

EXPERIMENT

	Page
Alcohol Lamp	38
Blow Pipe	38
Gas Delivery Tube	38
Mortar and Pestle	39
9. To pulverize a coarse solid to a fine powder	39
The Funnel and Filtering	39
10. To filter solid particles from a liquid	39
The Gas Generator	40
Measuring Liquids or Solutions	41
Glass-Blowing	41
11. To cut small glass tubing and rods	41
12. Fire polishing glass	41
13. To bend glass	41
14. To cut a glass jug in two	41

PART I

PART II
INORGANIC CHEMISTRY AND ITS COMMERCIAL
APPLICATION TO THE INDUSTRIES
MATTER IN CHEMISTRY

THE CHEMISTS' LABORATORY

INORGANIC AND ORGANIC MOLECULES

Mobility of Molecules in Solids, Liquids and Gases	44
--	----

Mass and Volume	44
To demonstrate the specific gravity of liquids	45
Malleability	45
Ductility	45
Brittleness	45
Elasticity	45
Hardness	46

FUNDAMENTAL PHYSICAL CONSTANTS WIDELY USED BY THE CHEMIST

Freezing Point or Melting Point	46
Super-Cooling	46
Boiling Point	46
Super-Heating	46
Measuring Temperature	47
The Elements and Chemical Change	47
The Atomic Theory	48
The Modern Conception of the Atom	48

**FUNDAMENTAL PHYSICAL CONSTANTS WIDELY USED BY
THE CHEMIST**

Freezing Point or Melting Point	46
Super-Cooling	46
Boiling Point	46
Super-Heating	46
Measuring Temperature	47
The Elements and Chemical Change	47
The Atomic Theory	48
The Modern Conception of the Atom	48

EXPERIMENT	Page	EXPERIMENT	Page
Kinds of Chemical Change		57. Oxidizing silver	58
Chemical Change Through Degradation by Heat		58. Asbestos Insulation	58
19. Decomposition of sugar	49	59. Cotton fiber	58
20. Decomposition of an inorganic salt by heating	49	60. Oxidizing sulphur in copper sulphate	58
21. Decomposition of sodium thiosulphate	49	Protection Against Fire	
Chemical Change by Double Decomposition		61. To fireproof cloth or paper	59
22. Action of ferric ammonium sulphate on calcium oxide	50	62. To fireproof wood	59
23. Action of aluminum sulphate on strontium nitrate	50	63. Fireproofing cloth	59
Substitution or the Displacement of One Element by Another		64. Fireproofing with sodium tungstate	59
24. Action of iron on copper sulphate	50	65. Fireproofing with sodium silicate	59
25. Action of zinc on copper sulphate	50	Fire Extinguishers	
26. Action of magnesium on copper sulphate	50	66. Carbon tetrachloride, a fire extinguisher	59
27. Action of zinc on hydrochloric acid	50	67. A hand grenade fire extinguisher	60
Chemical Change by Direct Union of Elements		Hydrogen	
28. Union of zinc with sulphur	51	Helium and Aviation	61
29. Union of magnesium with oxygen	51	Preparation of hydrogen	61
The Electric Cell		Reduction	
Electromotive Series		Reduction Experiments	62
America's Genius in the Field of Electricity	52	Reduction of potassium permanganate	63
The Atmosphere		Reduction of logwood	63
Oxygen		Bleaching	63
Oxygen Experiments		71. Bleaching flowers with sulphur dioxide	63
29. To remove oxygen from the air	53	Nitrogen	
30. Preparation of oxygen and how to test for it	53	72. Preparation of nitric acid	64
31. Preparation of oxygen from potassium permanganate	54	73. How to make an explosive mixture	64
Hydrogen Peroxide		74. Nitrogen from the air	65
32. Behavior of hydrogen peroxide toward blood	54	Ammonia	
33. A standard test for hydrogen peroxide	54	75. Preparation of ammonia	65
Oxidation		76. Formation of ammonia by decomposition of organic matter	65
Refrigeration and Air Conditioning		77. Dissociation of an ammonium salt	66
Chemical Oxidation Experiments		Water	
34. The making of a chemical fire	55	Dissociation of water into the elements oxygen and hydrogen	66
35. How to make a fire without a match	55	78. Decomposition of water by an electric current (electrolysis)	68
36. Fire ink	55	Explanation of the Electrolysis Experiment	
37. Oxidation of metallic zinc	56	Aqueous Solution	
38. How to make a fuse	56	79. A soluble substance	69
39. Oxidation of an element by means of a nitrate	56	80. An insoluble substance	69
40. To show the increase in weight upon heating iron in the air	56	81. Diffusion	69
41. Oxidation of spices	56	82. Diffusion of cobalt in water glass solution	69
42. Suffocating a burning candle	57	83. A chemical garden	70
43. Testing for carbonic acid gas	57	84. Diffusion through cellophane	70
44. Burning sulphur	57	85. Separation of starch from sugar	70
45. Burning iron	57	86. Separating sugar from a protein	70
46. Protecting iron from oxidation	57	Chemical Action in Water Solution	
47. Oxidation of zinc	57	87. Promoting chemical reaction by solution	70
48. Oxidation in the body	57	88. A color change due to solution	71
49. Combustion of charcoal	57	Dry Ice Experiments	
50. Burning sulphur	58	89. Extinguishing a burning candle	71
51. Burning paper	58	90. Burning sulphur	71
52. Oxidizing copper	58	91. Burning magnesium	71
53. Oxidizing iron	58	92. Floating a sunken ship	71
54. Oxidizing aluminum	58	93. Measuring dry ice pressure	71
55. Oxidizing nickel	58	94. A miniature gas volcano	71
56. Oxidizing zinc	58	95. Dry ice temperature	71

