

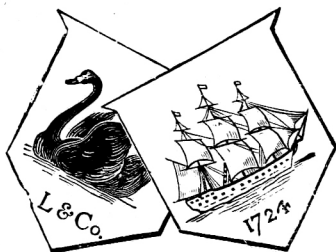
LONGMANS' GEOGRAPHICAL SERIES

BOOK III.

THE WORLD

FOR SENIOR STUDENTS

WITH 276 MAPS, DIAGRAMS, AND ILLUSTRATIONS



NEW IMPRESSION

LONGMANS, GREEN, AND CO.

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PREFACE TO 1912 EDITION

THIS book has been partly re-written and considerably enlarged with a view to meeting modern requirements. Great attention has been paid to Physical Geography, and a large number of new maps and diagrams have been added to illustrate such subjects as the rainfall of continents and countries, variations of climate as shown by maps giving isobars and isotherms, vegetable and other natural products, &c. Graphic representations have been given to show comparisons of trade between the different parts of the British Empire and other parts of the World. A Chapter has been added upon map-making, map-projections and map-reading. Sets of questions for practical work have been given upon the new physical maps in addition to the large number of questions with which the book was already provided. Statistics as to population have been brought into accordance as far as possible with the results of the Census of 1911.

NOTE TO 1918 EDITION

As far as possible statistics have been brought to the end of 1913.

PREFACE TO FIRST EDITION

THIS new Series of Geographies consists of five books, the first three of which have been arranged upon the concentric system both as regards matter and maps.

The first book gives a brief sketch of the chief geographical features of the globe. The second book traverses the same ground, but supplies greater detail. The third book goes still further into detail.

Hence, in studying the first book the pupil learns the most important facts and uses them as centres about which the additional facts in the second and third books are naturally grouped.

The maps have been constructed upon the same principle, and in each book they contain only such names as are mentioned in the text. The maps are so complete that no atlas will be needed for use with these books.

Particular attention has been paid to industrial and commercial geography, and throughout the series special stress is laid upon the close connection between the position, physical configuration, and products of a country with the employments of its people.

CONTENTS

	PAGE		PAGE
Introduction	1	The Sudan	431
Mathematical Geography	1	Western Africa	431
Physical Geography	16	British South Africa	434
The Ocean	33	Union of South Africa	439
The Atmosphere	44	The Orange Free State	443
Map-Making:		The Transvaal	443
1. Projections	70	Eastern Africa	445
2. By Actual Measurement	78	African Islands	447
Map Reading	81	America	449
Europe	84	North America	450
The British Isles	102	British North America	464
England and Wales	119	The United States	476
Scotland	184	Mexico and Central America	498
Ireland	205	West Indies	504
France	222	South America	508
Belgium and Holland	235	South American States	519
Germany	244	Brazil	520
The Alps	258	Venezuela	522
Switzerland	262	Guiana	523
Austria-Hungary	267	Colombia	524
Russia	281	Ecuador	524
Roumania	294	Bolivia	525
Sweden and Norway	296	Chile	526
Denmark	303	Argentine Republic	527
The Iberian Peninsula	306	Uruguay	529
Italy	317	Paraguay	529
Balkan Peninsula	328	Peru	529
Asia	340	Falkland Islands	530
Asiatic Russia	355	Australia	532
Asiatic Turkey	363	Victoria	543
Arabia	368	New South Wales	548
Irania	371	Queensland	554
The Indian Empire	375	South Australia	558
Indo-China	396	Western Australia	563
The Malay Archipelago	400	Tasmania	566
The Chinese Empire	403	New Zealand	569
Chusen	408	The Islands of the Pacific	579
The Japanese Empire	409	Pronunciation of Geographical	
Africa	413	Names	587
Northern Africa	425		
Index	593		

