CHEAPER THAN MATCHES.

The Ready-Made Gas of Bradford, Pa., Utilized by Smokers.

An Abundant Supply of Illuminating Gas that Never Fails—Hills that are Tipped With Fire.

Pittsburg Dispatch.

A stranger in Bradford once, seeing that, no matter where he went about the city, he found the gas burning at full head in every store and building in broad daylight, asked a citizen:

"Why do you keep your gas burning in the day time?"

"To save matches," said the Bradford man.

The stranger believes the native was lying. Strictly speaking, he was; but, figuratively, he was simply giving the stranger an idea in an epigrammatic way of the cheapness of light in Bradford. The stranger didn't know that the gas he saw blazing on every every hand at noonday came ready for use from a natural reservoir two thousand feet beneath the surface of the earth just beyond the city. He wasn't prepared for the statement that its cost was so small that everybody thought the time consumed in turning it off at night and turning it on again the next night was worth more than the gas consumed by continual burning. But that was what they told him, and it was true.

NATURAL GAS.

The drilling of oil wells is always attended by the appearance of inflammable gas in larger or smaller quantities, although its presence does not necessarily argue the existence of petroleum. Thus natural gas has been used for many years both for fuel and light in Liverpool, Ohio, but there is no petroleum there. The development of the Pennsylvania oil regions has been accomplished with greater economy because of the easy adaptability and cheapness of natural gas as fuel. Bradford and most of the towns in the oil region are lighted and heated by natural gas. The places where gas is found unobstructed by any flow of oil are called "gas streaks." They are extensive in the Bradford field. Gas is found in greater volume in the the third-oil sand, in the first fifteen feet of that stratum, although it is present in all three of the sands in some wells. Third-sand gas is discovered at a depth of from 1,000 to 2,200 feet, according to location. Gas terrirory is worth from $150 to $300 an acre, and the wells are drilled precisely as oil wells are.

The gas supply of Bradford and vicinity is controlled principally by the Keystone Gas company and the Bradford Gaslight and Heating company. They are chartered by the state. The latter company supplies Bradford with light and fuel. It has six wells, three on what is known as the Rixford gas streak, seven miles southeast of the city, and three on the West Branch streak, two miles southwest of the city. The gas from Rixford wells is collected in a large iron reservoir at the wells, and is forced to Bradford in iron pipes six inches in diameter for four miles of the distance, and eight inches diameter the rest of the way. The gas is turned into an eight-inch main as it comes from the West Branch wells. The gas reaches the city from these wells by its natural force. The Rixford gas is forced from the reservoir by pumps. At Bradford the West Branch gas has a pressure on the main of six pounds and a half to the inch; the Rixford gas forty pounds to the inch in the receivers.

HOW IT IS MANAGED.

Natural gas is conducted through the streets and into the buildings by the usual gas distributing system, and is used for light by the ordinary gas fixtures. The distributing pipes for gas in the smaller towns are merely laid on the top of the ground. In Bradford they are buried. The appliances by which the gas is utilized for fuel is simply an iron pipe which connects with the supply pipe, and runs into the stove, grate or range. The stove end of the pipe is perforated. A stop cock is attached to the pipe on the outside of the stove. When a fire is wanted a turn is given to the cock, a lighted match is thrown into the stove, and the fire is kindled. Natural gas is more expensive now than when it first came into use in Bradford. It is not measured. A uniform charge of 50 cents a month per burner is made to all consumers for illuminating purposes, with a discount of 20 per cent where twelve burners are in use. Hotels and other large consumers are given a discount from the rate per dozen burners. For an ordinary family cook or parlor stove the charge per month is $4. Large heaters and ranges are charged $6 a month. The quantity of gas consumed for fuel is regulated by the size of the holes in the end of the pipe. In the early days of using natural gas in Bradford, it was the habit of certain consumers to increase their supply of fuel by enlarging the feed holes. This has been made a misdemeanor by law, punishable by heavy penalties. Bradford consumes about 600,000 cubic feet of this gas a day. Until recently an ordinary stove would consume about 300 feet per hour. A device to regulate and economize the supply, without affecting the result in heating power, has come into use, and reduced the consumption to from sixty to seventy-five feet an hour per stove. It is simply a metallic globe, three inches in diameter, attached to the supply pipe outside the stove. The globe is perforated, and charges the gas with air in such a manner as to prevent extraordinary combustion.

THE NATURAL FLOW

of gas in the Bradford field has decreased very perceptibly within the past year. Until within half a year the natural pressure of the Rixford wells was sufficient to force nearly 1,000,000 cubic feet of gas to Bradford. Now it requires the artificial force that an engine of 400-horse power can furnish to drive gas that distance. The indicators at the wells show that where, one year ago, the pressure was 170 pounds, it is now but 25 pounds. "Nearly $50,000 was expended in perfecting the machinery by which the pumping of the gas from Rixford to Bradford was accomplished. In spite of the decrease in the gas supply, Bradford still lets its gas burn night and day. It is not on account of its cheapness now, but the theory is that the gas which is burned in daytime would be consumed in the waste pipes and by other waste, and it might as well be burned in the burners. But it certainly looks like wanton waste to see half the buildings ablaze with gas at noonday.