EXPERIMENT

Endothermic and Exothermic Changes

96. Lowering of temperature by solution
97. Raising of temperature by solution
- Artificial Refrigeration
98. How to make a freezing mixture
- Changing the Freezing and Boiling Points
99. Solution lowers the freezing point of water
100. Solution raises the boiling point of water

Supercooling

Undercooled water

Degree of Solubility in Water

102. Effect of temperature on solubility
103. Temperature's effect on solubility
104. Dissolving liquids in each other
105. Dissolving a gas in water
106. Removing a gas from solution by boiling

Diffusion

Testing for acidity

Testing for lime

Testing for sulphates

Testing for iron

Testing for carbon dioxide

Testing for sulphur

The boiling point of water, compared with salt

Purification of water by Distillation

Water of Crystallization

Water of crystallization

Formation of crystals (rock candy)

Disappearing ink

How to make a weather barometer

Crystals of copper sulphate

Crystals of tartaric acid

Crystals of iron alum

Crystals of magnesium sulphate

Crystals of Glauber's salt

Testing Water

Sewage Contamination

Bacteria in Industry

Hard Water

Temporary hardness—How to get rid of it

Permanent hardness—How to get rid of it

Clarifying water

Testing for odor

A test for color and clearness

How to test for solid matter in water

How to test for free alkali in water

How to test for acidity in water

How to test for organic matter in water

How to test for soluble sulphates in water

How to test for lime in water

How to test for iron in water

How to test for carbon dioxide in water

Sulphur

Behavior of sulphur at different temperatures

EXPERIMENT

139. Preparation of lime—sulphur solution
140. Sulphur dioxide from burning sulphur
141. Sulphur dioxide from sodium bisulphite
142. Bleaching with sulphur dioxide
143. Preparation of sulphurous acid
144. Preparation of sulphur trioxide
145. Preparation of sulphuric acid
146. Sulphur acid from sulphur dioxide and hydrogen peroxide
147. How to make strontium sulphate

Hydrogen Sulphide

148. How to make hydrogen sulphide
149. Action of hydrogen sulphide on sulphur dioxide
150. Action of chlorine gas on hydrogen sulphide
151. Reducing action of hydrogen sulphide
152. How to restore the color of white paint