LIST OF ILLUSTRATIONS

FIG.	PAGE	FIG.	PAGE
1. The Solar System	3	32. Map : Lines of Volcanoes	32
2. Diagram to illustrate the Roundness of the Earth	4	33. Section across the Atlantic between Cape Palmas and Cape St. Roque	35
3. Diagram to illustrate the Seasons	6	34. Map : Ocean Currents	36
4. Diagram to illustrate the Seasons	7	35. Diagram to illustrate 'Tides'	41
5. Diagram to illustrate the Seasons	7	36. Diagram to illustrate 'Tides'	41
6. Diagram to illustrate the Seasons	8	37. Diagram to illustrate 'Tides'	42
7. The Zones	9	38. Map : Co-Tidal Lines	43
8. Diagram to illustrate the Position of the Pole Star	10	39. The Barometer	45
9. Phases of the Moon	13	40. Temperature of Atmosphere	47
10. Diagram to illustrate a Solar Eclipse	14	41. Map : Isotherms : January	48
11. Diagram to illustrate a Solar Eclipse	14	42. " " July	49
12. Diagram to illustrate a Lunar Eclipse	15	43. General Movements of the Atmosphere	51
13. Diagram to illustrate a Lunar Eclipse	15	44. Map : Prevalent Winds	53
14. Land and Water Hemispheres	17	45. Motion of a Cyclone	55
15. Western and Eastern Hemispheres	17	46. A 'Times' Weather Chart	56
16. Stratified Rocks	19	47. A Cyclonic Disturbance	56
17. Stratified and Unstratified Rocks	19	48. Map : The World : Rain-fall June to August	58
18. Position of Rocks	20	49. Map : The World : Rain-fall December to February	59
19. The Soil	21	50. Map : The World : Products and Forest Lands	63
20. Action of Wind upon Rocks	22	51. Map : Races of Mankind	67
21. A Surface Spring	22	52. Map-making : Projection	71
22. An Intermittent Spring	22	53. Projection	72
23. An Artesian Well	23	54. Stereographic Projection	72
24. A River Channel	24	55. Map : The Eastern Hemisphere on Stereographic Projection	73
25. Delta of the Nile	25	56. Map-making : Globular Projection	74
26. " Mississippi	25	57. Map : The Eastern Hemisphere on the Globular or Equidistant Projection	74
27. A Glacier	26	58. Map - making : Orthographic Projection	75
28. A Fringing Reef	28		
29. A Barrier Reef	28		
30. An Atoll	28		
31. A Volcano	30		

FIG.		PAGE
59.	Map-making : Cylindrical Projection	76
60.	Illustrating Cylindrical and Conical Projections and Developments	77
61.	Map of Asia on the Conical Projection	77
62.	Map-making : Surveying	78
63.	Trigonometrical calculation	79
64.	Contour Lines	80
65.	Showing hachures	81
66.	Part of a 1-inch Contoured Map	82
67.	Symbols used on a 1-inch Ordnance Survey Map	83
68.	Section across Europe, North to South	86
69.	Section across Europe, West to East	87
70.	Map : Europe : Relief	89
71.	„ „ Physical	91
72.	„ „ January Isotherms	94
73.	Map : Europe : July Isotherms	95
74.	Map : Europe : Annual Rainfall	96
75.	Map : Europe : Vegetation	97
76.	„ „ Political	100
77.	„ „ Density of Population	101
78.	Effect of Sea-bed being raised 600 feet	103
79.	Effect of Sea-bed being raised 120 feet	104
80.	Map : British Isles : Relief	105
81.	„ „ Annual Rainfall and Isobars	107
82.	Map : British Islands : January Isotherms	108
83.	Map : British Islands : July Isotherms	109
84.	Map : British Islands : Vegetable Products	111
85.	British Isles : Distribution of Surface	112

FIG.		PAGE
86.	British Islands : Area of Chief Crops, 1913	112
87.	Total Trade of Chief Countries for 1912	115
88.	Map : British Islands : Density of Population	116
89.	Map : The World, showing British Empire	120
90.	Section across England and Wales	121
91.	Map : England and Wales : Relief	122
92.	Map : England and Wales : Hills and Plains	124
93.	Map : The Pennine Chain, &c.	125
94.	Map : England and Wales : Rivers, &c.	131
95.	Map : British Islands : Co-Tidal Lines	138
96.	Map : England and Wales : January Isotherms	140
97.	Map : England and Wales : July Isotherms	140
98.	Map : England and Wales : Rainfall and Isobars	142
99.	Map : Basin of the River Thames	143
100.	Map : Basin of the River Ouse	146
101.	Map : Basin of the River Trent	147
102.	Map : Basin of the River Severn	149
103.	Map : The Lake District	152
104.	Map : England and Wales : Distribution of Crops	153
105.	Map : England and Wales : Minerals	154
106.	Map : Lancashire and Yorkshire Coal-fields	157
107.	British Trade with other Countries, 1913	162
108.	United Kingdom : Chief Articles of Import, 1913	164
109.	United Kingdom : Chief Articles of Export, 1913	164
110.	Map : Railways and Coal-fields	167

