

RESOURCES

OF

THE PACIFIC SLOPE.

A

STATISTICAL AND DESCRIPTIVE SUMMARY

OF THE

MINES AND MINERALS, CLIMATE, TOPOGRAPHY, AGRICULTURE, COMMERCE,
MANUFACTURES, AND MISCELLANEOUS PRODUCTIONS, OF THE STATES
AND TERRITORIES WEST OF THE ROCKY MOUNTAINS.

WITH

A SKETCH

OF

*THE SETTLEMENT AND EXPLORATION OF
LOWER CALIFORNIA.*

BY

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AIDED BY A CORPS OF ASSISTANTS.



SAN FRANCISCO:

H. H. BANCROFT AND COMPANY.

1869.

The illuminating oils obtained by these experiments, after treatment with sulphuric acid and soda in the usual manner, acquired an agreeable odor, a light straw color, and burned as well in a lamp as good commercial oil.

No paraffine could be detected by refrigerating the heavy oils in a mixture of salt and ice. It is, no doubt, the absence of this body from the series of products obtained from the California oils generally, that accounts for the illuminating oil burning well at a density considerably below the commercial standard for oil obtained from Pennsylvania petroleum—a difference enhanced also by the absence of any considerable quantity of light naphtha. The lubricating oils of this series, likewise free from paraffine, retain on this account their fluidity at low temperatures.

The light oils obtained in these experiments corresponded respectively to 12.96, 14.56, and 18.96 per centum of the crude oil. The total commercial products were about 60 per cent. of the crude body, which likewise yielded sufficient coke to supply the fuel required in the distillations.

The excess of carbon in the heavier hydro-carbons of California suggests the probability of their having a value in their crude state as fuel. For this purpose they may be employed to give cohesion to coke, or fine coal, or any other cheap form of carbon, as has already been done with coal tar in England.

THE MANUFACTURE OF COAL OIL IN CALIFORNIA.—Small quantities of coal oil have been made in this State for many years. The materials in some localities require but little preparation for illuminating purposes. Between 1865 and 1867, Hayward & Coleman, a firm in the oil business in San Francisco, made 40,000 gallons of illuminating oil from springs of petroleum near Santa Barbara; but suspended operations in June, 1867, because imported oil was selling at 54 to 55 cents per gallon, a price so low as to render the manufacture unprofitable, owing to the high price of cases to contain it, transportation, and labor.

These gentlemen have expended capital and labor in efforts to render valuable the California petroleum. After many experiments to test its adaptability for fuel, they state that, although it costs \$5 per barrel to bring it from the springs to San Francisco, it is cheaper as fuel than coal or wood. It saves expense of hauling and splitting, and of feeding the furnace; it makes no ashes to be carted away; causes no waste in lighting or extinguishing the fire; while with wood or coal there is waste of time and material in these operations. The heat is under control, and may be easily regulated. The operations of this firm have been carried on for a year, with petroleum as fuel, for distillation and driving their engines, thus establishing the practicability of its use.

A number of establishments in the southern counties also use it for running machinery. A gentleman interested in the oil business has recently perfected an apparatus for burning it for domestic purposes. He has made application for a patent. This invention it is said performs the duty satisfactorily, burning the crude material without smoke or offensive odor.

Stanford Brothers have also expended capital and labor in efforts to manufacture oil from California petroleum, and have succeeded so far as to make oil; but not with profit. Up to July, 1867, this firm had made 100,000 gallons of illuminating oil, and a nearly equal quantity of lubricating, and have been making about 20,000 gallons of illuminating per month, since. Their works are still in operation.

For reasons stated, much of this oil is prepared to a standard density of 35° Baumé, which causes it to burn better, and exempts it from the tax of 20 cents per gallon levied on coal oils of 36°.

This firm purchase the crude oils from several localities, but obtain their chief supply from tunnels and pits near San Buenaventura. The high cost of vessels to contain the oil when made; of transportation and interest on capital, and the low prices ruling for the imported article, are impediments to the successful development of this resource.

It costs six cents per gallon for second-hand cans. New cans would cost 15 cents per gallon. Each 40-gallon barrel of crude material costs \$3, or 7½ cents

per gallon for transportation from the springs to the refining works. As the crude petroleum only averages 45 per cent. of marketable oil, each gallon of such oil costs 21 cents without the expense of refining, or the 20 cents for tax, or any allowance for commissions, loss, interest on capital, or other incidental expenses. For these reasons the interest is in a depressed condition. It is unprofitable to make oil when the imported article is less than 60 cents per gallon.

The material used by Stanford Brothers, in addition to the illuminating oil, produces about 25 per cent. of lubricating oil, which if it could be sold at 25 cents per gallon would make the other branch of the business profitable. But there is no market for it, owing to a prejudice against its use. The consumption of lubricating oil in California amounts to 500,000 gallons annually, including castor and China nut oils. That of illuminating oils reaches 900,000 gallons annually. Of course this creates an important trade for importers.

The Buena Vista Company made about 4,000 gallons of illuminating oil at their works near the springs, and other companies made more or less. Nearly a dozen companies had stills in operation for a short time. Mr. Stott has made about 5,000 gallons at San Francisco. Mr. Williams, of the same place, has also made about the same quantity. Altogether it is safe to estimate the quantity of California made coal oil at 175,000 gallons. The capacity of the stills for making it is sufficient to turn out 100,000 gallons per month.