Silver sulphide

Sulphur in rubber

Sulphur and silver coin

Nickel sulphide

Copper Sulphide

Zinc sulphide

Ferrous sulphide from sodium thiosulphate

Ferric sulphide from sodium thiosulphate

Nickel sulphide from sodium thiosulphate

Manganese sulphide from sodium thiosulphate

The Halogens

How to make chlorine gas

To show the bleaching properties of chlorine

How to make hydrochloric acid

Bleaching Powder

How to make chlorine from bleaching powder

Bleaching with bleaching powder

How to make iodine

How to test for iodine

Formation of lead iodide

Partition solubility of iodine

Testing vegetables for starch

Testing other substances for starch

Gas Warfare

The Gas Mask

Boron and the Borates

Boric acid from borax

Borax from boric acid

Test for boric acid

Examination of Talcum powder

Borax Glass

Cobalt borax glass

Iron borax glass

Manganese borax glass

Nickel borax glass

Chromium borax glass

Boron Compounds

Strontium borate

Magnesium borate

EXPERIMENT	Page	EXPERIMENT	Page
185. Aluminum borate	94	233. How to make a white flashlight powder	103
186. Ferric borate	94	234. How to make a red flashlight powder	103
187. Cobalt borate	94	235. How to make a green flashlight powder	103
188. Nickel borate	94	236. Making sparklers	103
189. Manganese borate	94	Thermite	103
190. Calcium borate	94	237. Thermite fusion	103
191. Chromium borate	94	Silicates	104
Phosphorus and the Phosphates	94	238. Silicic acid	104
192. Nickel phosphate	95	239. Sodium silicate (water glass)	104
193. Copper phosphate	95	240. Strontium silicate	104
194. Strontium phosphate	95	241. Zinc silicate	104
195. Aluminum phosphate	95	242. Aluminum silicate	104
196. Ferric phosphate	96	243. Nickel silicate	104
197. Manganese phosphate	96	244. Ferrous silicate	105
198. Calcium phosphate	96	245. Ferric silicate	105
199. Cobalt phosphate	96	246. Tin silicate	105
200. Magnesium phosphate	96	247. Chromium silicate	105
201. Chromium phosphate	96	248. Cobalt silicate	105
The Alkali Metals	96	249. Copper silicate	105
202. How to make sodium hydroxide	96	250. Manganese silicate	105
203. Manufacture of sodium bicarbonate or baking soda	97	251. Magnesium silicate	105
204. To convert sodium bicarbonate into sodium carbonate	97	252. Calcium silicate	105
Hydroxides	97	Ferrocyanides	106
205. Aluminum hydroxide	97	253. Zinc ferrocyanide	106
206. Ferric hydroxide	97	254. Aluminum ferrocyanide	106
207. Nickel hydroxide	97	255. Nickel ferrocyanide	106
208. Manganese hydroxide	98	256. Ferrous ferrocyanide	106
209. Zinc hydroxide	98	257. Ferric ferrocyanide	106
210. Cobalt hydroxide	98	258. Manganese ferrocyanide	106
211. Magnesium hydroxide	98	259. Cobalt ferrocyanide	106
212. Calcium hydroxide	98	260. Chromium ferrocyanide	106
213. Chromium hydroxide	98	261. Tin ferrocyanide	106
214. Obtaining potash from wood ashes	98		
Alkaline Earth Metals, Calcium, Strontium, Barium	99		
215. Burning limestone to quick lime	99		
216. Slaked lime or calcium hydroxide	99		
217. Making mortar	99		
218. To make Plaster of Paris	99		
219. Making a cast with plaster of Paris	99		
220. Calcium sulphide light	100		
221. Flame test for metals	100		
222. Red fire	100		
223. How to make green fire	100		
224. How to make yellow fire	100		
225. Preparing a safe explosive	101		
226. Pharaoh's serpents	101		
227. How to make snakes	101		
228. Red flame from sawdust	101		
229. An aurora borealis	101		
Color in Fireworks	101		
Aluminum, Zinc, Magnesium	102		
230. Colored aluminum lake	102		
231. Action of sodium carbonate on aluminum sulphate	102		
232. Action of zinc on alkalis	102		

PART III

ORGANIC CHEMISTRY AND ITS COMMERCIAL APPLICATION TO THE INDUSTRIES

Carbon	107
The Manufacture of Illuminating Gas	108
262. Preparation of charcoal—pyro-ligneous acid	109
The Smoking of Hams and Meats	109
263. Decolorizing properties of charcoal	110
264. Deodorizing properties of charcoal	110
265. Absorbing properties of charcoal	110
Absorbent Charcoal	110
266. Absorbing coloring matter with charcoal	110
267. Decolorizing vinegar	111
268. Absorbing bitter taste with charcoal	111
269. Absorbent charcoal from ground cocoanut shells	111
270. Absorbent charcoal from butternut shells	111
271. Preparation of absorbent charcoal from hickory nut shells	111

EXPERIMENT I

[illegible]

37% A white

337 Making a lacquer vehicle

527. Making a racquet vehicle

112
113
113
113
113
113
113
113
113
114
114

Carbon Monoxide	.	.	.	.	.
Ethyl Gas	.	.	.	.	.