FIG.		PAGE
111.	Map: Counties and Towns	171
112.	Map: The Six Northern Counties	172
113.	Map: The Five Eastern Counties	175
114.	Map: The Six North Midland Counties	176
115.	Map: The Six West Midland Counties	177
116.	Map: The Seven South Midland Counties	179
117.	Map: The Five South-Eastern Counties	180
118.	Map: The Five South-Western Counties	181
119.	Map: Wales	182
120.	" Scotland: Relief	185
121.	" The Grampians	187
122.	" Southern Scotland	188
123.	" Scotland: Physical	192
124.	" " Annual Rainfall and Isobars	193
125.	Map: Scotland: January Isotherms	194
126.	Map: Scotland: July Isotherms	194
127.	Map: The River Tay	196
128.	" " Clyde	196
129.	" " Tweed	196
130.	" " Forth	197
131.	" Scotch Coal-fields	197
132.	" Scotland: Distribution of Crops	198
133.	Map: Scotland: Coal-fields, Manufactures, Railways	198
134.	Map: Scotland: Counties and Towns	204
135.	Map: Ireland: Relief	207
136.	" " Physical and Political	209
137.	Map: Ireland: January Isotherms	211
138.	Map: Ireland: July Isotherms	211
139.	Map: Ireland: Minerals, Manufactures and Railways	212

FIG.		PAGE
140.	Map: Ireland: Rainfall, &c.	212
141.	" The River Shannon	213
142.	" Ulster	216
143.	" Leinster	217
144.	" Munster	220
145.	" Connaught	221
146.	" France	225
147.	" France: Vegetable and Mineral Products, &c.	228
148.	France: Trade with other Countries, 1913	231
149.	Map: Belgium and Holland	240
150.	Map: Germany	245
151.	" The River Rhine	248
152.	" Germany: Vegetable and Mineral Products	251
153.	Map: Germany: Trade with other Countries, 1912	254
154.	Map: Switzerland: Relief	259
155.	" The Alps	261
156.	" Switzerland	264
157.	" Austria-Hungary	269
158.	" The River Danube	274
159.	" Bosnia, Herzegovina, &c.	279
160.	Map: Russia	283
161.	" The Baltic Sea	286
162.	" Rivers of Southern Russia	287
163.	Map: Russia: Products, Manufactures, &c.	289
164.	Map: Roumania	295
165.	" Sweden and Norway	299
166.	" Denmark	305
167.	" The Iberian Peninsula	309
168.	Map: Italy	320
169.	" Northern Italy	321
170.	" The Balkan Peninsula	329
171.	Map: Greece	333
172.	" Servia	336
173.	" Bulgaria	337
174.	Section across Asia, North to South	341

FIG.		PAGE
175.	Map: Asia: Relief . . .	342
176.	„ „ Physical . . .	344
177.	„ „ Summer Rainfall . . .	348
178.	Map: Asia: Winter Rainfall . . .	348
179.	Map: Asia: January Isotherms . . .	349
180.	Map: Asia: July Isotherms . . .	349
181.	„ „ Vegetable and Mineral Products . . .	351
182.	Map: Asia: Density of Population . . .	354
183.	Map: Asia: Political . . .	357
184.	„ Russian Central Asia . . .	360
185.	„ Asiatic Turkey . . .	364
186.	„ Arabia . . .	369
187.	„ Irania . . .	373
188.	„ The Himalayan System . . .	376
189.	Map: India: Physical . . .	377
190.	„ „ January Isotherms . . .	380
191.	Map: India: July Isotherms . . .	380
192.	Map: India: Rainfall during South-West Monsoon . . .	381
193.	Map: India: Rainfall during North-East Monsoon . . .	381
194.	Map: India: The River Ganges . . .	384
195.	„ India: Vegetation, Manufactures, and Railways . . .	386
196.	India: Trade with other Countries, 1912 . . .	388
197.	Map: India: Political . . .	391
198.	„ „ Density of Population . . .	392
199.	Map: Straits Settlements, &c. . .	398
200.	Map: The Malay Archipelago . . .	401
201.	Map: The Chinese Empire . . .	405
202.	„ Japan . . .	409
203.	Section across Africa: West to East . . .	414
204.	Map: Africa: Relief . . .	415
205.	„ „ Physical . . .	416

