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SYSTEM OF
PHYSIOLOGIC THERAPEUTICS

VOLUME III

System of Physiologic Therapeutics

ELEVEN OCTAVO VOLUMES

AMERICAN, ENGLISH, GERMAN, AND FRENCH AUTHORS

A Practical Exposition of the Methods, Other than Drug-giving, Useful in the Prevention of Disease and in the Treatment of the Sick. Edited by SOLOMON SOLIS COHEN, A.M., M.D.

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Climatology and Health Resorts, Including Mineral Springs.
2 Volumes. With Colored Maps

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Descriptive Circular upon Application

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A SYSTEM
OF
PHYSIOLOGIC THERAPEUTICS

A PRACTICAL EXPOSITION OF THE METHODS, OTHER THAN DRUG-
GIVING, USEFUL IN THE PREVENTION OF DISEASE AND
IN THE TREATMENT OF THE SICK

EDITED BY
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VOLUME III

Climatology

Health Resorts—Mineral Springs

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IN TWO BOOKS

BOOK I

PRINCIPLES OF CLIMATOTHERAPY—OCEAN VOYAGES—MEDITERRANEAN,
EUROPEAN, AND BRITISH HEALTH RESORTS

Illustrated with Maps

PHILADELPHIA
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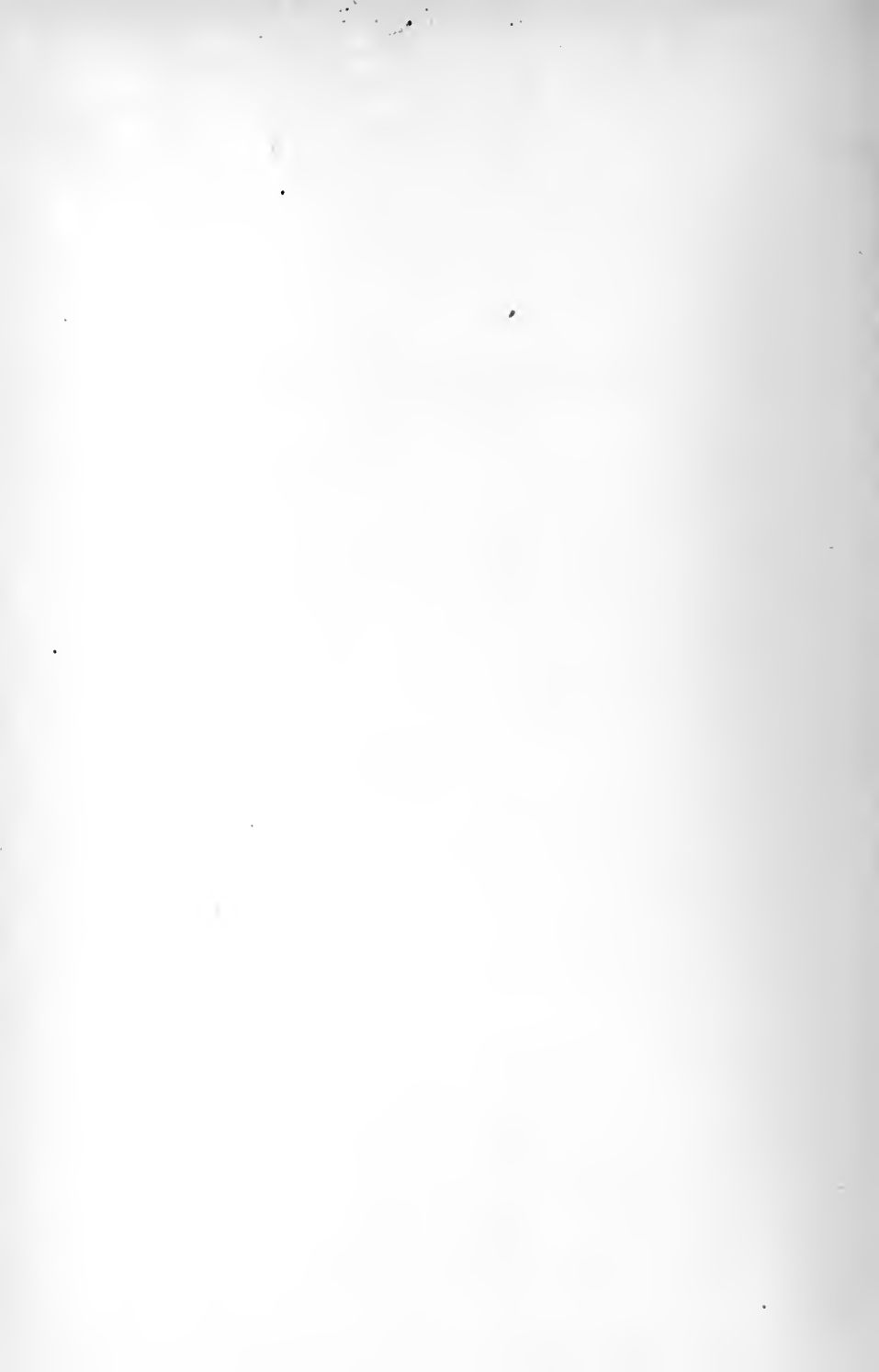
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PREFACE

