick. In Colorado are seams many times as thick and containing much more oil per ton. Reduction of shales involves an enormous mining operation, and after the oil is extracted the vast tonnage of refuse must be disposed of. So it is expensive compared with producing oil from wells.

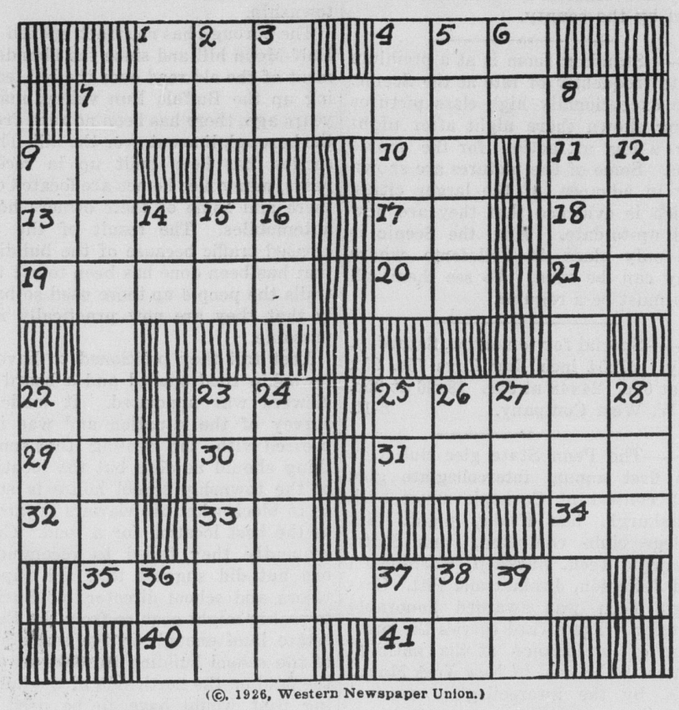
Ben E. Lindsey of the Bureau of Mines Experiment Station at Bartlesville, Okla., is confident that exploration, better recoveries, better utilization and deeper drilling would furnish enough oil to meet all requirements for at least twenty-five to fifty years, if it could be extracted in that time. But as a practical matter this will not be possible. Within that period there will be times of shortage, when oil from shales will be needed to supplement the oil from wells, etc.

Meantime federal and state governments and the industry are co-operating in an astonishing range of investigations and studies. These activities cover such a wide field that even an enumeration of them would run into tiresome detail.

### HOW TO SOLVE A CROSS-WORD PUZZLE

When the correct letters are placed in the white spaces this puzzle will spell words both vertically and horizontally. The first letter in each word is indicated by a number, which refers to the definition listed below the puzzle. Thus No. 1 under the column headed "horizontal" defines a word which will fill the white spaces up to the first black square to the right, and a number under "vertical" defines a word which will fill the white squares to the next black one below. No letters go in the black spaces. All words used are dictionary words, except proper names. Abbreviations, slang, initials, technical terms and obsolete forms are indicated in the definitions.

CROSS-WORD PUZZLE No. 2.



(©, 1926, Western Newspaper Union.)

**Horizontal.**

1—An enclosed place or box
4—A snake-like fish
7—A United States President
9—An Eastern state
10—A plural pronoun
11—Interrogative
13—Apart
17—Calcium (abbr.)
18—To proceed
19—To stop the progress of
20—Suffix in numbers
21—Termination of adjectives
22—Form of "to be"
23—To exist
25—An old saying
29—Exclamation to attract attention
30—In the year of our Lord (abbr.)
31—One who dotes
32—Signifying one
33—Southern Union (abbr.)
34—Point of the compass
35—Passing of a bill into law
40—A kind of liquor
41—Self

**Vertical.**

1—To become
2—In case that
3—Island east of Quebec (abbr.)
4—To eject
5—A treatise
6—Behold
7—A plant
8—Neglectful
9—A girl's name
12—A small coasting vessel
14—A pronoun
15—To perform
16—A prefix signifying on, above near
22—Exclamation of triumph
23—Pertaining to foundations
24—To draw forth
25—Adverb (abbr.)
26—A note of the diatonic scale
27—A preposition
28—Before
36—A continent (abbr.)
37—Objective case of I
38—For example (abbr.)
39—A word of denial

**Solution will appear in next issue**

### An Eighth Grade Symposium on Health.

Recently the scholars in the 8th grade, Allegheny St. building of the Bellefonte schools were required to write an essay on "Ways and Means of Reducing Tuberculosis in this Community."