FIG.		PAGE
206.	Map: Africa: Rainfall June to August . . .	418
207.	Map: Africa: Rainfall December to February . . .	418
208.	Map: Africa: January Isotherms . . .	419
209.	Map: Africa: July Isotherms . . .	419
210.	Map: Africa: Density of Population . . .	420
211.	Map: Africa: Vegetable Products . . .	420
212.	Map: Africa: Political . . .	422
213.	„ The Nile Valley . . .	427
214.	„ Western Africa . . .	432
215.	Section across South Africa . . .	435
216.	Map: British South Africa: Physical . . .	436
217.	Map: British South Africa: January Isotherms and Summer Rainfall . . .	437
218.	Map: British South Africa: July Isotherms and Winter Rainfall . . .	437
219.	Map: South Africa: Political . . .	441
220.	Section across North America, West to East . . .	451
221.	Map: North America: Relief . . .	453
222.	Map: North America: Physical and Political . . .	455
223.	Map: North America: Summer Rainfall . . .	458
224.	Map: North America: Winter Rainfall . . .	458
225.	Map: North America: January Isotherms . . .	459
226.	Map: North America: July Isotherms . . .	459
227.	Map: North America: Density of Population . . .	461
228.	Map: North America: Vegetation and Vegetable Products . . .	461
229.	Map: British North America . . .	463

FIG.	PAGE	FIG.	PAGE
230. Map: British North America: January Isotherms	465	254. Map: South America: Rainfall December to February	514
231. Map: British North America: July Isotherms	465	255. Map: South America: January Isotherms	515
232. British North America: Trade with other Countries, 1912	470	256. Map: South America: July Isotherms	51
233. Map: Ontario and Quebec	471	257. Map: South America: Density of Population	516
234. Map: The Gulf Provinces	472	258. Map: South America: Products	516
235. Map: Alberta, Saskatchewan, and Manitoba	473	259. Map: South America: Physical and Political	521
236. Map: British Columbia, &c.	474	260. Map: Australia: Relief	533
237. Map: The United States: Physical	479	261. " " Physical and Political	536
238. Map: United States: January Isotherms	482	262. Map: Australia and New Zealand: January Isotherms and Rainfall	538
239. Map: United States: July Isotherms	482	263. Map: Australia and New Zealand: July Isotherms and Rainfall	538
240. Map: The Mississippi Valley	483	264. Map: Australia and New Zealand: Vegetation and Products	540
241. Map: United States: Vegetation and Vegetable Products	486	265. Map: Australia and New Zealand: Density of Population	540
242. Map: United States: Density of Population	486	266. Commonwealth of Australia: Trade with other Countries, 1912	542
243. United States: Trade with other Countries, 1913	489	267. Map: Victoria and Tasmania	544
244. Map: The North-Eastern States	490	268. Map: New South Wales	549
245. Map: The United States: States and Towns	491	269. " Queensland	557
246. Map: The Great Lakes	494	270. " South and Western Australia	560
247. " The United States: Physical and Political	495	271. Map: Spencer Gulf and Neighbourhood	562
248. Map: Mexico and Central America	501	272. Map: New Zealand: Provinces, &c.	570
249. Map: West Indies	505	273. Map: The North Island	574
250. Section across South America: West to East	509	274. " The South Island	575
251. Map: South America: Relief	510	275. Dominion of New Zealand: Trade with other Countries, 1912	577
252. Map: South America: Physical	512	276. Map: New Guinea, &c.	580
253. Map: South America: Rainfall June to August	514		

LONGMANS' GEOGRAPHICAL SERIES

BOOK III

INTRODUCTION

1. **GEOGRAPHY**, as its name implies, describes the earth on which we live. It may be divided into four branches—Mathematical, Physical, Political, and Commercial.

