

through this world in flames—men live and love unharmed, tend sheep, plant onions, sleep, are born and die, as in more prosaic regions. The reeds and grass are in nowise affected by the flowing oil or by the burning gas. In fact, Rot-tiers, the traveller, thought the whole phenomenon electric, when he noticed that the vacuum in his thermometer tube seemed to be especially full of flame, and that the east wind put to quiet the whole exhibition; with which fact we may compare the curious discoveries of Moffat with his phosphorous thermometer, published in *Silliman's Journal*, December, 1862, p. 437, as bearing on his theory of two normal opposite air currents. From an equally remote era the Burman empire and northern Hindostan have received annual supplies of rock oil from the wells of the Himalaya valley of the Irrawaddy, through Rangoon; and it has always been a favourite drug in the Indian pharmacopœia.

In Italy, the oil wells of Parma and Modena date back nearly two centuries, the year 1640 being that assigned to their discovery. The springs of Ammiano have long lighted the streets of Genoa.

In France, oil springs have been known from time immemorial at Clermont and Gabian; and in Canton Neufchatel; and in Bavaria, Germany.

In the English coal mines, of course, the coal oil gas—the dreadful fire-damp—was always a well-known demon to the mining population; but in 1659 Shirley, perhaps first, describes it to the reading public as an illuminating gas. In 1733, Sir James Lowther laid pipes along the mines and burned the gases at the surface of the earth. Dr. Clayton's retort experiments, to which we referred above, were six years later still. His "incondensable spirit" he burned in bladders for the amusement of his friends, as did Dundonald again in 1786, and Murdock in 1792. But the lighting of London streets and houses with gas came not till 1842. Twenty years have elapsed, and there are in Great Britain and Ireland, 1,015 gas works, with a capital of \$90,000,000, charging an average of \$1.80 per thousand cubic feet to small consumers, and deducting from twenty-five to thirty per cent. for heavy consumption. Some of these companies pay twelve per cent. dividends, and many of them ten per cent. The average capital of British gas works is said to be nearly twenty per cent. less than that of American works.

In America, the history of coal oil commences with the use which the white settlers found the Indians made of it for medicine, for paint, and for certain religious ceremonies. The settlers adopted its medicinal use alone, and retained for more than one affluent of the Alleghany river the Indian name of Oil Creek. The one which has become so celebrated lately, enters the river a few miles above the town of Franklin. The oil was collected by the natives and the whites by spreading blankets on the marshy pools which line the edges of the bottoms at the foot of steep hill-sides, or even mountain walls, such as hem in those valleys and support a table land of coal measures above. The remains of ancient pits, with notched logs for ladders, show how long the product has been valued by the Aborigines. But although in all the valleys of western New York and Pennsylvania, eastern Ohio and Kentucky, and north-

western Virginia, the evidences of the almost universal existence of the Seneca Oil was known to the early settlers, its actual abundance underground was not dreamed of. Even long after the era of salt-well boring had begun, the isolated cases of spouting wells did not teach the truth as it is now known. Some of the oldest salt wells of the Pittsburg region, it is true, and of the Kanawha valley, yielded not only brine, but also oil and gas in great abundance; and in more than one place, and with a partial and temporary success, the gas was tubed off and led beneath the boiling vats for fuel. But it was too fitful in its escape to be relied upon; the oil which accompanied it was of no use, and when abundant a great nuisance. Hildreth describes the quantities of Petroleum spouted from the salt well bored in 1819, in the valley of the Little Muskingum, in Ohio, and the tremendous explosions of gas which interrupted, sometimes for days together, the flow of brine. It was this fitful and ungovernable vis a tergo, having its unknown seat of power in the deep, which made every effort futile to employ the gas as fuel.

Travellers report, however, that this has been successfully done by the Chinese salt-makers for many centuries. As for the oil, continues Hildreth, it made for itself a local commerce, beginning to be in demand for lamps in workshops and manufactories, and the suggestion was already made that it would serve to light the streets of the cities Ohio. It is not a little singular, says Mr. Hodge, that with the sources of supply thus pointed out, and the useful application of the Petroleum understood, its value should have remained unappreciated, and at the expiration of more than thirty-five years, be at last perceived through the progress of experiment made upon the distillation of bituminous shales and coal. But the fact seems to stand thus: the natural coal oil was a disgusting and imperfect thing, and there was neither the pressure of necessity nor the favor of science applicable, in Ohio, in the beginning of the century, to its purification. The destruction of the whale fishery, the increase of the railroad system, with its rolling gear and workshop machinery, and the coming in of lard oil as a substitute for whale oil, all had to intervene between the inception and the performance of the coal oil drama.

It was in 1847, that Mr. Young, in Glasgow, (the most intimate friend, by the way, of the African traveller, Livingstone,) had established his purification of Petroleum from the Ridding's mines in Derbyshire, boghead cannel, common coal shales, peat and solid bitumen, and introduced the use of these mineral oils to such an extent, that a search for the native article long known to exist, was set on foot in earnest. The oils of the coal region of America at once commanded principal attention. The first practical movement in this direction was not made, until, in 1854, Messrs. Eveleth & Bissell, of New York, secured the right to the upper spring on Oil Creek, and organized a company. Still, three years passed before Mr. Bowditch and Col. Drake, of New Haven, began the first Titusville boring, striking the oil stratum at seventy-one feet depth in August, 1858. The drill sank suddenly into a cavity, and the oil rose within five inches of the surface, and was pumped off at the rate of, at first, 400 and afterwards 1000 gallons per day.