511
511
511
511
511
511
511
511
911
511
511
511
511
511
511
511
511
511
511
511

545. Evergreen

119
119
119
119
120
120
120
120
120
120
120
120
120
120
120

54. Happy New Year . . .

355. April Fool

12
12
12
12

Page

121

121

122

122

122

122

122

122

122

122

122

122

123

123

123

123

[illegible]

EXPERIMENT	Page	EXPERIMENT	Page
358. Why zinc vessels are not used for foods	134	410. A sugar bath	139
359. Cooking in copper vessels	134	411. Iron in your tonic	139
360. Testing silver plate	134	412. Iron in blood	140
361. Cleaning silverware	134	413. Decolorizing tincture of iodine	140
362. Removing iodine stains	134	414. Stains on your fingers	140
363. A test for soil in the flower pot	135	415. Cleaning a straw hat	140
364. A fragrant paste wax	135	416. Removing paint from cloth	140
365. Keeping the surface of window panes clear	135	417. Preparation of a good gum for labels	140
366. Colored soap	135	418. Rubber cement	140
367. Perfumed soap	135	419. Cleaning marble	140
368. Liquid soap	135	420. Vegetable stains on the hands	140
369. Transparent soap	135		
370. How soap cleanses	135		
371. Laundry soap	136		
372. Borax soap	136		
373. Medicated soap	136		
374. Dissolving grease	136		
375. How biscuits are raised	136		
		TESTING FOODS	
		Testing for Starch	
376. Protein in the white of an egg	137	421. How to make a solution for testing starch	141
377. Protein in chicken's liver	137	422. Testing for starch in rice	141
378. Protein in lamb's kidney	137	423. Testing for starch in potatoes	141
379. Protein in dry cheese	137	424. Testing for starch in flour	141
380. Protein in the skin of a potato	137	425. Testing for starch in corn	141
381. Protein in breakfast cereal	137	426. Testing for starch in apples	141
382. Protein in glue	137	The Food Chemist—Jack Horner	
383. Protein in rayon silk	137	427. Testing a raisin for iron	142
384. Sulphur in proteins	137	428. Testing raisin seeds	142
385. Sulphur in old leather glove	137	429. Apple seeds	142
386. Sulphur in dried cheese	137	430. Quince seeds	142
387. Sulphur in rubber tubing	137	431. Turnip seeds	142
388. Sulphur in woolen yarn	137	432. Cabbage seeds	142
389. Sulphur in ground mustard seed	137	433. Beans	142
390. Testing canned goods for copper	137	434. Sunflower seeds	142
391. Copper in oysters	137	435. Lettuce seeds	142
392. Copper in scallops	138	436. Wheat kernel	142
393. Copper in a round clam	138	437. "Tums for your Tummy"	142
394. Testing coffee	138	438. Pop corn	142
395. Decolorizing hamburger steak	138	439. Popcorn balls	143
396. Hydrogen peroxide and liver	138	440. Grape seeds	143
397. Hydrogen peroxide and a lamb's kidney	138	Starch and Sugar Industry	
398. Chicken feathers	138	441. How to make potato starch	143
399. Honey comb	138	442. How to make cornstarch	144
400. Iron in honey comb	139	443. How to make starch from flour	144
401. Bees' wax	139	444. Changing starch into glucose (sugar)	144
402. A wasp's nest	139	445. Making starch from Bantam sweet corn	145
403. Composition of a wasp's nest	139	446. Manufacture of potato starch	145
404. House flies	139	447. Changing starch into sugar in the body	145
405. The house wasp	139	448. Sugar as a reducing agent	146
406. Tannin in tea	139	Testing for Proteins	
407. Sanka coffee	139	449. How to test for proteins in eggs	146
408. Potato sprouts	139	450. How to test for proteins in milk	146
		451. How to test for proteins in meat	146
		452. How to test for proteins in beans	146
		453. Testing for sulphur in proteins	147
		Bread Making and Baking Powder	
		454. How to make baking powder	147
		455. How to test for starch in baking powder	147

