Page

I. INTRODUCTION		4
Growth of pollution	•	2
Smoke abatement		5 6
Scope of the book		7
IL ORIGIN OF FUEL		, 0
Primeval fuel	•	0
Cellulose	•	10
Superior fuels	•	12
Quantity of fuel		13
Calorific value		13
Gross and net calorific value	•	16
World reserves and annual output		18
III. NATURAL FUELS		20
Wood	•	20
Wood charcoal	•	20
Peat		22
The coal series		23
Lignite		24
Bituminous coal		25
Anthracite		28
Cannel and boghead	•	29
Ash and sulphur in coal		29
Washed coal	•	31
Coal hazards	•	31
Mineral oils and resins		33
Petroleum	•	34
Natural gas		35
IV. ARTIFICIAL FUELS		27
History	•	37
Coke	•	28
Metallurgical coke	•	30
Gas coke	:	41
Low-temperature coke		41
Coal tar and tar oils		42
Hydrogenation and hydrocarbon synthesis		42
Alcohol		43
Manufactured gaseous fuels		44
Coal gas		44
Water gas	· .	<u> </u>

	Page
Producer gas	47
Blast-furnace gas	48
Sewage-sludge gas	49
V. INDUSTRIAL BOILERS	50
Vertical boiler	53
Locomotive boiler	53
Atmospheric pollution from small boilers	55
Lancashire boiler	55
Economic boiler	57
Water-tube boilers	58
Boiler operation	61
Carbon dioxide	65
Smoke as an index of efficiency	67
Smoke elimination from boilers of medium size	68
Alternatives to hand firing	72
Boiler availability	74
Soot blowing	76
	10
VI. POWER AND ELECTRICITY	77
The reciprocating steam engine	78
The turbine $\ldots$ $\ldots$ $\ldots$ $\ldots$ $\ldots$ $\ldots$	79
The gas turbine $\ldots$ $\ldots$ $\ldots$ $\ldots$ $\ldots$ $\ldots$	80
Internal-combustion engine	80
Atmospheric pollution from engines	82
$Cooling towers \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots$	84
Electricity	86
Hydroelectricity	87
Tidal power	89
Uses of electricity	90
VII INDUSTRIAL FURNACES	02
Group (4) furnaces	03
Horizontal retorts	95
	93
Vertical retorts	95
Static vertical retorts	90
Crown (2) furnaces	97
Plast furnaces	90
	90
$Cupotas$ , $\ldots$	99
Atmospheric polition nom furnaces in Groups (1) and (2) Crown (2) formages	101
Group (3) furnaces $\ldots$ $\ldots$ $\ldots$ $\ldots$	102
Open-nearth furnaces	102
Keneating Turnaces	103
Smoke in the steel industry	103
$\mathbf{Iar \ burning} \ . \ . \ . \ . \ . \ . \ . \ . \ . \ $	104
Clay industries	104
Lime and cement kilns	107
Atmospheric pollution from furnaces in Group (3)	109

**\$**:

		Page
VIII. DOMESTIC FIRES.		111
Choosing a heating appliance	•	112
The open fire.	•	113
The openable stove	·	119
The closed stove	·	440
Central heating	•	119
District heating	•	120
Gas heaters	•	121
Electric heaters.	·	122
Appliances combining several functions	•	123
Domestic heating in America	•	123
Domestic heating and atmospheric pollution	•	124
Hot water and cooking	•	125
Coal economy	·	120
IX ATMOSPHERIC DOLLUTION	•	131
IN. AIMOSPHERIC POLLUTION	•	133
	•	136
	• •	137
Other particles		138
Sulphur dioxide		139
Other pollution from the combustion of fuels .		140
Pollution from other sources		141
Gases from chemical works		141
The offensive trades		143
Particles		143
X. MEASUREMENT OF ATMOSPHERIC POLILITION		4 4 5
Measurement of smoke		145
Smoke filter	•	140
Automatic filter	•	149
Portable smoke filter	• `	151
Weighable smoke filter	• 1	153
Measurement of ash and other deposited pollution	•	154
Deposit gauge	•	155
Rapid surveys of deposited matter	• • 1	156
Measurement of subbur dioxide	• 1	160
Volumetric estimation of gulabar distil	• :	164
Sulphur dioxide by the least	. 1	164
Surveys of subbur disside	. 1	167
Microscopic surplur dioxide	. 1	172
Microscopic examination of grit	. 1	173
Microscopic examination of suspended matter	- 1	175
Measurement of daylight	1	78
Potassium iodide method	1	78
Photographic methods.	1	79
Photoelectric methods.	1	79
XI. DISTRIBUTION OF POLLUTION		0
In Britain as a whole	1	01
	1	81

1. Sec. 1.

VII

	Page
Deposited matter	181
Smoke and sulphur dioxide	185
Distribution within a town	188
Deposited matter	188
Smoke and sulphur dioxide	189
Distribution in parks and smokeless zones	194
XII. CHANGES IN POLLUTION	197
Changes in deposited matter	<b>2</b> 00
Changes in suspended pollution (smoke and sulphur	
dioxide)	203
The yearly cycle	205
The weekly cycle	205
The daily cycle	206
Irregular variation	207
Effect of the weather	208
Summary	213
XIII. EFFECTS OF POLLUTION	214
Health	215
Animals	217
Plants	217
Metals and materials	218
Fog. visibility and sunlight	220
Cost of pollution	223
Conclusion	224
VIV DEVENTION OF ATMOSPHERIC DOLLITION	
AIV, FREVENTION OF AIMOSFILERIC FOLLOTION	225
Dreventing ash and grit	22)
Selection of fuel	230
Design and operation of furnace	230
Grit arresters	231
Air conditioning	232
Dreventing sulphur dioxide	43/
rieventing surpliur dioxide	231
XV. THE LAW AND ITS ADMINISTRATION	243
Alkali &c. Works Regulation Act, 1906	246
Public Health Act, 1936	254
Manchester Corporation Act, 1946	257
Anti-smoke laws in the United States	259