In this work I have endeavored to be as concise as possible without omitting important points. By desire of the editor theoretic discussions have been confined to fundamentals. The remarks concerning localities and climatic conditions in America contained in Parts I and III, and the descriptions of American health resorts in Part II, are by my collaborator, Dr. Hinsdale. A treatise like the present is necessarily to a great extent a compilation. In it I have made use of the work of many climatologists, but most help has been derived from my father, Sir H. Weber, after whose various writings, moreover, the book has been modeled. In many parts I have given his views almost verbatim as he has expressed them himself, but he cannot be held responsible for faults that may be found in my pages.

F. PARKES WEBER.

19, HARLEY ST., LONDON, W.,
July, 1901.



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CONVERSION TABLES

In the text of this volume temperatures are expressed in degrees Fahrenheit, altitudes in English feet, and distances in English miles, but the following conversion tables may be found useful :

TEMPERATURES: CENTIGRADE AND FAHRENHEIT DEGREES.		TEMPERATURES: CENTIGRADE AND FAHRENHEIT DEGREES.		TEMPERATURES: CENTIGRADE AND FAHRENHEIT DEGREES.		HEIGHTS: METERS AND ENGLISH FEET.	
Cent.	Fah't.	Cent.	Fah't.	Cent.	Fah't.	Meters.	Feet.
100	212	44	111.2	-12	10.4	9	29.5
99	210.2	43	109.4	-13	8.6	10	32.8
98	208.4	42	107.6	-14	6.8	20	65.6
97	206.6	41	105.8	-15	5	30	98.4
96	204.8	40	104	-16	3.2	40	131.2
95	203	39	102.2	-17	1.4	50	164
94	201.2	38	100.4	-18	-0.4	60	196.8
93	199.4	37	98.6	-19	-2.2	70	229.6
92	197.6	36	96.8	-20	-4	80	262.4
91	195.8	35	95	-21	-5.8	90	295.2
90	194	34	93.2	-22	-7.6	100	328
89	192.2	33	91.4	-23	-9.4	200	656.1
88	190.4	32	89.6	-24	-11.2	300	984.2
87	188.6	31	87.8	-25	-13	400	1,312.3
86	186.8	30	86	-26	-14.8	500	1,640.4
85	185	29	84.2	-27	-16.6	600	1,968.5
84	183.2	28	82.4	-28	-18.4	700	2,296.6
83	181.4	27	80.6	-29	-20.2	800	2,624.7
82	179.6	26	78.8	-30	-22	900	2,952.8
81	177.8	25	77	-31	-23.8	1000	3,280.8
80	176	24	75.2	-32	-25.6	2000	6,561.7
79	174.2	23	73.4	-33	-27.4	3000	9,842.6
78	172.4	22	71.6	-34	-29.2	4000	13,123.5
77	170.6	21	69.8	-35	-31	5000	16,404.4
76	168.8	20	68	-36	-32.8		
75	167	19	66.2	-37	-34.6		
74	165.2	18	64.4	-38	-36.4		
73	163.4	17	62.6	-39	-38.2		
72	161.6	16	60.8	-40	-40		
71	159.8	15	59	-41	-41.8		
70	158	14	57.2	-42	-43.6		
69	156.2	13	55.4	-43	-45.4		
68	154.4	12	53.6	-44	-47.2		
67	152.6	11	51.8	-45	-49		
66	150.8	10	50	-46	-50.8		
65	149	9	48.2	-47	-52.6		
64	147.2	8	46.4	-48	-54.4		
63	145.4	7	44.6	-49	-56.2		
62	143.6	6	42.8				
61	141.8	5	41				
60	140	4	39.2				
59	138.2	3	37.4				
58	136.4	2	35.6				
57	134.6	1	33.8				
56	132.8	Zero	32				
55	131		30.2				
54	129.2		28.4				
53	127.4		26.6				
52	125.6		24.8				
51	123.8		23				
50	122		21.2				
49	120.2		19.4				
48	118.4		17.6				
47	116.6		15.8				
46	114.8		14				
45	113		12.2				

HEIGHTS: METERS AND ENGLISH FEET.	
Meters.	Feet.
1	3.2
2	6.5
3	9.8
4	13.1
5	16.4
6	19.6
7	22.9
8	26.2

DISTANCES: KILOMETERS AND ENGLISH MILES.	
Kilometers.	Miles.
1	0.6
2	1.2
3	1.8
4	2.4
5	3.1
6	3.7
7	4.3
8	4.9
9	5.5
10	6.2
20	12.4
30	18.6
40	24.8
50	31
60	37.2
70	43.4
80	49.7
90	55.9
100	62.1
200	124.2

NOTE.—The higher temperatures are given because mineral waters are frequently mentioned in the present volume. The temperature of some thermal springs is close to or actually that of boiling water.