Mathematical Geography treats of the earth as a planet, its shape and size, its motions and their results, latitude and longitude, and the methods by which its surface may be represented on globes and maps.

Physical Geography treats of the natural features of the earth's surface, such as the distribution of land and water, and the conformation of its crust; of its atmosphere and climate; of its minerals, plants, and animals; and of the causes which bring about changes on its surface.

Political Geography treats of the various countries into which the surface of the earth is divided, their political and social institutions, and the occupations and condition of the people inhabiting those countries.

Commercial Geography treats of the exchange of commodities, the locality and manner of their production, the modes of transport, and the routes by which they are carried.

MATHEMATICAL GEOGRAPHY

2. **THE EARTH AS A PLANET.**—In very early times astronomers noticed that, while the vast majority of the stars seemed to maintain their relative position unchanged from year to year, five appeared to change their position in the heavens

with regard to the other stars. These five on this account were called **planets**, while the others were termed **fixed stars**. After a while it was discovered that these planets moved round the sun as a centre; then the discovery was made that our earth was also a planet, moving round the sun in a similar manner to the other five; now we know that numbers of other heavenly bodies, some larger and some smaller than the earth, also revolve round the sun at varying distances and in different times, forming with the sun what is called the **Solar System**.

The path described by one body in its revolution round another is called its **orbit**. The orbits of the planets are not quite circular, but slightly elliptical, the sun occupying one of the foci. It therefore follows that a planet is not always at the same distance from the sun. When nearest the sun the planet is said to be in *perihelion*, and when at the point of its orbit which is most distant from the sun in *aphelion*.

3. The Solar System consists of—

(a) The sun, situated near the centre.

The sun, around which the earth travels at an average distance of nearly 93 millions of miles, is one of the multitude of fixed stars. It appears larger and brighter to us, because it is so much nearer than the other stars. It is an intensely hot body, shining by its own light; while most of the planets and their satellites are cool bodies, and do not, therefore, give out light of their own. Compared with the earth, the sun is a globe of enormous dimensions; its **diameter** being 866,500 miles—that is, nearly 110 times the diameter of the earth; while to make up its **bulk** about 1,800,000 bodies as large as the earth would be required.

When viewed through a telescope, **dark spots** may often be seen upon its brilliant surface. If one of these spots be carefully noticed, and observed again after a few days, it will be found to have moved farther towards the western side of the sun's disc, where it finally disappears. After an interval it reappears on the eastern side, and arrives at the position where it was first noticed in about twenty-five days, furnishing us with a proof that the sun **rotates** on its axis in that time.

(b) **Eight large planets.** These, arranged according to their distance from the sun, are:—**Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.**

Each of these planets except Mercury and Venus is attended by one or more satellites, which revolve round it, and accompany it in its revolution round the sun.

The following table shows the number of moons, distances from the sun, and diameters of the primary planets:—

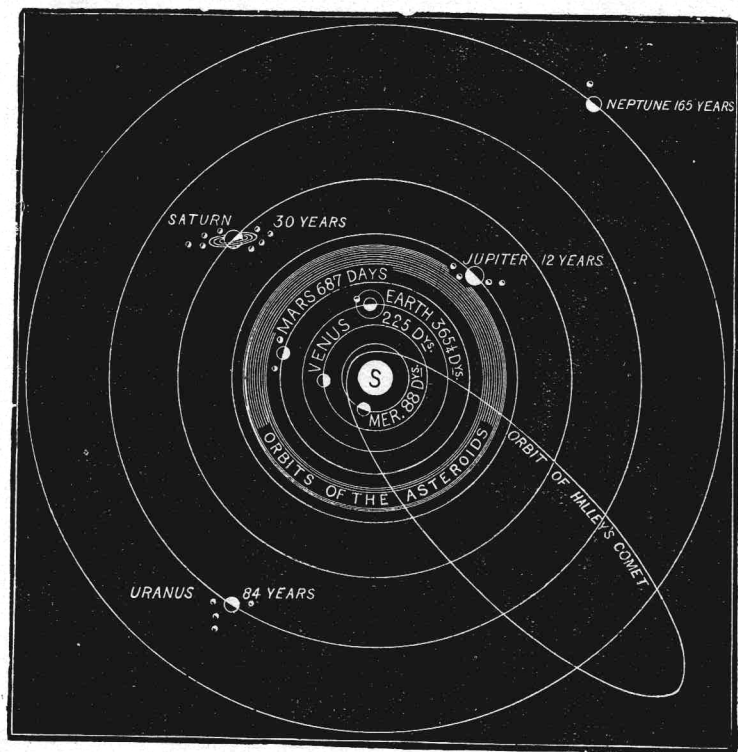
Planet	Moons	Distance from the sun in millions of miles	Diameter in miles
Mercury	—	36	3,030
Venus	—	67·2	7,700
Earth.	1	92·9	7,918
Mars	2	141·5	4,220
Jupiter	4	483·5	86,000
Saturn	8	886·5	71,000
Uranus	4	1,782	31,800
Neptune	1	2,792	34,500

