THE CONVERSION OF COAL INTO OILS

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AUTHORISED ENGLISH TRANSLATION

EDITED

WITH A FOREWORD AND NOTES

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FOREWORD

The problem of the production of oil fuel from coal was raised to a subject of first-class national importance for this country by the findings of the Royal Commission on fuel and engines for the Navy presided over by the late Lord Fisher in 1912–1913. The question became acute in view of the shortage of oil supplies during the war, and is being kept alive in Great Britain, and in other countries not producing natural oils, by the rapidly growing demands for liquid fuel for commercial purposes on land, on the sea and in the air. A fundamental condition for the solution of this question and the achievement of the still more ambitious task of the complete liquefaction of coal is a clearer and more precise knowledge of the constitution of coal, and of its behaviour under chemical and physical treatment, than we at present possess. Much progress in this direction has been made by workers in this country and in the United States of America during the last ten or fifteen years. An extensive series of valuable contributions to the subject has emanated from the Kaiser-Wilhelm-Institut für Kohlenforschung at Mülheim-Ruhr in Germany, a research organisation inaugurated in July 1914, a few days before the outbreak of the World War. The results of these investigations, carried out under the direction of Professor Franz Fischer and dealing with all phases of the production of liquid fuel from coal, have been published in six volumes of *Gesammelte Abhandlungen zur Kenntnis der Kohle* and in papers contributed to *Brennstoff-Chemie*. To most English readers these publications are known in abstract only. I therefore readily accepted Prof. Fischer's invitation to prepare an English version of *Die Umwandlung der Kohle in Öle*, a work in which the whole problem of the conversion of coal into liquid compounds is reviewed and critically examined in the light of his and his collaborators' researches and those of other workers.

In revising the English version the following questions had to be decided: whether additions to the literature on the subject published after the completion of the German manuscript should be dealt with; whether the description of plant for low-temperature carbonisation, particularly in Great Britain, should be brought up to date; and whether the author's expressions of opinion should be commented upon. In my endeavour to preserve the personal note of the book, and after consultation with the author, I decided to follow the original text without alterations, excisions or additions, as closely as is compatible with English phrasing. I considered it, however, desirable to append some notes dealing with the latest developments of low-temperature carbonisation, the treatment of primary tar and the hydrogenation of coals. The reasons for selecting the subjects of the additions are given in the Appendix.

The absence of general agreement on the question of the terminology of coal made it advisable to adhere to a literal translation of the types of coal used by the author, which are based in the main on the Westphalian classification.

The following approximate equivalents (with the terms of Seyler's present nomenclature in brackets) may be found useful :—

Lean coal	= dry non-caking coal (" carbonaceous ");
Fat coal	= hard coking coal (meta-, ortho-, para-bituminous);
Gas coal	= long-flame caking coal (meta-lignitous);
Gas-flame coal	= long-flame non-caking coal (ortho-lignitous).

The generic term " bituminous coal " stands for *Steinkohle*, mostly as contrasted with " brown coal."

The actual translation, which other duties prevented me from carrying out, was made by Dr. H. Borns, to whom my thanks for much painstaking assistance are due.

I am also indebted to Mr. A. H. Raine for reading the proofs and compiling the index.

R. Lessing.

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AUTHOR'S PREFACE

Impressed with the scientific, industrial and economic importance of "the Conversion of Coal into Oils," I have written this book for the purpose of outlining the possibilities which the researches of the last decade have opened up.

Under the title adopted I have discussed both the partial conversion by cautious destructive distillation, with the "Production of Primary Tar," and the total conversion by direct "Hydrogenation of Coal," as well as the synthetic conversion preceded by gasification. The latter, the "Synthol Process," combined with primary tar production, likewise indicates the possibility of a total conversion, and indeed offers, in my opinion, the best promise for the future.

In order to complete and to frame the picture, I have added to the study of the three chief methods, which constitute the essence of the book, an introductory chapter on "Coal Extraction by Solvents" and a concluding one on "Hydrocarbons from Carbides." If the perusal of the book should suggest that my deductions seem to be based more upon work carried out under my direction than would appear justified from our share in the scientific output, the reader must not conclude that I underrate the importance of the work done elsewhere. I have, on the contrary, been anxious to give due consideration to all the literature on the subject. On the other hand, the investigations on which I have now been engaged for nine years have been planned and arranged to explore all avenues which lead from coal to oil.

I wish to express my indebtedness to my collaborator, Dr. Hans Tropsch, who kindly read the proofs and compiled the index.

Franz Fischer.

Mülheim-Ruhr.

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