ODD AND INTERESTING EVENTS IN THE DEVELOPMENT OF OIL SHALE

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The many attempts to utilize oil shale in its 1200 years of recorded history has as one might expect, resulted in the documentation of a variety of developments and events. Some are records of history and historic uses; others include happenings in the actual planning and attempts to mine and process the material; still others areas of interest include some of the terms and equipment developed by those who performed the work. Oil shale is not unique in these aspects, but like similar occurrences in other industries, these items do not receive wide publicity, but are found only by those who have had the opportunity to research the subject at some depth.

I have had the pleasure of discovering a number of rather odd or unusual events of interest that have occurred over the world during the attempts to utilize oil shales and would like to share some of these with you.

One item of interest is the fact that in some areas of Austria shale oil is still called "Thyrschenblut" - the petrified blood of a giant named Thyrsus who was killed in Tyrol by a hero Haymon, a companion of Detrch of Berne, around 800 A. D., or thus the legend goes.

Did you know that when Robert Young constructed his first plant to recover oil from oil shale at Addiewell his friend Dr. Livingston (later of African fame) laid the foundation stone?

Oil shales of Broxburn and West Calder, Scotland, were used in the Bronze Age for burial cists and at a later date for field drains, paving and similar purposes since they resisted moisture and could be quarried in large slabs. Similar uses were found in the Campsie District, where the oil shale was known as "vitament".

The Kimmeridge shales of southern England were found to have been cut into disca 1.25 to 2.125 inches in diameter and 0.25 to 0.75 inches thick. They were cut with great precision. Who made them and for what is unknown, but archeologists date their origin to pre British and Roman occupation.

There is evidence that English oil shales were worked in Phoenician times for some constituent not now known. Later they were used in the 16th century for heat to evaporate sea water to produce salt, and for reducing related schists to produce alum.

Also in Kimmeridge the courts ruled in 1864 that the "offensive-smelling and unmarketable shale oils could not be held in anticipation of Youngs patent."

Some Scottish mining terms of interest were:
"cousie" haulage - in which the weight of the full hutch or car draws up the empty in an inclined shaft;
"cuddy" haulage; the name cuddy was given to a balancing hutch (car) which is weighted and runs on its own track. When full hutch is descending, the cuddy balanced it and eliminated braking. The heavier cuddy then raised the empty car to the top of the incline.
"dook" - this was a downward inclined underground passage or ramp in the mine.
"snorer" - this was a multi-stage centrifugal water pump with a centrifugal air pump attached to the suction end. Used for sinking purposes.

As oil shale replaced boghead coals and other softer material, the gang of men using long-handled hammers could not produce the required shale for retorting, even though their number was quadrupled. So the first toothed-roll crusher was invented in 1885-6.

Redwood in 1897 remarked "no matter what form of retort is used, it is absolutely necessary for their safe working that the gas main shall be well supplied with explosion doors... The iron cover has about 3 feet of chain attached securing it to the main. In case of explosions - which occur quite frequently - the iron cover is blown off and affords immediate relief to the main, while the chain prevents the cover being blown any great distance and temporarily lost."

Problems also occurred in early refining. The early cast-iron cylinders with wrought iron heads soon cracked around the middle and dropped their 500 gallom contents into the furnace below.

The next stills of 1,000 gallon capacity were made of boiler plate and had a concave bottom of the same material. These also failed since after four or five distillations, the entire bottom often would drop, in one piece, into the furnace and cause a serious fire.

Early settlers of the Blue Mountains near Georgian Bay in Ontario, Canada, found a rock that would burn if ignited. An English Lawyer named William Pollard, while setting beside a camp fire, found that filling a flintlock

musket barrel with ground shale and heating it in a campfire would produce a flow of oil through the guns nipple that burned with a fine blue flame.

Such experiments led to the establishment in 1859 of an oil shale works in Cragleith, on the shores of Lake Huron. This plant operated until 1863 when nearby oil wells reduced profitability. This was the only commercial shale oil operation in Canadian history to date.

Records showed that the needed shale was mined from a nearby quarry. The Canadian Geological Survey could not find the quarry and questioned the source of the shale. Finally in 1966 the quarry was located. A resort hotel had constructed a swimming pool in it.

In Australia the steep and winding grades to the Newnes Oil Shale Plant required the use of full-gage Shay (gear driven) railroad locomotives. The plant was closed and some years later the rail was removed and sold as scrap. It wasn't until the rail removal crews reached the plant that the owners found that the best locomotive was marooned. Its still there.