Fig. 1 shows the order and time of revolution of the planets. The distances are not to scale, Neptune being really about eighty times as distant from the sun as Mercury.

(c) A number of smaller planets, termed **planetoids** or **asteroids**, revolving between the orbits of Jupiter and Mars.

(d) **Comets**.—These are bodies usually moving in an elongated

FIG. 1.—THE SOLAR SYSTEM.



orbit, at one time very near and at the other an immense distance from the sun. They vary much in appearance, but generally consist of a more or less bright **head**, followed by a train of dimmer light called the **tail**.

Some comets have a regular period of revolution, and move round the sun in an elongated elliptical orbit. Others move in a curve like a parabola, and after passing round the sun vanish into space.

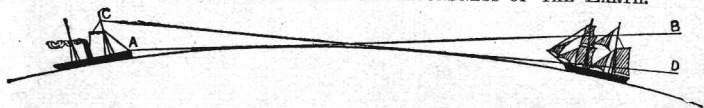
(e) **Meteors.**—These are small bodies travelling round the sun like comets, with which they possibly have some connection. Under the term are included **shooting-stars**, **fire-balls**, and **aërolites**.

When one of these bodies in the course of its revolution strikes our atmosphere, the friction caused by its rapid motion generates so much heat that it burns, and we see it as a streak of light.

4. THE SHAPE OF THE EARTH.—Owing to the action of certain well-known laws, the earth is not a perfect sphere. Careful measurements show that it is slightly flattened at the poles and slightly bulging at the Equator. Such a figure is termed an **oblate spheroid**. The following points, among others, are adduced as reasons for concluding that the earth is spherical in shape.

1. When a ship is approaching the shore, the first parts to be seen are the top-sails; as she nears the land the lower sails and rigging come into sight, and lastly the hull appears. If the earth's surface were flat, the hull, being the largest part, would be visible first. The look-out in the crow's nest sees the whale spouting before it can be seen by the men on deck, because he looks over the curved surface which intercepts their view. If two vessels

FIG. 2.—DIAGRAM TO ILLUSTRATE THE ROUNDNESS OF THE EARTH.



approach each other (fig. 2), the observer at *A* sees only the portion above the line *AB*, while the look-out at *C* sees all above the line *CD*.

These appearances are noticeable in all directions, objects of the same height coming into view at the same distance. This shows that the surface must be spherical, as, if round in one direction only, these distances would vary.

2. The shadow thrown by the earth on the moon in a lunar eclipse is *always* circular in shape, which could not be the case unless the earth were spherical in form.

3. The sun, moon, and the other heavenly bodies are globular in form, and therefore it is only natural to assume that the earth is also a globe.

4. Numbers of ships circumnavigate the globe every year, sailing eastward round Africa to Australia, and returning by Cape Horn to their starting-point. This could only be accomplished upon a body having a round surface.

5. The sun rises earlier for places east and later for places west. If the earth's surface were flat he would be visible at all places on the surface directly he appeared above the horizon.

6. The Pole Star is seen on the horizon at the Equator; as the observer goes north it gradually rises above his horizon at the rate of 1° for every 69 miles (approximately) traversed, until at the North Pole it appears directly overhead. This would not be the case on a plane.

