

12. Center of magnitude.  
Of motion.  
Of gravity.

13. Mechanical Powers.  
Levers.

False balance.

Steelyard.

Remarkable property of the lever.

Desaguliers's paradox.

Screw.

Wedge.

Pulleys.

Inclined plane.

axle and Wheel.

Compound engines.

14. Friction.

Its effects.

15. Methods by which friction may  
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16. Advantages and Disadvantages

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low  
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In surmounting } obstacles.  
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17. Descent of heavy bodies.

18. Rolling } of bodies down inclined  
Sliding } planes.

19. Pendulums.  
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20. Observations on the motion of a  
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In small arcs of a circle.

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21. Curve of quickest descent.

22. Expansion of metals.

23. Methods of correcting the effects of  
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Of

Clocks.

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24. Collision of bodies.

Center of percussion.

25. Forces of bodies in motion.

Different opinions of philosophers  
on this subject.

Depths to which falling bodies sink.

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26. Rotatory motion.

Center of gyration

27. Projectiles.

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# Of Fluids.

28. Properties of fluids.  
Their gravity in proprio loco.  
Their pressure.  
The experiments of Paschal and  
Of others.
29. Center of pressure.
30. Hydrostatical paradox.
31. Mixture of fluids.
32. Sinking of bodies in fluids.  
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of water.
33. Immersion of a solid in two fluids.
34. The specific gravity  
Of Solids,  
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35. Chemical experiments by Mr. Kir-  
wan on the Specific Gravities of  
Compounds.

- Mathematical specific gravity.  
Specific gravity by observation.  
Increases of density in compounds.  
The time required for this effect to  
take place.
36. The compound hydrostatical balance.
37. Method of determining the capacity  
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38. Method of determining the capacity  
of an irregular vessel.
39. Spouting of fluids.  
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The quantity thrown out in a given  
time in various circumstances.
40. Experiments to determine the nature  
and cause of the Vena Contracta.
41. Pressure of the air.  
Torricellian experiments.  
Experiments of M. Arnot.  
Combination of Fluids.  
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Syringes.

Syphons.

Cohesion of polished plates.

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42. Water barometer.

43. Observations on the height of the atmosphere.

44. Portable barometer.

Of measuring the heights of mountains.

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45. Opinions concerning the ascent of water in capillary tubes,

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Cotes,

Hawksbee,

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46. Examination of the experiments on capillary tubes, said to have been made

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47.

The attraction of the indefinitely small particles of matter for each other.

Examples,

In glass,

Water,

Mercury,

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48. The height to which water is raised in any simple capillary tube.

49. Method of measuring exactly the diameters of tubes.

50. Capillary syphons.

51. Elasticity of the air.

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———— of air and mercury.

Law by which air is rarified.

By which it is condensed.

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Diving bell,

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Air pumps.

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Their construction.

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Different kinds of them.

Various contrivances for measuring  
the rarefaction of the air.

Experiments with rarified air.

53. Method of determining the capacity  
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the tubes, which form the communi-  
cation between the barrel and the  
receiver.

54. The condenser.

Its construction.

Contrivance for measuring the degree  
of condensation.

Experiments with condensed air.

55. Sound in vacuo.  
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56. Production of Facitious Airs by va-  
rious chemical processes.

General properties of facitious airs.

57. Fixed air.

Chemical discoveries  
of Black,  
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Ang

And others.

58. Nitrous air,  
Discoveries  
of Hales,  
Priestley,  
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59. Nitrous air considered as a test of  
the purity of atmospherical air.

Eudiometers.

60. Nitrous air considered as a consti-  
tuent part of nitrous acid.

61. Inflammable air.  
Its production and  
Specific gravity.  
Air balloons.

62. Of the phlogistication of the air by  
various methods.

63. Properties of phlogisticated air.

64. Dephlogisticated air.  
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of Priestley,  
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65.



65. Production of dephlogisticated air  
 From Nitre,  
 Red precipitate,  
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 Red Lead,  
 Red Lead and Oil of Vitriol,  
 Turpeth Mineral,  
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66. Of the constitution of the atmosphere.  
 Experiments  
 Of Scheele,  
 Lavoisier,  
 And others.
67. Methods of finding the specific gravity of elastic fluids.
68. Elastic fluids, which lose their form and properties upon the application of cold.  
 Steam,  
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70. The prodigious force of steam when confined and heated.  
 Steam engines.
71. Condensation of factitious airs by increasing the pressure.
72. Rarefaction of them by diminishing the pressure.
73. Rarefaction of them by the application of heat.
74. The ascent of smoke and rarefied air through chimnies.  
 Remarks on the construction of chemical furnaces for exciting the greatest heat.
75. Remarkable changes, which certain elastic fluids undergo, upon the application of considerable heat in certain circumstances.
76. Vapour of water } forced thro' red-hot  
 of spirits of wine } tubes.