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS

CLIMATOTHERAPY—BOOK I

PART I

PHYSICS, PHYSIOLOGY, AND GENERAL
THERAPEUTICS OF CLIMATE

A SYSTEM OF PHYSIOLOGIC THERAPEUTICS

CLIMATOTHERAPY

PART I

PHYSICS, PHYSIOLOGY, AND GENERAL THERAPEUTICS OF CLIMATE

CHAPTER I

THE ELEMENTS OF CLIMATE

Definition. Determining Factors

Definition of Climate

Climate is the combination of the various conditions of the atmosphere and the earth's surface, determining the suitability of a region or site for the life and health of animals and plants. Climatotherapy is the utilization of climate to promote the comfort or recovery of the sick, or to prevent the development of disease. In its study, which is intimately connected with general sanitation and public health, we are concerned only with the effects (direct or indirect) of climate on man; but observations on the flora and fauna furnish us with valuable information as to the temperature, humidity, equability, sunshine, winds, and nature of the earth-surface of a locality, all of which have obvious bearings on the suitability of the place in question for man in general, and for persons of different constitutions.

A climate that may be termed 'good,' in the sense that it favors the development of races of men both vigorous in body and capable in mind, is a climate characterized by frequent moderate variations in the weather. Such a climate exercises the powers of adaptation and resistance of the different organs without subjecting them to excessive strain, and thus keeps the body in proper working condition. But the climate best suited for one race, is not necessarily that best suited for another race, and the most suitable climate for any particular person depends on his individual constitution and on his state of health or disease. In regard to the **treatment of disease**, it is important to remember that no climate is perfect, that irregular variations may occur in all climates, and that the climate of most health resorts is not equally suitable for particular diseases at all seasons of the year. "For any given class of cases, that climate is a good one," says Sir H. Weber, "in which the qualities that would be disadvantageous are to a certain degree absent during the whole year, or at least part of the year; while other qualities are present by the proper use of which the bodily strength is raised and the restoration of the affected organs and functions is facilitated."

Determining Factors of Climate

The climate of any particular region or site is determined by :

1. Its **distance from the equator** (latitude).
2. Its **elevation above sea-level** (altitude).
3. Its **distance from, and relation to, bodies of water**—large seas, inland lakes, and marshes.
4. **Other features of the surroundings and the aspect of the site toward them** : Slopes, level plains, or deserts ; high mountains, hills, or forests affording shelter from the wind ; cliffs and rocks reflecting sunlight on the place or cutting it off during portions of the day.
5. The **prevailing winds, local and general**, these depending practically on the preceding factors.
6. The **nature of the soil and the natural or artificial conditions connected with the surface of the locality and its neighborhood**. The ground may be rocky, porous, as in sandy locations, or clayey ; permeable or impermeable to moisture ; and,

according to its permeability and configuration of surface, dry or moist and suitable or unsuitable for good drainage. The surface may be bare or covered with a greater or lesser profusion of vegetation (naturally or owing to irrigation and cultivation), and such conditions may influence considerably the moisture and range of temperature of the local atmosphere. If bare of vegetation, the surface may be dark (black igneous rocks, etc.) or light (yellowish sand and white chalky cliffs), and may reflect the sunlight with a glare; it may be hard and rocky or soft and sandy or dusty. Sometimes only small portions of the surface may be bare (roads, etc.), but in dry climates such areas may, with the slightest wind, give rise to disagreeable clouds of dust.

The **density of the population** and the artificial conditions introduced by man are most important elements in determining the wholesomeness or unwholesomeness of a climate. In this respect the amount of space occupied by buildings and dusty roads, the nature and extent of the local industries, and the presence or absence of large factories connected with them, the sufficiency or insufficiency of drains, and the general hygienic arrangements of the neighborhood must specially be noticed.

CHAPTER II

ELEMENTS OF CLIMATE RELATING TO THE ATMOSPHERE

Composition of the Air. Dust and Micro-organisms. Temperature. Light. Electricity. Moisture. Absolute and Relative Humidity.

We shall now consider separately some of the main elements on which the climate and healthfulness of a locality depend. Though each element is discussed as briefly as possible, a certain amount of repetition has been found unavoidable.