5. THE SIZE OF THE EARTH.—By the aid of the stars the various dimensions of the earth have been accurately deter-

mined. In round numbers the equatorial diameter is 7,926 miles, while the polar diameter is 7,900 miles. The difference of $26\frac{1}{2}$ miles between the two diameters in so large a body is so slight, that for all practical purposes we may regard the earth as a globe. The earth's circumference at the Equator is 24,899 miles; and the area of its surface 197,000,000 sq. miles.

6. THE MOTIONS OF THE EARTH.—The earth has two motions—

(a) **Rotation**, the daily (*diurnal*) turning on a line which passes through its centre, and is called the **axis**.

(b) **Revolution**, the yearly (*annual*) motion round the sun.

The first motion, rotation, gives us the length of the day, and, by bringing the various parts of the earth's surface successively into sunlight, causes the alternate light and darkness which we term **day and night**.

The sun appears to rise in the east, pass across the sky, and disappear in the west every day. If certain stars be observed at night, they will be found to follow a similar course. These appearances must be due either to the fact that these bodies are moving round the earth, or that the earth turns on its axis. This latter fact has been accepted for several reasons, among which may be mentioned: the flattening of the earth at the poles, and the bulging at the Equator (due to a rotatory motion); the incredible velocity the heavenly bodies would possess in order that they might revolve round the earth in twenty-four hours; the improbability that larger bodies would revolve around smaller ones.

The term day is used in two senses: first, to denote the time of the earth's rotation on its axis, and, secondly, the time from sunrise to sunset.

The time of the earth's rotation is easily found by observing when a particular fixed star is exactly south, and then noting when the same star reappears in the same position. This time is found to be 23 hours 56 minutes 4 seconds, and is called a *sidereal day*. The ordinary day, which is measured from the sun, is 3 minutes 56 seconds longer than the time of the earth's rotation, and is called a *mean solar day*. Its greater length is due to the fact that, while the earth has been making a complete rotation, it has also been moving onwards in its orbit, and hence must continue to turn nearly four minutes longer, to bring any given place to the same position with regard to the sun as on the previous day.

7. The second motion, revolution, determines the length of the year. It takes the earth $365\frac{1}{4}$ days to make one revolution round the sun. This revolution is made with the earth's axis inclined to the plane of its orbit at an angle of $66\frac{1}{2}^\circ$, and constantly pointing in the same direction. This causes the variation in the length of day and night and the difference in the altitude of the sun at noon, and thus brings about the **change of seasons**.

The exact time taken by the earth to complete one revolution round the sun is 365 days 6 hours 9 minutes 9 seconds. This is called the *sidereal year*, because it is the time which the sun appears to take to go round from one fixed star and return to the same. The *tropical*, or *equinoctial*, year is the one used for ordinary purposes. Its length is 365 days 5 hours 48 minutes 46 seconds, and it is the time occupied by the sun in moving from one tropic or equinox back to the same again.

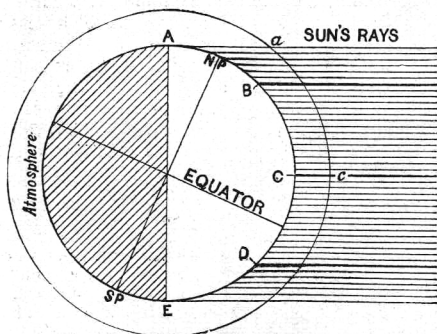
The reasons for concluding that the earth revolves round the sun are also drawn from observations of the heavenly bodies. If in the Northern Hemisphere we watch the rising of the sun from December 21 to June 21, he will be found to rise farther and farther north each day; while from June 21 to December 21 he appears to rise farther and farther south. Because this apparent motion stops at these dates, they are called the **Solstices**; June 21 being the **Summer Solstice**, while December 21 is the **Winter Solstice**. If the earth remained in the same position, the sun would rise and set in the same points each day.

Certain stars also, which are visible at one period of the year, pass out of sight and appear again after a year's interval in the same place, while other stars come into view and then disappear again in their turn.

These constant changes, which occur every year under exactly similar circumstances, tell us that the earth is continually changing its position in the heavens.