EXPERIMENT	Page	EXPERIMENT	Page
456. How to test for alum in baking powder	148	502. An ink remover	156
457. How to test for copper sulphate in bread	148	503. Ink powder	156
Testing Milk	148	504. Blue ink powder	156
458. How to test for coloring matter in milk	148	505. Red ink powder	156
459. How to test for starch in milk	148	506. How to make carbon paper	157
460. How to test butter	149	507. How to make blue typewriter ribbon	157
461. How to make casein	149	508. A finger print record	157
Soap	149	509. Detecting finger prints	157
462. Making soap	150	510. Blue ink	157
463. Why soap cleanses	150	511. Violet ink	157
464. Making liquid soap	150	512. Lemon ink	158
465. Chemical films and bubbles	150	513. Red ink	158
Detergents	151	514. Safety ink	158
Solving the Hard Water Problem in the Kitchen, Laundry and Bathroom	151	515. Copying ink	158
466. Action of ordinary soap on hard water	151	516. Making a camphor ball float	158
467. Action of ordinary soap on sea water	151	517. Formation of lead iodide	158
468. Soap in acid solutions	151	518. Magic transfer solution	158
469. Treating hard water with a hymalal salt	151	519. Partition solubility of iodine	159
470. Treating sea water with a hymalal salt	151	Fermentation	159
471. Action of hydrochloric acid solution on soap	151	520. Changing sugar into carbon dioxide	159
472. Action of calcium chloride solution on soap	152	521. Changing starch into sugar and carbon dioxide	160
473. Action of calcium chloride on a hymalal salt	152	522. The formation of mould	160
474. Action of barium chloride on a hymalal salt	152	523. Growth of mould	160
475. Action of strontium chloride on a hymalal salt	152	524. Composition of mould	160
Alkaline Detergents and Their Behavior Towards Metals	152	525. Sugar fermentation	160
Immersion Tests	152	526. Fermentation of corn syrup	160
476. Experimental Procedure.—Immersion test with metal strip	152	527. Making vinegar	160
477. Tin and sodium hydroxide	152	528. Souring of milk	161
478. Tin and sodium carbonate	152	529. Artificial butter	161
479. Tin and trisodium phosphate	152	530. Testing butter	161
480. Tin and sodium silicate	152	531. Testing butter	161
481. Copper sheet	152	532. Testing butter	161
482. Zinc sheet	153	533. Milk and the common cold	161
483. Sheet aluminum	153	534. Changing cider into vinegar	161
Gums, Adhesives and Glues	153	535. The souring of milk	162
484. How to cement broken glass	153	Essential Oils and Perfumes	162
485. How to mend broken china or porcelain	153	536. Making rose water	162
486. How to mend black crockery	153	537. Making geranium water	162
487. How to mend blue chinaware	153	538. Making lilac water	163
488. Another household cement	153	539. Making violet water	163
489. How to make envelope or postage stamp mucilage	154	540. How to make sachet powder	163
490. A common household adhesive paste	154	541. How to make incense	163
491. Another household adhesive paste	154	542. How to make wintergreen extract	163
492. Labels for your bottles	154	543. How to make lemon extract	163
Ink	154	544. How to make orange extract	163
493. How to make black writing ink	155	545. Potpourri sachet	163
494. How to make blue ink	155	546. Sage	164
495. How to make purple ink	155	Experiments with Flowers	164
496. How to make carmine ink	155	547. Action of ammonia on a violet	164
497. How to make green ink	155	548. Action of ammonia on pansy blossoms	164
498. How to make a commercial blue-black ink	156	549. Action of ammonia on red rose	164
499. How to make printer's ink	156		
500. A commercial ink powder	156		
501. A red ink powder	156		