The idea that the manufacture of California petroleum may yet be made profitable is not abandoned. A company was organized at San Francisco as recently as September, 1867, with a capital of \$1,250,000, for the purpose of working petroleum and asphaltum deposits.

THE MODE OF OCCURRENCE.—The oils of California do not "occur" in the same manner as those found in the Atlantic States. Here there are no flowing wells, nor is it probable any will be found. Some of the wells sunk in the Mattole valley, Humboldt county, reached the depth of 1,166 feet without obtaining a flow, though sunk in a district overflowing with oil on the surface. Other wells of nearly equal depth have been sunk in other counties, through various formations, with similar results.

Without entering into speculations as to the cause of the abundance of oil on the surface, and its deficiency below, it is enough to know that oil exists in sufficient quantity. There are many natural wells or springs of it in the Coast range, some forming pools of oil; others showing but little more than "indications" of that material. From some of these springs petroleum flows in a black, viscid stream, like tar; from others, clear, colorless, and comparatively pure. In exceptional instances it has been used without preparation in common coal oil lamps. At some places the springs are widely separated; at others, scores of them are found within the space of an acre. Generally the single springs produce the most petroleum. About some are large deposits of asphaltum, while none of this mineral is seen within miles of others, though the oil has been flowing for centuries, and its course can be traced for miles along the surface.

Where a record has been kept the flow of petroleum has been larger during the night than the day, and more abundant in winter than summer. Usually where petroleum is found there are salt springs and alkaline waters.

Reference to the oil wells of San Fernando district, Los Angeles county, will convey a general idea of the oil formation in the Coast range.

This district is situated 30 miles northwest from Los Angeles. The formation lies in a range of mountains extending in a course nearly east and west. The central stratum is shale, which seems to contain the most oil, and inclines north and south at an acute angle, the top being from 150 to 200 feet wide, slightly depressed, and covered by a stratum of sandstone of variable thickness. This shale is bounded by a similar sandstone, alternating with thin seams of limestone and hard conglomerate. At the base of the mountains the formation is hard

sand and limestone, both containing marine fossils of a recent era. These mountains reach a height of about 700 feet above the local river beds, and about 4,000 or 5,000 feet above the sea level.

The oil stratum varies in width, being in some places a mile or more, as in Rice cañon, in others only a few hundred feet; but is continuous for many miles. In the gulches and cañons, where the water has eroded the formation and exposed the shale to the action of the atmosphere, the oil is found oozing out. The water in the district is unfit for use. Oil is also found on the summit of the mountains, which are crested with shale, being carried through the shale by capillary attraction. At some places beds of "brea," or asphaltum, have accumulated, where the oil has evaporated. The rocks, forming beds of streams which dry up during the summer, are covered with a complex alkaline efflorescence.

The manner of collecting the oil in this district is by sinking pits in the vicinity of the natural springs, in which oil and water collect. The oil is skimmed off by hand, each pit of 20 by 20 yielding about two barrels per day. When collected it is dark green in color, and about as thick as sirup in summer, and contains about 80 per cent. of oily matter, mechanically combined with 20 per cent. of water, from which it is difficult to separate it.

In other places tunnels are run into the mountain. The oil drips from the slate when it is cut through.

The Buena Vista oil claim is located on a belt of bituminous shale from two to three miles wide, and from 30 to 40 miles long, running parallel with the Coast range, near Buena Vista lake, Tulare county. From this formation petroleum exudes at a number of places.

The oil obtained was the seepage of one of these springs collected in pits dug for the purpose. These pits are generally 20 feet deep, five feet wide by eight feet long, each producing about 300 gallons of crude materials in 24 hours, containing 40 per cent. of light, and 50 per cent. of lubricating, or heavy oil. The claim was worked from February, 1864, till April, 1867, when, owing to the low price of oil, it was found unprofitable to prepare it for the San Francisco market, and the local demand was fully supplied.

A notable difference exists in the density of the oil from this place when obtained at but slightly different depths from the surface, ranging from 18° Baumé to 22° at 20 feet, 22° and 26° at 30 feet.

Similar surface deposits are met with in nearly all the valleys of the Coast range.

It will be seen from this imperfect sketch, that although not occurring in the same manner as the earth oils of other countries, the California oils are nevertheless valuable for illuminating purposes. The cost of production is the material point which must govern the development of many natural resources of this State. It is a question that must be candidly met. So far as petroleum is concerned, it must be acknowledged the facts are against us. But cheap labor and increased facilities for transportation will naturally follow an increase of population. With capital and labor as cheap as in New York or Europe, California petroleum would be a source of wealth to the country. At present it is an unprofitable resource.

QUICKSILVER.—THE NEW ALMADEN MINES were so fully described in the preliminary report, that a brief reference to their present condition will be sufficient here.

The production of quicksilver in these mines has fallen off nearly one-half during the present year owing to various causes, the chief of which is, the limited demand for the article as compared with former years, and the increased production from other sources. A large quantity has accumulated in the markets of the world, estimated by some as high as 100,000 flasks. The mines of Almaden, in Spain, have furnished a large proportion of this supply; and the production has been considerable in Austria and South America.