LIQUID FUEL.
LIQUID FUEL

FOR

MECHANICAL AND INDUSTRIAL

PURPOSES.

COMPiled BY

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E. & F. N. SPON, 125, STRAND, LONDON.
NEW YORK: 12, CORTLANDT STREET.
1890.
PREFACE.

The present treatise on liquid fuel is, I believe, the first work of its kind in the English language. Hitherto no book has been published, to my knowledge at least, devoted solely to the mechanical and industrial applications of liquid fuel, and the problems involved thereby. No apology is therefore needed for introducing it to the public, except in so far as its imperfections may demand one. These I feel certain are many, and I can only crave the reader's indulgence, and ask him to make allowances for such shortcomings as he may detect, and to bear in mind the difficulties which are inseparable from a compilation of a work of this nature. I have entitled it a compilation, for it cannot pretend to anything more; indeed, had I called it a translation, I would perhaps have been more accurate, as it is principally based on the excellent series of articles recently published in the 'Zeitschrift des Vereines deutscher Ingenieure,' under the title of "Die Verwendung flüssiger Heizstoffe für Schiffs- kessel" (The Employment of Liquid Fuels for Marine Boilers), itself compiled by Herr Marine-Ingenieur Busley, of the German Navy, from every imaginable source. Of these articles I had the honour of preparing a condensed abstract for the columns of The Engineer newspaper, and it is by the kind permission of the proprietors of that periodical that I have been enabled to found the present work on this abstract. I have made additions to it from the Annual
Preface.

Report of the United States Navy Department; from that admirable treatise on Petroleum, the posthumous work of Mr. B. J. Carew; from Mr. Marvin's popular 'Region of Eternal Fire,' Mr. Thwaites' pamphlet on liquid fuel, M. F. Hue's 'Aux pays de Pétrole,' Mr. Urquhart's paper before the Institution of Mechanical Engineers, Mr. Craft's paper read at the Memphis meeting of the American National Association of Brickmakers, Messrs. Funck & Co's lists, &c. Notwithstanding the pains I have taken, no one can feel more deeply than myself the hopeless inadequacy of the present volume. Perhaps it will serve the purpose, however, of stopping a gap until the time may have become ripe for the publication of a thoroughly comprehensive work. After all it is not from books, but actual practice alone, that really satisfactory knowledge on any given subject can be derived. As a guide, therefore, to the practical man, the book may, perhaps, be not unacceptable.

I must not omit to acknowledge publicly my great indebtedness to Mr. James Forrest, the Secretary of the Institution of Civil Engineers, through whose courtesy I was permitted to make use of the valuable library of that institution.

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39. Redcliffe Square,
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October, 1889.
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CHAPTER I.

INTRODUCTION.

"LIQUID FUEL" is a term used to designate the residuals of mineral oil, and is thus described by Mr. B. J. Carew in his 'Practical Treatise on Petroleum':—"Under the name of 'liquid fuel' the heavy residual oil left in the still after the burning oil has been taken off, and constituting about 60 per cent. of the original charge, is very extensively employed under the furnaces and locomotives all through the Caspian region." This residual oil the Russians call *astakhi*, and have used very successfully for years past. In England, France and Germany, its introduction has hitherto been very much hampered by its very high price; but in Russia, while, as Mr. Carew says, Western Europe and the United States have been experimenting on, and devising all manner of, petroleum furnaces, the problem has been satisfactorily solved. This local success is not due to any great superiority of the inventions themselves, but simply to the fact that in the Caspian region the abundance of petroleum and the comparative scarcity of coal have jointly contributed to stimulate inventions having in view the consumption of petroleum as fuel, hence great attention has been given to the subject. Engineers of the highest skill and reputation have devoted much time to improving and devising apparatus for the convenient consumption of the heavy oil as a fuel. Their efforts have been eminently successful, and now this "liquid fuel" is the