Several years ago a paper given here described the only known in situ experiment in Australian shales. Dr. Cane of Tasmania and the author of the Australian Chapter of my book said in effect--that's pretty good Johnny but its not the way I heered it. According to Dr. Cane, the retort workers were on strike and the miners were murmuring about striking also. Fell (the Superintendent) thought it would be a good time to try an experiment and also bring the 'miners' to heel. He allowed the broken shale to accumulate in the passage ways and at the mine mouth. When the miners eventually did strike, Fell got the day laborors to fill up one of the side tunnels with broken shale. He then poured shale oil over the outer portion of the crushed shale, started the fans, and set fire to the oil. I was told that the "whole fire" got away from him, there was smoke and flames everywhere. The fans were stopped and the fire allowed to burn itself out. It took some time to get the mine in working order again.

Also in Australia, in spite of extensive studies by "blue ribbon" committees and details of operation and financing. When the National Oil Pty. Ltd., (the Glen Davis Operation) was formed their Directors deliberated the matter and came up with decisions diametrical opposit to nearly all the previous recommendations. The assets of the Newnes plant were moved at great expense and reinstalled at Glen Davis where the water was in short supply and in general all accommodations were much poorer than those at Newnes. We haven't time for details but the Glen Davis plant was a failure economically from day one and all in all little oil was produced.

A somewhat similar situation occurred during WW II in Germany when the Government took over all oil shale operations. The Coal-Oil-Union von Busse Kommanditure-Geselshaft was formed. Instead of developing plans similar to existing plants, such as Lurgi and the Chalk Works, this new corporation turned its attention to the production of shale oil "in situ" and in "Meiler" (piles), with the result that no appreciable amounts of shale oil were produced.

Most of you are aware that the Chinese Fushun oil shale operation utilizes shale stripped as overburden to reach the coal. Are you aware that the Fushun coals were being mined about 750 years ago by the Koreans for fuel for the china and earthenware industry? During the Kantung Era 300 years later, mining was prohibited by the Chinese Government because the workings were too near the Manchu emperor's mausoleum in the suburbs of Mukden. Still later, during the 27th year of the Kuangshu Era, the Chinese Gov't. permitted resumption of mining. During and prior to the Russo-Japanese war (1904-05), the Russians produced approximately 300 tons a day from three collieries. The first open pit was started in 1914.

In Canada Dr. Abraham Gesner, who many consider as Dr. Young of Scotland's counterpart in America, patented the material kerosene in about 1852.

Goldie Meir, on the lack of oil in Israel stated, "Moses wandered the wilderness for 40 years and then settled on the only area that had no petroleum."

Brazil has had its problems, They entered into an agreement with the Julius Pintch Co. of Germany to set up an oil shale plant in Marau. The equipment was available and the first payment was made, but alas, to no avail, for within a month (1939) Germany became involved in World War II. The planned oil shale plant has never been constructed.

In an attempt to dispose of discharge water from retorting of oil shale the water was run into a nearby field. Robert Bell noted that the growth of grass in the disposal area was extraordinarly luxuriant. Investigation revealed the ammonia content. The subsequent recovery of ammonium sulfate was the life saver of the Scottish industry.

The Scottish fields were intruded by sills and dykes of diabase and quartz-dolerite at two different periods. The intrusions destroyed great areas of oil shale, converting it into procellanite. In one case an area of 29 square miles was invaded setting free a great quantity of oil, some of which was found in adjacent sandstones and some as pools of oil in the sill itself.

In France it was noted that Neolithic man (late stone age) used the Autun oil shale for bracelets. The authors personnal hypothesis was that the shales had a "magic value" or more simply the odor of the shales repelled vermin.

The use of oil shale for works of art is supported by the existance of beautiful art objects made of oil shale found in the ruins of Mesopatania.

The use of Autun oil shale by the Romans for decoration and paneling and sculpture in their temples is evident by the finding of these items in the temple ruins of France.

Some Tasmania shale products were noteworthy because of their appallingand nauseating smell (the straight gasoline had 1.6% sulfur). Nevertheless the gasoline was prized by the local racing-car drivers, particularly for the hill climbs. When the sulfur (and the odor) was reduced because of complaints of the townspeople, the racing community complained that the "petrol had lost its punch", and stopped using it.

There are many more such items, but I believe we will stop here. I hope you have enjoyed hearing of the trials and tribulations of early day oilshalers. Perhaps one day the problems of a United States oil shale industry will be recited here. Thank you.