All of the papers turned in are said to have been quite creditable, some exceptionally good. By a process of elimination they were sifted down to a few from which the best thoughts were taken to make up the following composite essay on the subject assigned.

Eight grade scholars are very young and we think you will agree wth us, when you have completed reading it, that they have handled their subject very well indeed.

#### WAYS AND MEANS OF REDUCING TUBERCULOSIS IN THIS COMMUNITY.

In the year 1882, the cause of the most distructive germ plague in the world was discovered by Dr. Robert Koch, of Germany. This plague, known as tuberculosis, causes more deaths each year than all the common deseases combined and kills many more people than war has ever done.

Tuberculosis is a desease caused by tubercule bacillus affecting any part of the human body especially the lungs.

It has long been a question as to whether tuberculosis is a hereditary disease. Many believe that the germs are born with the individual and are ready to be developed on the least exciting cause; however we believe this has been much exaggerated though a person may be born without the power of resisting it.

Impure air, density of population, and over crowding has much to do with its development.

It has been found by investigation that there is a decided relation of cause and effect between dampness of soil and consumption.

Although there has not been many cases of tuberculosis in this community we are not free from its grip to a great extent.

We should be very careful to form good health habits. Uncleanliness is only carelessness and the cause of much suffering. People having the disease should take proper care of themselves and take caution as to their ways of preventing the spreading of this malady. Everybody should help make our community a non tubercular one. Let us keep our houses and yards clean, have lots of fresh air, and don't be afraid that the sun will hurt the carpet. Believing that the kitchen is the most important room in the house because that is where our nourishment and strength is prepared. Keep it tidy, and never let the "typhoid flies," a splendid aid to the disease, enter our homes. Never buy meat and milk from dealers whose goods are uncertified. Don't ever spit on the streets—this is very uncleanly.

Always use a handkerchief—especially when in company. Be very careful of articles used by consumptives as the germs may lodge in other things that are mixed with them.

By cooperating with each other we will soon abolish tuberculosis. We would be assisting America if we do these things. Remember "health means happiness."

The disease multiplies because of the ignorance of some and the greed of others, so lets make our motto "down with tuberculosis" and be crusaders for health.

### Solution to Last Week's Puzzle.

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—Oxford's Rexie of M. B. 515701, a senior four-year-old Jersey cow, owned by the Pennsylvania State College, at State College, Pa., has completed an official 365-day test in which she produced 561.73 lbs. of fat and 11595 lbs. of milk. She carried calf for 247 days of this time. With this record she qualified for the Register of Merit of the American Jersey Cattle club. Oxford's Rexie of M. B. was tested once previously and in that test she produced 401.08 lbs. of fat as a senior two-year-old.

—If a hotbed is available a number of perennials can be started now so that they will bloom next season, landscape gardening specialists of the Pennsylvania State College say. Some of those to be seeded now are columbine, Shasta daisy, larkspur, and single hollyhocks.

—During the winter months the breeding ewes need a good ration and plenty of exercise. Feed a good leguminous hay, such as alfalfa, clover, or soybean. Silage or root crops and a little grain complete the ideal ration.

—Do not feed old Dobbin too much on days when he is standing idle. Azoturia, commonly known as the Monday Morning Disease, annually takes its toll in crippled and dead horses on farms where a full ration is fed regardless of the amount of work done.

—Cutting the firewood with a carpenter's saw is just as sensible as using one to prune the fruit trees. Buy and use a good pruning saw. Efficient tools make it easier to do efficient work. Ninety cents for a pair of hand shears and a dollar and quarter for a saw is an investment justified even in the home orchard.

—Dairy cows should be kept under cover on all cold or stormy days. More milk from the same amount of feed will result and cows will keep in better condition. Our best dairymen treat their cows right.

### Muskrat, Valued for Its Fur, Found Only in North America.

Muskrats are purely North American animals. Their long scaly tails, flattened vertically, act as rudders when the stocky animals are in the water, says "Nature Magazine." There is little danger of extermination at present, though their fur has been extensively used under various trade names. The average length is twenty-one inches, weight two pounds.

—Subscribe for the Watchman.