COLLECTED FROM THE MAILBAG

Page	EXPERIMENT	Page
164	550. Action of ammonia on pink rose	171
164	551. Action of ammonia on red tulip	172
164	552. Action of ammonia on petunias	172
164	553. Action of ammonia on red geraniums	173
164	554. Action of ammonia on red carnations	173
164	Practical Chemistry	173
164	555. Heat by chemical reaction	173
164	556. Freezing with chemicals	173
165	557. Glycerine-litharge cement	173
165	558. Casein-borax glue	173
165	559. Protecting book bindings	174
166	560. Stains for wood	174
166	Textile Chemistry and Dyeing	174
166	Testing Textile Fibers	174
166	561. The burning test	174
166	562. Aceton test for cellulose acetate	176
166	563. Microscopic examination	176
166	564. Wetting test to identify linen	177
166	565. A quantitative test for fabric composition	177
167	Dyeing	177
167	566. Dyeing with an aniline dye	177
167	567. Using an aniline dye with a mordant	177
167	568. Dyeing with a natural vegetable dyestuff	177
167	569. Another black dyeing	177
167	570. Mordant dyeing with cochineal	177
168	571. How to make a brown sulphur dye	178
168	572. How to make a black sulphur dye	178
168	573. How to make black logwood dye	178
168	574. How to make dark red logwood dye	178
168	575. How to make green logwood dye	178
168	576. How to make blue horse chestnut dye	178
169	577. Changing red logwood solution yellow, then blue	180
169	578. Changing yellow turmeric solution brown	180
169	579. Changing red cochineal solution violet, then orange	180
169	580. How to dye cloth red	181
169	581. How to dye cloth dark blue	182
169	582. How to dye cloth a light blue	182
170	583. How to dye silk gray	182
170	584. How to dye cotton iron buff	182
170	Spot and Stain Removal	182
170	585. To remove grease from clothing	184
170	586. To remove paint from clothing	185
171	587. To remove ink spots	186
171	588. To remove iron rust	187
171	589. How to remove acid spot	187
171	590. How to remove alkali from clothing	188
171	591. How to remove grass stain	188
172	592. How to remove mildew	189
172	593. How to remove iodine stain	189
172	Textiles and Agriculture	190
172	Source of Wool	190
172	594. Wool scouring	190
172	595. Wool grease	190
172	596. Clothing	190
164	597. Shoddy	171
164	598. Source of Cotton	172
164	599. Cotton industries	172
164	600. Cotton plant	172
164	601. Source of Silk	173
164	602. Cocoons	173
164	603. Degumming	173
164	604. Examination of Fabrics with the Microscope	173
165	605. Wool fiber	173
165	606. Cotton fiber	173
165	607. Chemical Identification of Textile Fibers	173
165	608. Identification of wool	173
165	609. Solubility of wool in alkali	173
166	610. Identification of cotton	173
166	611. Action of alkali on cotton	174
166	612. Action of alkali on silk	174
166	613. Action of alkali and copper sulphate on cotton	174
166	The Chemistry of the Body	174
166	614. How to test for sugar in urine	176
167	615. How to test for albumin in urine	176
167	616. How to test for proteins in urine	177
167	617. Testing urine for acidity	177
167	618. Testing urine for ammonia	177
167	619. Testing urine for phosphate	178
167	620. How to test for acid mouth	178
168	The Chemistry of Plants—Agriculture	178
168	The Chemistry of Fertilizers—Farming	178
168	621. Nitrogen forming bacteria	180
168	622. To show the effect of carbon dioxide on plant life	180
168	A SIMPLE PHOTOCHEMICAL EXPERIMENT TO DETERMINE THE ACTIVITY OF THE ENERGY OF THE SUN'S RAYS	180
169	619. "Cold Light," or Light by Chemical Action	181
169	620. A demonstration of "Chemiluminescence"	182
170	Luminol	182
170	PART IV	182
170	ELECTRO-CHEMISTRY	182
170	The Dry Cell and How It Is Made	184
171	How the Dry Cell Works	185
171	The Wet Cell	186
171	The Storage Battery	187
171	621. How to test a battery of dry cells	187
171	622. How to determine the positive or negative wire	188
172	623. Another way to tell the positive and negative wires	188
172	624. How to show the direction of a current	189
172	Electroplating	189
172	625. How to copper-plate	190

EXPERIMENT

626. How to nickel-plate	191
Electrotyping	191
627. How to reproduce a medal	192
628. How to make a bronze statue from a plaster cast	192
Etching by Means of Electricity	193
629. How to etch on copper	193
630. How to etch on steel	193
631. Copper-plating by immersion	194
632. Tin-plating by contact	194
633. Nickel-plating by contact	194
634. Formation of a current by contact of copper with zinc	194
635. Formation of a current by contact of silver with zinc	194
Electrolysis	194
636. The electrolysis of sodium chloride	195
637. The lemon electric cell	195
638. How to clean silverware electrolytically	195
639. How to galvanize iron with zinc	196
640. How to galvanize iron with nickel	196

INTRODUCTION

The object in writing this elementary book is to present the simpler fundamental concepts of the Science of Chemistry in a form which will appeal to boys, and arouse in them a desire to acquire an understanding and appreciation of some of the fundamental laws of nature. The subject matter has necessarily been arranged and presented in a style to stimulate the boy's interest and curiosity without creating the feeling, on the part of the boy, that he is undertaking a laborious problem which will not give him pleasure. It is earnestly hoped that the subject matter will provide the opportunity for any boy to have a lot of fun in doing the many experiments, and by so doing, obtain an elementary knowledge of the principles upon which the Science of Chemistry is based.

A.C. Gilbert