Natural gas is a most important factor in lessening the cost of drilling an oil well. It takes twenty-three to twenty-five days to drill a well. The gas companies furnish gas for fuel for the boilers. The charge by the Bradford Gas Company is $1.25 a day for each well. The Keystone Company makes a charge of 6 7-10 cents per foot drilled for the use of gas to fire a boiler. One dollar per day per well is the charge for pumping wells. The Keystone Company have several hundred wells connected with their gas lines—225 in the new Allegheny field alone. The companies require monthly pay in advance for stoves and lighting. Well drillers pay at the end of each month. The gas is used just as it comes from the earth, no refining process being necessary. There are different qualities of the gas. Some of it burns with more or less smoke. The Bradford gas is especially clean. The gas has the odor of petroleum.

BIG FELLOWS.

Some of the gas wells in the Bradford field have been remarkable for the great force of the gas. The Pickett well was remarkable in this respect. This well is situated on the Rixford gas streak, seven miles from Bradford. It was drilled as an oil well in the spring of 1860 by H. E. Pickett. He reached the third sand at a depth of 1,725 feet. At 1,724 feet the gas vein was struck. The rush of gas was so tremendous that drilling had to be suspended. The roar of gas as it rushed from the well is said to have been like that of Niagara. The supply was controlled and had a pressure of 140 pounds to the square inch. It furnished fuel to thirty-five drilling wells in the summer of 1879, besides running hundreds of thousands of cubic feet to waste. An engine at the well was run by this gas instead of steam, so great was its power. A peculiarity of this well was that when the gas was in operation in the engine ice would form on the outside of the cylinder, sometimes an inch in thickness, in the hottest days of summer. The shrubbery for rods about the well was killed by the action of the gas. When the well was drilling four feet in the sand, all moisture was evaporated in the well by the gas, and a column of fine, white dust was thrown out many feet high in the air. The well is still a good gas-producer, and is on the Bradford Gas company's line. Its pressure, if confined, would have registered 500 pounds to the square inch in 1879.

Natural gas is a fruitful source of accidents in the oil regions, in the drilling of wells especially. When a heavy vein of gas is suddenly struck in the first or second sand, it is liable to be ignited by the lamp in the derrick, the forge, or the fire-box of the boiler. This is frequently followed by loss of life and property. The removal of the boiler and lamp from proximity to the well is often no protection against a gas explosion. The gas will settle to the ground under certain conditions of the atmosphere, or be blown along until it comes in contact with the lamp or fire.

GREEN HANDS

Working about the wells occasionally inspect oil wells with lanterns, and generally pay for their rashness with their lives.

Besides its use for warmth and light, natural gas has been successfully utilized in the manufacture of a superior quality of carbon lampblack. Professor Edison is new experimenting with this lampblack for use in connection with his electric light.

Most of the oil towns are rendered as light as day the year round by the burning of huge gas jets in the streets. It is a common thing to see people sitting at night on their piazzas in warm weather and reading or sewing by the light of one of these jets two blocks away. These jets are seen glaring on the summits of high hills and deep in the ravines and valleys. The hills around Bradford are crowned with a circle of these pillars of fire. The depths of many a wilderness are clothed with perpetual light by scores of these great torches of nature. In the immediate vicinity of many of these gas jets the grass grows green all the year round. The many narrow gauge railroads which have found thoroughfares by devious and dizzy ways to every nook and corner of the Bradford field, carry the traveler through the heart of this strangely illuminated region. The scene that greets the stranger coming into the region at night is extremely wierd and awe-inspiring.

Drinking-Water as a Source of Disease.

Popular Science for February.

I cannot go further into the consideration of these circumstances; I only cite them as evidence of the influence of moisture in the soil so far as it is measurable by the proportion of ground-water present. We are more nearly concerned with the relation of the soil to the water which we apply to our use, which we draw from wells and springs, to water as a vehicle conveying matters out from the soil. When typhus or cholera rages epidemically in any place, two parties immediately set up a contention as to whether the epidemic influence proceeds from the water or the air. It must be admitted henceforth that either is possible, that a so-called sickly soil can impart its noxious properties equally to the water and to the air it contains, but it may also be possible as to certain matters and lower organism. Observation and experiment must decide upon that. Most physicians have hitherto considered that infection was probably most directly conveyed through the water, and the so-called drinking-water theory has been developed from this view. It has, however, been ascertained that the best known infectious agent in the soil, the bacillus malariæ, which Klebs and Tommassi-Crudelli have discovered and called in Roman fever districts, can live without air. These investigators found that the malarial poison was not communicated to the water that stood over a richly malarious mud. Tommassi says, in his latest work on the Roman malaria and the ancient drainage of the Roman hills, that "the bacillus malariæ is pre-eminently an air-living organism." Among the conditions favorable to its propagation in a malarial soil which need not be a swamp soil Tommassi specifies a temperature of about 20 deg. C. (68 deg. Fahr.), a moderate degree of steady moisture, and the direct action of the oxygen of the air on all parts of the mass. He says further: "The lack of one of these conditions is enough to cause a suspension of the development of the spores and of the increase of the malarial ferment." If anyone, however, believes that this organism must also remain inoperative when it passes into our blood because that is a fluid, he should be reminded that it makes a great difference whether we put such organisms, taken from their airy nests in moist soil, into cold water, or into warm blood where air is supplied to them from the corpuscles.

We cannot, indeed, answer, with the results of experiment and microscopical investigation, questions respecting the infectious diseases whith the specific germs of which we are not acquainted, but we may be guided in the matter by other facts. Naegelli says: "Contagion fungi can keep up their peculiar activity in the water only for a short time. The purer it is the less food they find in it; they are very soon removed by exhaustion in clear spring-water; and, even in water that contains food for them and where they can multiply fast, degeneration quickly sets in, and they are changed into common ferments."