77. Products from the union of some elastic bodies.  
 Dephlogisticated air united with several sorts of inflammable air.
78. Observation on the properties, which several elastic fluids are supposed to communicate to bodies in a state of combination.
79. Chemical discoveries,  
 Relating to the nature of  
 Lime,  
 Alkalies,  
 Acids,  
 Various sorts of inflammable air,  
 The principle of inflammability or phlogiston.
80. The solution of Solids in fluids.  
 The nature of chemical affinity.
81. Cohesion of the particles of metallic substances.  
 Ductility of metals.

82. M<sup>r</sup>. Mowean's experiments on the agreement between the chemical affinities, and the adhesive forces of Mercury, and other metallic substances.  
 Probability of reducing the chemical affinities to calculation.
83. The velocities with which very light elastic spheres ascend during the solution of solids in fluids.
84. The effects  
 Of heat,  
 Cold,  
 And pressure,  
 upon their diameters.
85. The uncertainty of the mathematical computations on this subject.
86. General observations concerning the existence of other fluids, or material substances, which have no sensible gravity, and are supposed to be the cause of  
 Electricity,  
 Magnetism,  
 Heat,  
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# Electricity.

87. History of Electricity.  
88. Of Electrics,  
and non-electrics.  
89. Of conductors.  
Non-conductors.  
Insulation.  
90. Light bodies.  
attracted } by excited electrics.  
repelled }  
91. <sup>2d</sup> Properties of bodies electrified by the  
contrary powers.  
<sup>1st</sup> Two kinds of electricity  
92. Methods of producing the opposite elec-  
tricity by the same electric.  
93. Electrical machines  
Various constructions of them.  
Their uses.  
94. Experiments made.  
At the prime conductor,  
At the rubber.  
95. The Leyden phial.

96. An Electric plate,  
Charged,  
Discharged.  
The velocity of electricity.  
97. Different explanations of the  
preceding experiments.  
98. Particular experiments, which seem  
favourable to the opposite theories.  
99. Electrical batteries.  
100. Electrometers.  
101. Atmospheric electricity  
A plate of air charged.  
Thunder and lightning.  
Electrical kite.  
102. Utility of knobs } in preserving build-  
of points } ings from the effects  
of lightning.  
103. Electrical experiments  
In rarefied air,  
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Luminous conductor.  
Aurora borealis.  
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104. The electrophorus.  
105. Use of electricity  
In medicine,  
In several important experiments in chemistry.  
Production of water.  
Of nitrous acid.  
Conversion of alkaline into inflammable air,  
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## Magnetism.

106. History of magnetism.  
107. General properties of the loadstone.  
Armed magnets.  
108. Communication of magnetism,  
By the loadstone.  
Iron bars,  
Friction,  
Electricity.  
109. Recent experiments on magnetism  
by Cavallo.  
110. Poles of a magnet.  
Magnetic meridian.  
111. Variation of the magnet.  
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112. Dipping needles.  
113. Mariner's compass.  
Best construction of it.



114. Methods of making artificial magnets.

Combination of magnets.

115. Analogy between the powers of electricity and magnetism.

116. Uses of magnetism  
In Chemistry  
de.

## Heat.

117. History of discoveries concerning the Causes and effects of Heat.

Opinions of Bacon,

Boyle,

Newton,

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Wilke,

Irwin,

Bergman,

Scheele,

de.

118. Obscurity of the cause.

Importance of the effects.

119. The most general effect of heat is Expansion.

120. Exceptions to the law of expansion.  
Several phenomena explained from the expansion of water in freezing.



121. History of the invention of  
Thermometers.  
Different kinds of them.  
The air  
Spirit of wine }  
Oil } Thermometers.  
Mercurial }
- Method of constructing thermometers.
122. Of the equable } expansion of vari-  
unequable } ous substances.
123. The effects of heat in altering the  
specific gravities of bodies.  
The weight of a cubic foot of water  
at different heats.
124. Particular quantities of expansion  
Of air }  
Mercury } in a given temperature.  
&c. }
125. Of the fixed points of thermometers.
126. Graduation of thermometers, and  
Comparison of them with each other.

127. Methods of measuring the  
greater heats.  
By Newton,  
Black,  
Wedgewood.
128. Variations of experiments from the  
computation by Newton's rule.
129. Heats of metals just beginning  
to melt.  
Heats of mixtures of metals.
130. Insufficiency of thermometers to  
determine the absolute quantity of  
of heat in bodies.
131. Pyrometers.
132. The equilibrium }  
and transmission } of heat.  
Different powers of bodies in trans-  
mitting heat.  
Observations on the quantities of  
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times.



Newton's opinion concerning the  
time that bodies of different magni-  
tude take to lose their heat.

133. Transmission of heat.  
Through rarified air,  
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134. Heat is excited by various causes.  
Friction,  
Collision,  
Congelation,  
Chemical mixtures,  
Fermentation,  
Electricity,  
Solar rays,  
Inflammation of fuel,  
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135. Fluidity.

Various degrees of heat necessary  
for the fusion of bodies.  
Some bodies fly off in vapours before  
they are sufficiently heated for fusion.

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Changes which some bodies un-  
dergo by being melted.

