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ARCHAIC MANNER OF LOW-TEMPERATURE CARBONIZATION OF OIL SHALE IN WARTIME GERMANY

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Estonian oil shale industry with its 80-years-old history is unique in the world and has been an object of continuos interest of other states processing analogous resources. Germany, when preparing for a big war in 1930s, was deeply interested in shale oil as a possible substitute for naphtha and as a special fuel for submarines.

In the Kiviõli shale oil plant basing on German investments the production of oil was started in 1936. Germany was also the biggest consumer of Estonian shale oil. In 1940-41, the Estonian oil shale industry belonged to the sphere of interest of Soviet Russia. The leaving Soviet Army destroyed most of the equipment of oil plants in 1941. Thereafter, close behind the German Army, German engineers from Baltische Ölgesellschaft m.b.H. came to administer Estonian oil shale industry. They had great plans for developing oil industry (to raise shale oil production up to 0.5 million tons per year). The realization of these plans in wartime failed due to the lack of qualified staff and application of Russian prisoners of war instead.

In 1944, Estonian shale oil industry was subordinated to the soviet power again and the last remaining specialists led by a mining engineer Emil Kuhi escaped to the West. Baltische Ölgesellschaft invited them to Süd-Württemberg in Germany. They were commissioned to put a shale production into operation over there. A great shortage of oil during the end of war compelled Germans to use every possibility to overcome this difficulty.

Dr. Schweitzer started with his researches on low-temperature carbonization of local oil shale in a chemical laboratory at Stuttgart

Technical University in 1937. In co-operation with Lurgi Works, a new type of reactor was designed. Reactor had a throughput rate of 1000 t per day. Its construction began in 1943 in Frommern. In the same year Deutsche Ölschiefer-Forschung Gesellschaft (DÖLF) was founded, followed by the foundation of Deutsche Schieferöl-Gesellschaft m.b.H. next year.

The project under the general name "Wüste" in Süd-Württemberg in district Rottweil-Balingen included ten oil shale plants giving a job to prisoners of seven concentration camps. Erection of eight more shale plants was planned. Free Estonian specialists worked in a plant near the village Dormettingen. The director of Baltöl Dr. Sennewald nominated Estonian mining engineer E. Kuhi for the director of this plant. About a hundred Estonians worked there, including chemists M. Sc. Pääsuke and Ivaste, engineers Aunapuu, Kivirand and others.

Because of lack of skilled workers, a quite primitive flow sheet of charring in piles was used for producing oil. Mined shale was heaped up to form a flat pile 1.5 m high in a 10 × 30 m field (Fig. 1) on perforated iron tubes (∅ ca 300 mm) which were connected to a main collecting pipe. Carbonization gas was exhausted by fans from the collecting pipe on electric filters where oil was separated (Fig. 2).

The equipment was installed in winter 1944/45, and the first unit was put into operation on March 3, 1945. The first production - 18 tons of oil - was sent to Balinger airport.

The war came to the end , and in July 1945 Estonians decided to leave the place. In October 1945, Emil Kuhi turned the management over to a Baltic German Kurt von Middendorf from whom he had taken over the mine in Küttejõu in Estonia in 1939. The ring closed...

In spite of the efforts of K. v. Middendorf to keep German oil shale production in operation with the help of wartime levers, the unprofitable production was closed down in 1949.

War is a force enabling to put into practice even most uneconomical processes, as demonstrated by shale oil production in wartime Germany. It is clear, of course, that oil shale industry may be quite profitable under other circumstances: in the same German district oil shale was successfully used as fuel for producing cement (Rohrbach Zement).

Some characteristics of Jurassic oil shale of Süd-Württemberg district (in %):

