

**AMERICAN LUBRICANTS  
FROM THE STANDPOINT  
OF THE CONSUMER**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649046720

American Lubricants from the Standpoint of the Consumer by L. B. Lockhart

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**L. B. LOCKHART**

**AMERICAN LUBRICANTS  
FROM THE STANDPOINT  
OF THE CONSUMER**



## AMERICAN LUBRICANTS

Published by

**The Chemical Publishing Co.**

Easton, Penna.

Publishers of Scientific Books

Engineering Chemistry

Portland Cement

Agricultural Chemistry

Qualitative Analysis

Household Chemistry

Chemists' Pocket Manual

Metallurgy, Etc.

# AMERICAN LUBRICANTS

From the Standpoint of the Consumer

BY

L. B. LOCKHART

Consulting and Analytical Chemist

---

EASTON, PA.  
THE CHEMICAL PUBLISHING COMPANY  
1918

---

LONDON, ENGLAND:  
WILLIAMS & NORGATE,  
14 Henrietta Street, Covent Garden, W. C.

TOKYO, JAPAN:  
MARUZEN COMPANY, LTD.,  
11-16 RINOSABASHI TORI-SANCHOME

222703

JAN 18 1919

TES

L81

6938397

#### PREFACE.

The purpose of this book is to aid the user and the buyer of lubricants in a more intelligent selection of oils and greases. The point of view throughout is that of the user rather than that of the refiner.

An effort has been made to include such facts and figures in regard to lubricants as will best serve to bridge the gap between the refiner or manufacturer and the consumer. Of almost equal importance, a conscientious effort has been made also to *exclude* irrelevant matter so as not to obscure the main facts.

In a book of this character it is of the utmost importance that the refiner, the seller, the buyer and the user of lubricating oils speak the same language.

The language of the American oil trade, so far as viscosity is concerned, is that of the Saybolt Universal Viscosimeter; consequently all viscosities given in this book are with this viscosimeter at 100° F. unless otherwise specified, except that the viscosity of cylinder oils is taken at 210° F. Likewise the Flash and Fire Tests are with the Cleveland (or similar) Open Cup. Unless otherwise stated, all temperatures are Fahrenheit, and the Baumé gravity is based on the Bureau of Standards scale at 60° F.

The specifications given are in all cases the latest obtainable.

The author takes this occasion to acknowledge his indebtedness, directly and indirectly, to the published data on petroleum oils which has been drawn upon freely.

He trusts that the book will prove of practical aid, especially to the buyer and the consumer of lubricants.

L. B. LOCKHART.

Atlanta, Ga., August 1, 1917.



## CONTENTS.

	PAGE
Chapter I—Crude Petroleum.....	1-6
The Shift in Production—Characteristics of Crude Petroleum—Paraffin-Base and Asphalt-Base Oils—Properties of Different American Crudes—Chemical Composition—Origin of Petroleum—Field Production, Storage and Transportation.	
Chapter II—The Refining of Petroleum.....	7-12
General Considerations—Steam Distillation—Group Separation—Gasoline—Kerosene—Lubricating Oil Distillates—Cylinder Stock—Fire or Destructive Distillation—Yields from Different Crudes—Western Lubricating Oils.	
Chapter III—The Refined Products.....	13-20
A. <i>Light Distilled Oils:</i> Gasoline or Naphtha—Kerosene—Mineral Sperm Oil—Gas Oil.	
B. <i>Distilled Lubricating Oils:</i> Paraffin Oils—Neutral Oils—Spindle Oils—Loom Oils—Engine Oils—Motor Oils—Turbine Oils—Air Compressor Oils—Paraffin Wax.	
C. <i>Undistilled Oils:</i> Cylinder Stocks—Cylinder Oils—Petrolatum or Vaseline—Car Oils—Fuel Oils.	
D. <i>Mixed Oils:</i> Blended Oils—Compound Oils.	
E. <i>Miscellaneous Oils:</i> Rosin Oils—Coal Tar Oils—Thickened Oils—Shale Oil.	
F. <i>Special Properties of Mineral Oils:</i> Stability—Coefficient of Expansion—Specific Heat—Heat of Combustion.	
Chapter IV—Friction and Lubrication.....	21-34
Unnecessary Stresses—Two Kinds of Friction—Solid Friction—Solid and Fluid Friction—Fluid Friction—Viscosity—Viscosity and Friction—Viscosity and Temperature—Oil Lubrication—Oil Testing Machines—Circulating Oil Systems—Bearings—Grease Lubrication—Graphite as a Lubricant—Mica as a Lubricant.	