THE COMPOSITION OF THE AIR

Pure atmospheric air contains on the average 20.7 parts per cent. by volume of oxygen and 78.3 parts of nitrogen (C. Flügge). The percentage of oxygen is remarkably constant. Angus Smith, however, found as much as 20.99 per cent. on the west coast of Scotland, while in the narrow streets of large towns, such as Manchester and London, the air may contain only 20.8 parts per cent. or less of oxygen. Argon, which constitutes slightly less than 1 per cent. of the atmosphere, appears to be chemically inert, and nearly all that is taken into the body can be found again in the expired air. The effects of the watery vapor and relative humidity of the air in modifying climate will be considered further on. The proportion of carbonic acid gas in the atmosphere varies widely. The quantity contained in pure open air is given as from 0.03 to 0.04 per cent., but it may be as low as 0.02 per cent., and in forests, when there is no wind, the proportion may be increased slightly. In the confined air of theaters, schools, law-courts, and closed rooms, it may reach as much as 0.2, 0.6, or even 1 per cent.

Ozone, an allotropic form of oxygen, has a disinfectant action when present in sufficient quantity, but in the minute proportions in which it ordinarily exists in the atmosphere (always less, it is said,

than 1 in 700,000 parts), its actual effects on micro-organisms and on the human body cannot easily be estimated. It is said to be most abundant on the seacoast, on mountains, in woods, especially of coniferæ, and on desert plains; it is likewise augmented by intense sunlight and during rainy weather, particularly during thunder-storms. There is less ozone in houses and towns than in the open country, and it is absent altogether near putrefying substances. According to B. W. Richardson, an excess of ozone in the air causes deleterious irritation and even inflammation of the respiratory tract.

Probably the chief importance of ozone in the air depends on the fact that its presence indicates absence of the injurious organic substances that quickly decompose it. On the other hand, an unusually large proportion of carbonic acid gas, though possibly not sufficient to be of itself injurious, indicates that the air is tainted by excess of organic impurities. Such impurities are frequently revealed by an accompanying disagreeable odor, but it is probable that their poisonous qualities have been overestimated by Brown-Séguard and d'Arsonval; the effects attributed to poisonous organic excretions from the lungs being partly due, perhaps, to excess of carbonic acid gas and partly to the psychic influence of nauseating odors.

The probable excess of microbes, some of them doubtless pathogenic, in air containing an excess of carbonic acid is of greater importance. Dr. Henry MacCormac long ago attributed the origin of pulmonary tuberculosis in great part to the effects of 'breath rebreathed,'¹ and recently A. Ransome and A. Hillier have suggested that the effete organic material given off in the expired air may act as a pabulum or, at least, by its presence in excess, favor the growth of the tubercle bacillus. Ransome (Royal Society, 1898) found that tubercle bacilli could be cultivated at ordinary room-temperature on wall-paper or filter-paper impregnated with moisture condensed either from expired air or from humid air arising from the ground.

Among other substances more or less frequently present in the

¹ Cf. B. W. Richardson, on "Rebreathed Oxygen," *The Asclepiad*, 1887, vol. 1V, p. 172.

air; **common salt** (chiefly at the seaside) must especially be mentioned. Owing to the spray thrown up on the shore, sea air becomes charged with particles of salt water held in suspension. This quality is, of course, most noticeable in stormy weather and on steep and rocky coasts. The **iodin**, which is found in traces in sea air, appears, according to the researches of Armand Gautier, to exist in organic combinations, and may form part of minute organisms or fragments of organisms held in suspension in the air.

Dust¹ and Micro-organisms in the Air

J. Tyndall, by his well-known experiments with the electric light, drew attention to the countless floating particles in the air, and, by his writings² and ingenious demonstrations, emphasized their significance from a hygienic point of view. Of these particles, some are organic and some inorganic. The **inorganic material** blown up from sandy deserts and dusty roads by the wind may be irritating to the eyes, to the respiratory passages, and to the skin of the face; it constitutes a great drawback of many dry and otherwise healthful climates. Dust can be carried to enormous distances by aërial currents; volcanic dust has thus been transported from Iceland to Norway and Scotland, and dust swept up by whirlwinds from the deserts of Africa may be carried far out to sea. **Organic dust**, set free during various industrial processes from plant fiber, animal skins, etc., may, like inorganic dust, do harm by mechanical irritation of the respiratory passages, etc., but some kinds of organic dust may be injurious through chemical properties or, still more so, by reason of vital activities. Thus, in susceptible individuals, the pollen of plants gives rise to hay-fever; and pathogenic microbes, if present in the dry dust or attached to particles of water floating in the air, may cause infectious diseases. The number of microbes in the air of crowded portions of large towns is enormous. In large,

¹ Dust, metallic fumes, and other impurities in the air are well-known causes of disease in certain trades. We need mention only the bronchial and pulmonary affections of metal-grinders, stone-grinders, workers in mother-of-pearl, etc. Happily these affections can frequently be averted by the exercise of proper precautions. The whole subject is dealt with in works on public health, etc.

