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EDITOR'S PAGE

PROSPECTIVE OIL SHALE UTILIZATION

Global oil shale resources are estimated to be about 10^{13} tonnes. The oldest deposits, such as those in Estonia and NE Siberia, formed 450–500 million years ago. Compared with other fossil fuels, the distribution of oil shale around the world is relatively uniform. Oil shales have been discovered in almost 100 states. Let us try to speculate about future trends in more sensible use of oil shale resources. No doubt that the problem presents a serious challenge to geologists, biologists, technologists and other specialists to provide future generations with necessary resources and safe environment.

There is no doubt that bound carbon present in fossil fuels, oil shales included, will be exhausted by the end of the next two or three centuries. The question is, how to consume the carbon resources as effectively as possible.

The world population has crossed the line of seven billions, and every eleven years will add another billion. According to UNO data every fifth person of the world suffers from malnutrition.

Hence the first challenge – what could be done to use World's oil shale resources, particularly their bound carbon for producing raw material for food – energetic components of nutritives. Investigations in this field have been made in many states. "Activation" of oil shale organic matter in order to turn it into a bacterial culture medium, for instance, would pose no problem to the modern science. Destruction of kerogen, an organic polymer, has been being investigated almost for a hundred years. I should refer here to studies dealing with the effect of chlorine on American and Estonia oil shales (the monograph by Mc Kee, Master's thesis by A. Saar and others). Successful application of microwave technique for rubber depolymerization is of considerable interest as well. The history of investigating bacteria dates back to their discovery by a Dutch scientist A. van Leeuwenhoek in 1676. We know now that bacteria live in any environment in the world. Their biomass exceeds that of human population ten times. As we know, the present possibilities of solving the nutrition problem of mankind are reaching their limits. A potential means to alleviate the problem might be growing Protozoa. However, consumption of the food based on Protozoa requires great changes in our eating habits.

The second challenge at oil shale utilization could be paying more attention to developing oil shale chemistry besides its direct burning and energetic use of the products of its technological treatment (shale oil and gas). The possibilities of direct application of oil shale kerogen have obviously not been used to the full. Enrichment methods enabling to produce kerogen concentrates containing at least 70% of kerogen have been applied on an industrial scale. The use of oil shale organic matter as the raw for chemical industry would require preceding separation of individual compounds. One of the processing solutions would be the use of the mixture of dicarboxylic acids obtained by oxidation of kukersite kerogen.

Prof. A. Fomina and her co-workers have shown more than 50 years ago already that the mixture containing dicarboxylic acids from the amber acid (C_4) to the sebacic one (C_{10}) can be separated successfully yielding high-grade individual acids. Their results offer, in principle, the possibility to use the refined individual acids both as a chemical raw and as a source of energetic components of food. Environmental requirements are becoming more strict day by day all over the world since man has become the crucial factor in transformation of natural materials. Estonia with her oil shale energetics, considering the small population, belongs certainly to the top of countries with large-scale rearrangements of natural resources. Thus, scientists and technologists face a serious challenge. They have to return to more profound studies aimed at "transportation" of oil shale organic matter to the surface without actually mining it. There is much to do in this field. Fairly optimistic expectations are based on the encouraging data obtained by companies that have started substantial research on *in situ* technologies for recovering shale gas. It makes us optimistic. Estonian oil shale and Dictyonema shale – graptolite-argillite – need further detailed investigations in this aspect as well. As for oil shale underground retorting or gasification technologies, the research conducted so far has revealed serious environmental problems which must find their solution before carrying out corresponding industrial applications. It must be stressed that global oil shale resources are of most different nature locally, both from chemical and technological point of view. This is why every deposit has to be studied individually to avoid possible mistakes at generalization.

Last but not least, I call on all the readers and contributors of "Oil Shale" to exercise their imagination more freely, as "the present phantasy can become a future technics" as expressed by a Member of the Soviet Academy Alexander Fersman (1883–1945).

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