# CONTENTS

v

	PAGE
Chapter V—Lubrication of Internal Combustion Engines	35-41
Lubricating Conditions—Stationary Gasoline Engines— Gas Engines—Railroad Section Cars—Motor Boats— Motorcycle Engines—Gasoline Tractors—Kerosene En- gines—Kerosene Tractors—Aeroplane Engines—Diesel Engines.	
Chapter VI—Automobile Lubrication.....	42-53
A. <i>Motor Lubrication:</i> Mechanical Considerations— Temperature Conditions—What Happens to the Oil—Effect of Carbon Deposits—Removal of Carbon Deposits—Motor Oil Tests—Cylinder Oil Specifications—Analyses of Some Motor Oils— Motor Oil Chart—Oil Consumption.	
B. <i>General Chassis Lubrication:</i> Transmission Lubri- cation—Differential Lubrication—Worm Drives— Roller Bearings—Use of Cup Greases—Electric Road Vehicles.	
Chapter VII—The Lubrication of Electrical Machinery..	54-57
Dynamos and Motors—Transformer Oil—Electric Ele- vators—Rotary Converters—Vertical Electric Genera- tors—Electric Railways.	
Chapter VIII—The Lubrication of Steam Cylinders and Steam Engines.....	58-69
Saturated Steam Conditions—Superheated Steam Con- ditions—Method of Applying Cylinder Oils—Cylinder Stocks—Cylinder Oils—Analyses of Some Cylinder Oils—Cylinder Greases—Poor Lubrication—Cylinder Deposits—General Engine Lubrication—Marine En- gines—Steam Turbines.	
Chapter IX—The Lubrication of Steam Railways.....	70-82
Locomotive Cylinders and Valves—Saturated Steam Cylinders—Cylinder Deposits—Superheated Steam Cyl- inders—Conradson's Apparatus for Studying Cylinder Oils—Some Results with Conradson's Apparatus— Locomotive Journals—Crank Pins—General Engine Lubrication—Car Journals—Car Oils—Analyses of Car Oils—Shop Oil—Oil Supplies.	

	PAGE
Chapter X—The Lubrication of Cotton Mills and Other Textile Mills.....	83-91
Lubrication and Power Losses—Spindle Lubrication—The Lubrication of Special Spindles—Analyses of Some Spindle Oils—Stainless Oils—Sewing Machine Oils—Loom Oils—Analyses of Loom Oils—General Mill Lubrication—Shafting Lubrication—Cylinder Oils—Turbine Lubrication—Dynamo Oil—Lubricating Greases—Lubrication of Knitting Mills.	
Chapter XI—The Lubrication of Miscellaneous Plants and Machines.....	92-99
A. <i>Flour Milling Machinery.</i>	
B. <i>Cotton Oil Mills.</i>	
C. <i>Rolling Mills: Hot Neck Rolls—Cold Neck Grease—Roll Gears—Cylinder Oils—Yard Cars and Locomotives—General Lubrication.</i>	
D. <i>Miscellaneous: Air Compressors—Compressed Air Machinery—Mine and Quarry Machinery—Ice Machinery—Printing Presses—Cutting Tools.</i>	
Chapter XII—Physical Methods of Testing Lubricating Oils .....	100-107
The Determination of Viscosity and Its Significance—Saybolt Universal Viscosimeter—Engler Viscosimeter—Engler Viscosity with Small Amounts of Oil—Pennsylvania Railroad Pipette—Temperatures at which Viscosity is Measured—Fictitious Viscosity—Absolute Viscosities—Standardization of Viscosimeters—Mechanical Tests.	
Chapter XIII—Physical Methods of Testing Lubricating Oils (Continued) .....	108-121
A. <i>Gravity Test: Its Value and Meaning—Baumé Gravity—Specific Gravity—Method of Reading Hydrometers.</i>	
B. <i>Flash Test: Its Determination and Value—Open Testers and Closed Testers—Cleveland Open Cup Tester—Pennsylvania Railroad Tester—Bureau of Mines Closed Tester—Thermometer Corrections.</i>	
C. <i>Fire Test.</i>	
D. <i>Vaporization Test.</i>	
E. <i>Cold Test. Cloud Test.</i>	
F. <i>Color and Appearance.</i>	
G. <i>Emulsification Test.</i>	