² See "Dust and Disease," in Tyndall's "Fragments of Science," London, 1871.

windy cities during cold, dry winters, when the ground remains frozen for long periods at a time and cannot be cleansed with water in the usual way, the annoying dust that is swept up by the wind from the roads consists not only of particles of organic refuse and excreta, but partly of living micro-organisms, pathogenic as well as nonpathogenic ; though, as a matter of fact, pathogenic microbes are but rarely detected in the open air. Molds are much more numerous than bacteria : C. Flügge (1897) gives from 500 to 1000 as the average number of spores and microbes present in a cubic meter of open air, only from 100 to 200 of them being bacteria.

When the general hygienic arrangements are good and the accumulation of filth is not permitted, the number of bacteria in the air will, of course, be smaller. Winds, showers of rain, and, above all, sunlight, are the natural purifiers of the air. Sparsity of population is naturally associated with smaller numbers of microbes in the air of a district. Thus, P. Miquel, at Paris, from six years' observations, found the average number of microbes in a cubic meter of air taken from the crowded Rue de Rivoli to be 3910, more than eight times the number (455) in the same quantity of air from the park of Montsouris. In the air of the Hôtel Dieu hospital he estimated the number of microbes as 79,000 in a cubic meter.

From these considerations it is obvious that in the open spaces and parks of large towns the number of germs in the air is smaller than in the more crowded districts ; that the air of the open country, especially on the tops of hills, compared with that of towns, is relatively free from microbes ; and that these latter are practically altogether absent from the air of very high altitudes away from towns, and from the air of the open ocean and of the arctic regions.

Temperature of the Air

Temperature is the most important factor in the climate of a place. The following points must be taken into consideration : The mean annual temperature and the mean temperature for the different seasons and months of the year ; the difference between the temperature in the sun and the temperature in the shade ; the daily range of temperature at different seasons of the year ; the liability of a locality to sudden irregular variations in temperature.

The temperature of a place depends chiefly on its distance from the equator. Other circumstances, however, largely modify the influence of latitude. Among these are: The altitude; the proximity of seas and large bodies of water, or of high mountains, glaciers, and snow-fields; the humidity of the air; the nature of the earth's surface; and the prevalent winds.

Heat, from a climatic point of view, is practically derived entirely by radiation from the sun. To reach the earth's surface, heat and light must pass through the earth's atmosphere. Were it not for the water vapor it contains, the atmosphere would allow all the heat to pass through it, and would, in fact, be as diathermic as space itself. As it is, a variable quantity of heat is absorbed by the aqueous vapor (thus helping to warm the air) before it reaches the ground; much light and heat are kept back by clouds and mists, when these are present. On reaching the earth's surface, the rays of heat and light are partly thrown back again (reflected) into the atmosphere and space, and partly absorbed; the light-rays being transformed into heat. Thus it is that the earth's surface receives the supply of heat by which, in turn, it warms the atmosphere. The proportion of rays reflected to rays absorbed varies with the nature of the surface. In general terms, the smoother and more nearly white the surface, the greater is the reflection. From chalky cliffs, snow-fields, glaciers, and sheets of water it is especially powerful, while absorption is great when the soil is dark and dull or covered with green grass and dark foliage. A covering of snow during the long winter months prevents the soil from absorbing the sun's rays, and therefore greatly increases the heat in the sun and the cold in the shade.

The **temperature in the sun** and the **temperature in the shade** must be differentiated clearly. The latter depends mainly on the quantity of heat given off from the earth's surface, whether of land or water; but at any one spot it may be altered greatly by temporary currents of air. Dry air allows the heat given off from the earth to pass through it much more easily than through moist air, and it is therefore less readily warmed. Hence in the dry climates of inland plains and in high altitudes the difference between the temperature in the sun and the temperature in the shade is much greater than in the moist climates of the sea-coast. This marked

difference between the temperature in the sun and that in the shade is accompanied by a wide daily range of temperature; for when the air is dry and clear, the heat stored up in the earth's surface during the day is lost rapidly by radiation into space during the night; so that, however hot and bright the day may have been, the night tends to become cold. Since in cold weather the atmosphere cannot contain so much aqueous vapor as during hot weather, these characteristics of dry climates are more marked in winter than in summer; in some climates they can be observed only during winter.

When moist ocean winds pass over tracts of land, especially hilly or mountainous land, they part with much of their moisture, so that the climate of places situated more to leeward is drier and less equable. Norway and Sweden offer good examples of this; thus, Buchan points out that while Hernösand on the eastern coast has an annual range of 42.5° F., at Aalesund, situated on the western coast, in the same latitude on the other side of the Dovre Fjord Mountains, the annual range is only 18.4° F. Similarly, in the British Islands, while Valencia, in the west, on the coast of Kerry, has a temperature range of only 16° F., that in the east, at Greenwich, is 26° F. The range of temperature increases generally in proceeding inland from the coast. The annual range of temperature on the ocean shores is usually limited to about 20° F., while in the north-central parts of Asia it may reach 60° F., and even more than 100° F.