8. THE SEASONS.—As the earth flies on its journey round the sun, the direction at which the sun's rays strike any part

FIG. 3.—DIAGRAM TO ILLUSTRATE THE SEASONS.



of its surface undergoes constant change, and the amount of heat received at any particular place consequently varies. The relative effect of the sun's rays upon equal portions of the earth's surface may be seen from fig. 3. When the sun is higher in the heavens, its rays strike the ground more nearly perpendicular, and the amount of heat

received is greater, for the following reasons:—

(a) When the sun is higher, the number of rays falling upon any part of the earth's surface is greater than when it is lower. If AB, BC, CD, and DE represent equal parts of the earth's surface, it is evident that BC, where the sun's rays fall more perpendicularly, receives a much greater number of rays than AB, where the rays strike the surface in a more slanting direction.

(b) The rays pass through less atmosphere when the sun is higher, and consequently do not lose so much of their heat. The rays at A pass through the atmosphere for a much greater distance than those at C, Aa being greater than cc.

9. The cause of the change of seasons is best understood from a consideration of the following diagrams:—

If the earth's axis were perpendicular to the plane of its orbit, as in fig. 4, then it is evident that every place on its surface would have 12 hours day

and 12 hours night. The regions about the Equator would have, as now, the hottest climate (par. 8), while towards the poles it would grow gradually colder. There would be no difference in temperature at any given place throughout the year, and consequently none of the changes which we call seasons.

If we now incline the earth's axis to the plane of its orbit as in fig. 5, we get an explanation of the variation in the length of days and nights which brings these changes about. It will be seen that when the earth is in this position the sun's rays reach a considerable distance beyond the North Pole, and that, although the earth rotates on its axis, a considerable area around the North Pole (from a to b) remains continuously in the light, while a similar area around the South Pole (from c to d) does not receive any light from the sun. This is the position of the earth with regard to the sun at midsummer for the Northern Hemisphere, while for the Southern Hemisphere it would be midwinter. If in fig. 4 L marks the position of London, then it is clear that one rotation gives an equal length of day and night, LM being equal to MN; but in fig. 5 the point

FIG. 4.—DIAGRAM TO ILLUSTRATE THE SEASONS.

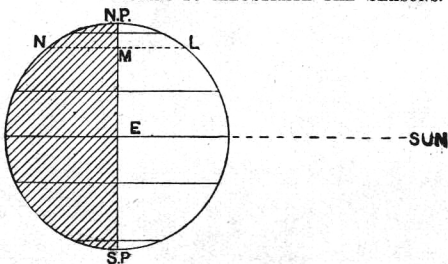
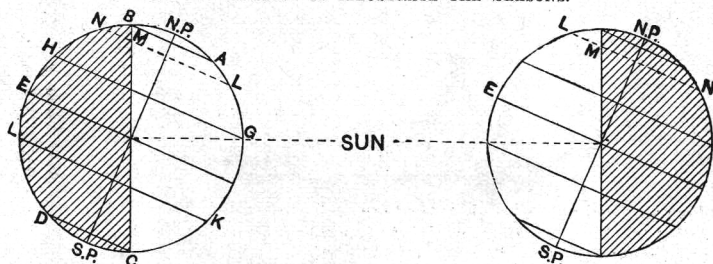


FIG. 5.—DIAGRAM TO ILLUSTRATE THE SEASONS.



L would be in sunlight for a much greater part of the rotation, LM being now much greater than MN.

The distance beyond the North Pole at which the sun's rays strike the earth's surface is $23\frac{1}{2}^{\circ}$, and is determined by the inclination of the earth's axis to the plane of its orbit. This gives the position of what is called the **Arctic Circle**, while a similar distance from the South Pole marks the position of the **Antarctic Circle**.

10. Fig. 6 shows the earth at four points of its orbit. At A, the earth's position at the *summer solstice* (June 21), the North Pole is turned towards the sun, which is now overhead at noon on a line $23\frac{1}{2}^{\circ}$ north of the Equator, called the **Tropic of Cancer**. This line is called a **tropic** because the sun appears to turn south after reaching it. The Northern Hemisphere is now in the midst of its summer, while the Southern Hemisphere is in the midst