136. Further observations concerning  
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Theory of latent heat.

Quantity of heat which is absorbed  
by melting solids.  
Quantity of heat which emerges from  
congealing fluids.  
The sensible heat of bodies during their  
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At fusion  
137. Experiments,  
Which seem to confirm this theory.  
Slow melting of ice and snow.  
Slow congelation of water.

Cold produced by the liquefaction of  
ices.  
Heat produced by the congelation of  
water.

138. The latent heat contained  
In melting bees' wax,  
Melted spermaceti,  
Melted metals,  
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139. The production of artificial cold by  
Ice and snow mixed with  
Nitrous acid

140. <sup>See.</sup>  
The congelation of quicksilver.  
The precautions necessary to be used  
in order to determine its freezing  
Point?

141. Production of heat by the  
Crystallization of Salts.

142. General Observations.  
On the congelation of fluids,  
the crystallization of Salts.

143. Vapour.  
The manner in which elastic steams  
are produced.

The heat of boiling water.  
Variation of this heat

144. Greater heats communicated to water  
by increasing the pressure.  
Papin's digester.

145. The theory of latent heat applied to  
explain the production of vapour.

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146. Quantity of heat, which disappears  
during the formation of vapour.  
Quantity of heat, which emerges from  
condensed steam.

147. Unelastic vapours.  
Various theories of  
Their production,  
And ascent,  
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Halley,  
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<sup>See.</sup>  
148. The solvent power of the air,  
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Mist,  
<sup>See.</sup>

149. Method of determining the quantity  
of the rarefaction of water, when  
reduced to vapour.  
Opinions of Gravesande,  
Musschenbroek,  
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150. Remarkable degree of cold produced by the evaporation of volatile fluids.  
 In the open air,  
 In vacuo.
151. The boiling point  
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152. Congelation of water by the evaporation of ether.
153. The sensible heat of the air is diminished by rarefying it.
154. It is increased by condensing it.
155. The temperature of chemical mixtures,  
 where elastic fluids escape } during the process of combination.  
 Do not escape — }
156. Another explanation of the melting of bodies and of the formation of vapour.
157. Methods of determining these capacities in several substances,  
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- Ice,  
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159. Dr. Crawford's theory  
 Alteration of the capacities of bodies for containing heat.  
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 The separation }
- Metals,  
 Their calces,  
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160. Determination of the degree of the thermometer upon Fahrenheit's Scale, where the heat is nothing.
161. Animal heat.  
 Quantity of absolute heat in  
 Air inspired,  
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162. Absolute heat  
 Of arterial blood,  
 Venous blood.
163. The temperature of animals that breathe,  
 — that do not breathe.
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164. Power of animals to produce cold.
165. Morgan's objections to D.<sup>r</sup> Crawford's theory.
166. Variation of the capacity for containing heat in the same body at different temperatures.
167. Ignition.
168. Inflammation.  
 Nature of inflammable bodies.  
 Their residuum after combustion.
169. Further observations concerning the existence of phlogiston, the phlogistication of the air.
170. The facts adduced in proof of the doctrine of latent heat and the different capacities of bodies for containing heat, explained according to the opinion of an Intestine Motion and Vibration of the smallest particles of matter.  
 Probability of the truth of this theory.
171. From facts,
172. From reasoning.

## Light.

174. History of the discoveries of the ancients on this subject.
175. Nature of Light.  
 Its velocity,  
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176. Light transmitted through small apertures.  
 Its density at different distances.
177. Rays of light:  
 Reflection } of them.  
 Refraction }
178. Laws of reflection,  
 of refraction.
179. Inclination of the rays when they cannot pass out of a denser into a rarer medium.
180. Observations concerning the causes  
 Of reflection,  
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181. Reflection of rays  
From plane surfaces,  
Curved surfaces.

182. Refraction of rays.  
Through mediums terminated by  
parallel surfaces,  
Through lenses of various kinds,  
Through prisms  
Of glass,  
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183. Images.  
Their position  
And magnitude.

184. Of the eye.

185. Optical appearances according to  
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Of the eye.

186. Construction and uses  
Of Telescopes } of various kinds.  
Microscopes }  
The magic lantern.

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187. The solar image  
Through various apertures,  
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188. Separation of light into rays of  
different colours.  
Experiments of Newton.

189. Mixture of artificial colours.

190. Important experiments by M.  
Dollond.

Colour without refraction.  
Refraction without colour.  
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191. Of the rainbow.

192. Colours of natural bodies.  
Theory of Newton.

Experiments which illustrate the  
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193. Concentration of solar light  
By large mirrors,  
Lenses.

194. Recent application of these instru-  
ments to some important purposes  
in Chemistry.



195. Connection between  
Heat and  
Light.  
Experiments of  
D<sup>r</sup>. Hook, and  
Others.
196. Light considered  
As a component part of bodies.  
As their phlogiston.
197. Morgan's observations on the light  
of bodies in a state of combustion.  
The colour of the electric spark.
198. Remarkable effects of light,  
On vegetation  
On the colours of bodies.
199. Observation on the reflection of light  
and heat from  
Metallic } mirrors.  
Glas }  
200. Separation of light and heat
201. Colours of the higher regions of the  
the atmosphere.