In America, wide extremes of temperature are experienced. The greatest range of yearly temperature is usually recorded in North Dakota: 143° F. is not an unusual record at Fort Buford in that State, while the lowest temperature ever recorded in the United States was -63° F. at Poplar River, Montana, in January, 1885. From West Iowa north and northwest to the British possessions and in north-central Nevada the annual range is more than 120° F. The least yearly range in the United States is at Key West, Florida— 41° F. It is about 50° F. at San Francisco, and less than 70° F. over the Florida peninsula, along the west Gulf coast, on the Carolina coast, and generally along the Pacific coast.

In regard to health resorts, however, it is the range of tempera-

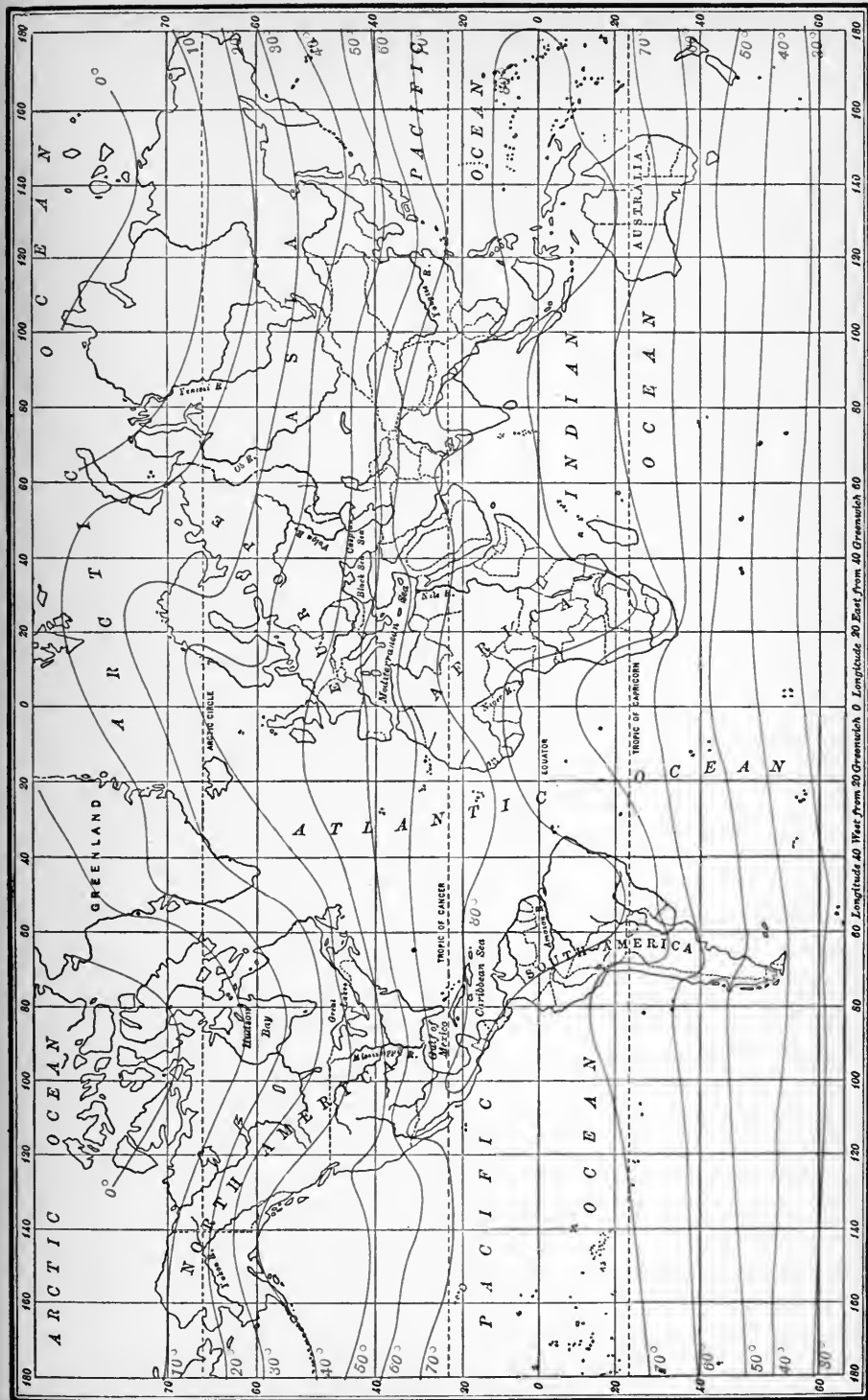
ture for a particular season only, with which physician and invalid are concerned.