Organic matter	9.5
Ashes	70.8
CO_2 carb.	19.7
Sulfur	2.7
Oil yield	3-4.5

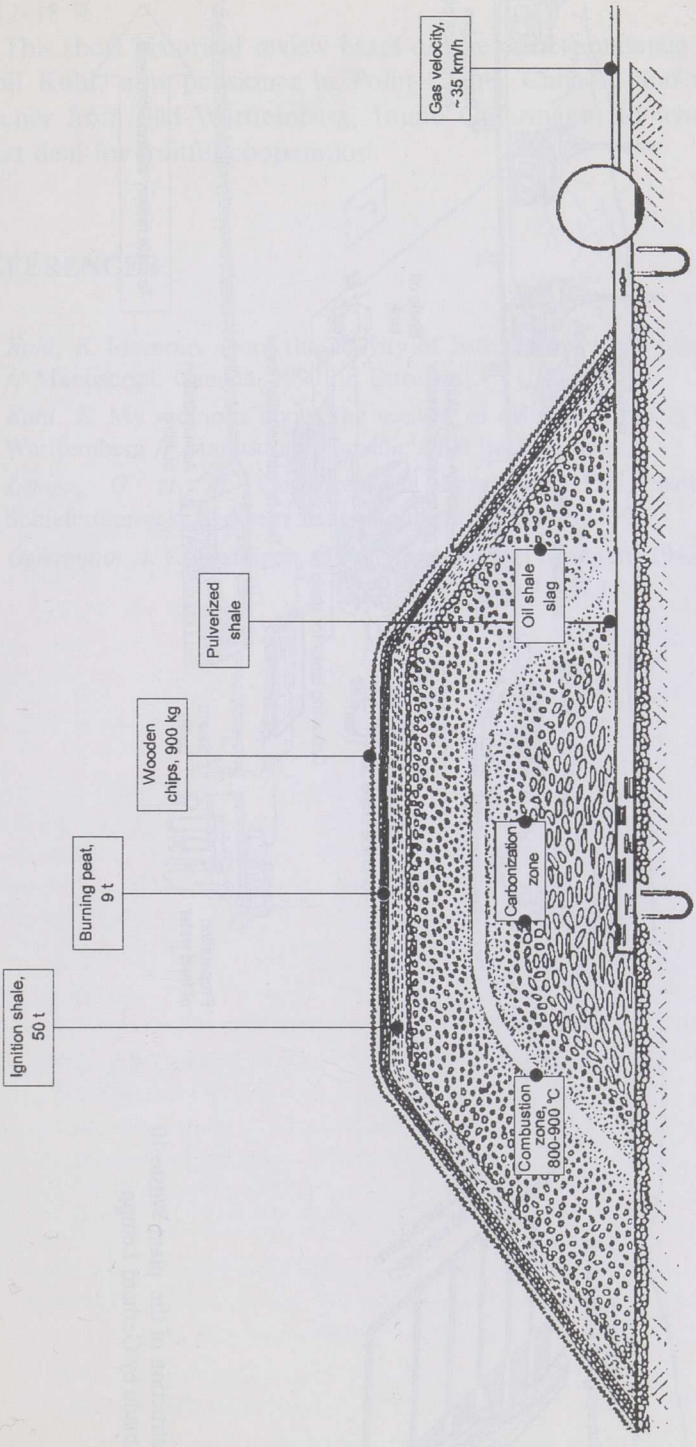

Fig. 1. Cross section of an oil shale pile (according to the method used in Wüste-Werke) (in the bottom of the pile perforated pipe for exhausting combustion gas)

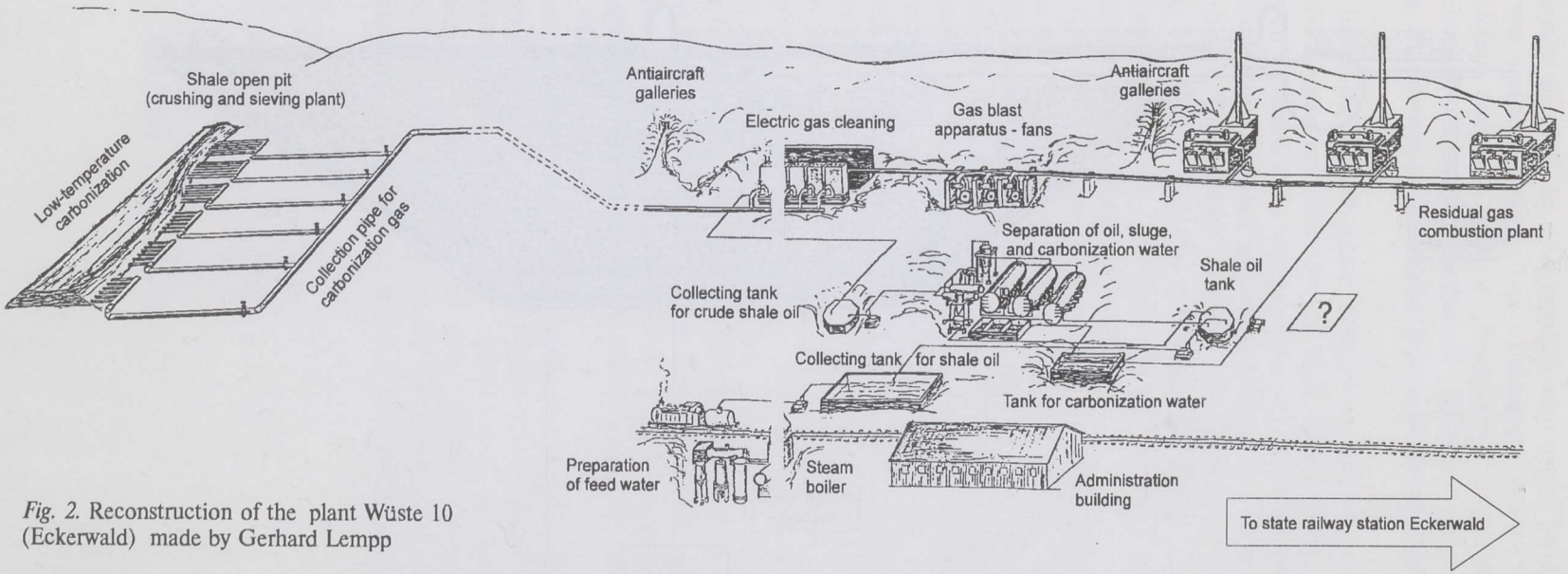

Fig. 2. Reconstruction of the plant Wüste 10 (Eckerwald) made by Gerhard Lempp

Estonian kukersite contains 35.5 % of organic matter and the oil yield is 12-18 %.

This short historical review bases on the correspondence with engineer Emil Kuhi, now pensioner in Point-Claire, Canada, and with a school teacher from Süd-Württemberg, Immo Opfermann, to whom we owe a great deal for fruitful cooperation.

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