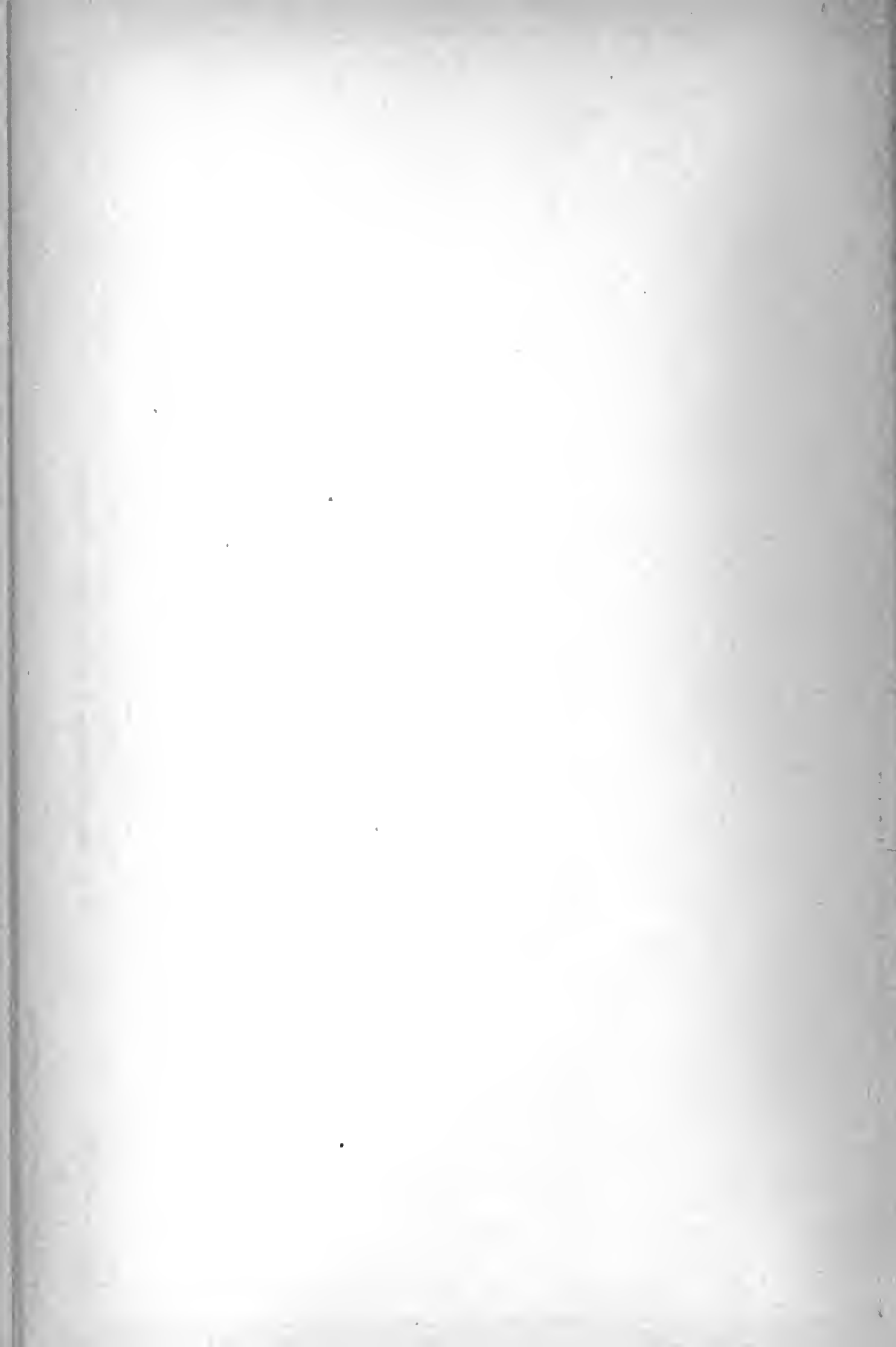
We need not further consider here the general influence of proximity to the sea in diminishing the daily and annual range of temperature. The importance of the great **ocean currents** in modifying the mean annual temperature of the coast must, however, be mentioned. There are warm and cold currents in the ocean for the same physical reasons that these are present in the atmosphere. Warm ocean currents flowing northward from tropical regions heat the air over them, and thus modify the climate of the northern coasts they wash. The warm Gulf Stream, arising from the neighborhood of the Gulf of Mexico, exerts a great moderating effect on the Atlantic seaboard of the United States and on the northwestern coast of Europe, against which it impinges, and to it the prevalent southwestern winds of England owe their warmth and moisture. On the other hand, currents flowing from the arctic and antarctic regions exert a contrary effect. Thus, a cold ocean stream flowing southward from Davis Strait and along the coast of Labrador has a chilling influence on the climate of the northeastern coast of America, and antagonizes to some extent the influence of the Gulf Stream. (See Plate I.)

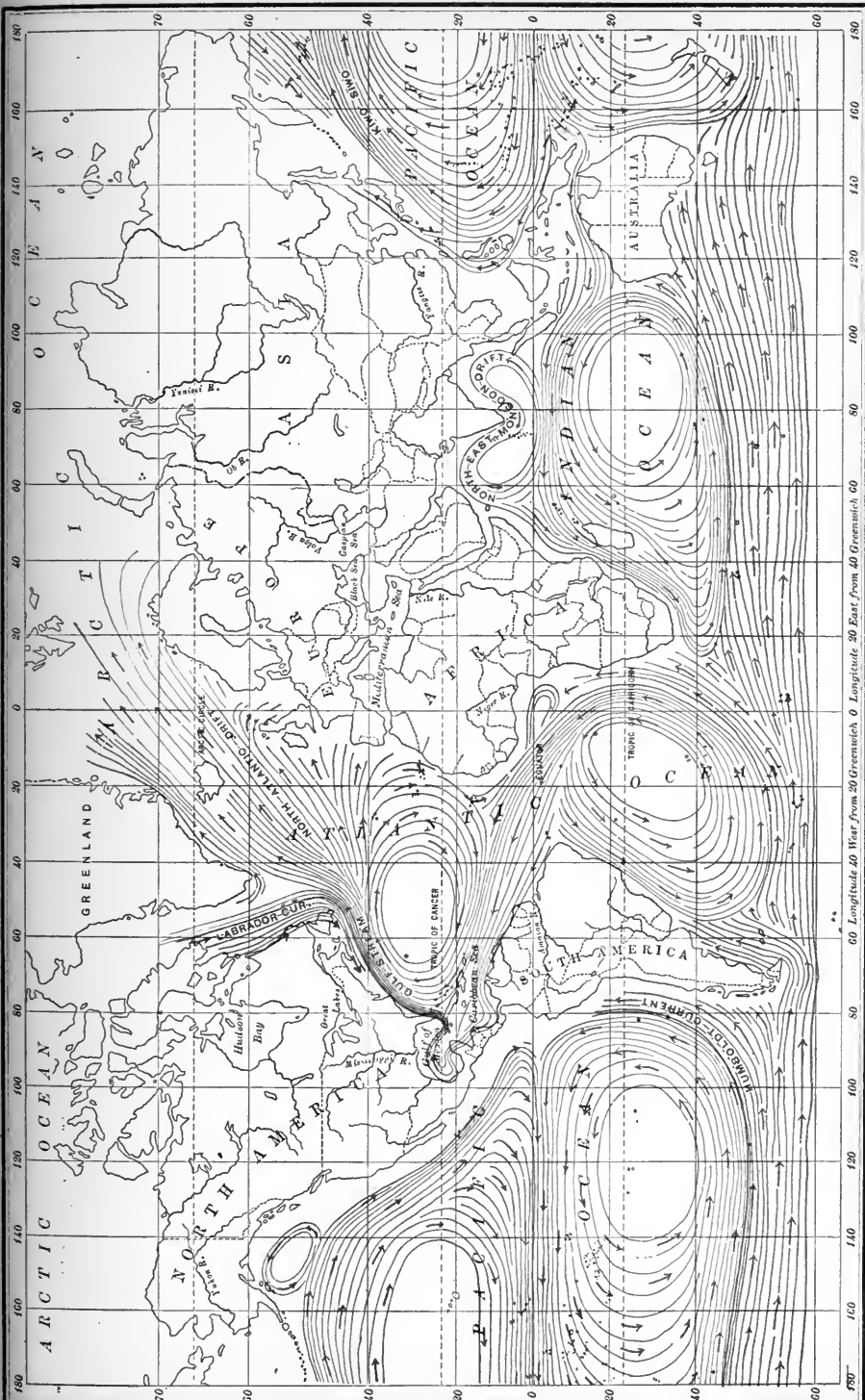
The proximity of large **inland lakes** and bodies of water has, like the proximity of the ocean, a certain tendency to make the climate humid and equable, but if, during winter, the surface becomes frozen, the sheet of ice thus formed will, of course, have a different effect on the range of atmospheric temperature. Buchan remarks that the curving round of the January isothermals upon the regions surrounding the Baltic is to some extent due to the freezing of the shallow, brackish waters of that sea during winter. Had the Baltic been deeper and more salt, and not subject to freezing, the winter climate of places on its coast would have been much less severe.

A covering of moist grass and herbs, by the constant evaporation from its surface, in hot weather tends to lower the temperature of the superjacent air. **Vegetation** in general has a tendency to modify temperature somewhat, by increasing the moisture of the air.

The **position** of a place has an effect on its temperature by exposing it to, or sheltering it from, cold or warm currents of air,







Mean Annual Direction of the Ocean Currents.

Equatorial Currents in Red.
 Polar Currents in Blue.
 Arrows show direction in which current flows.

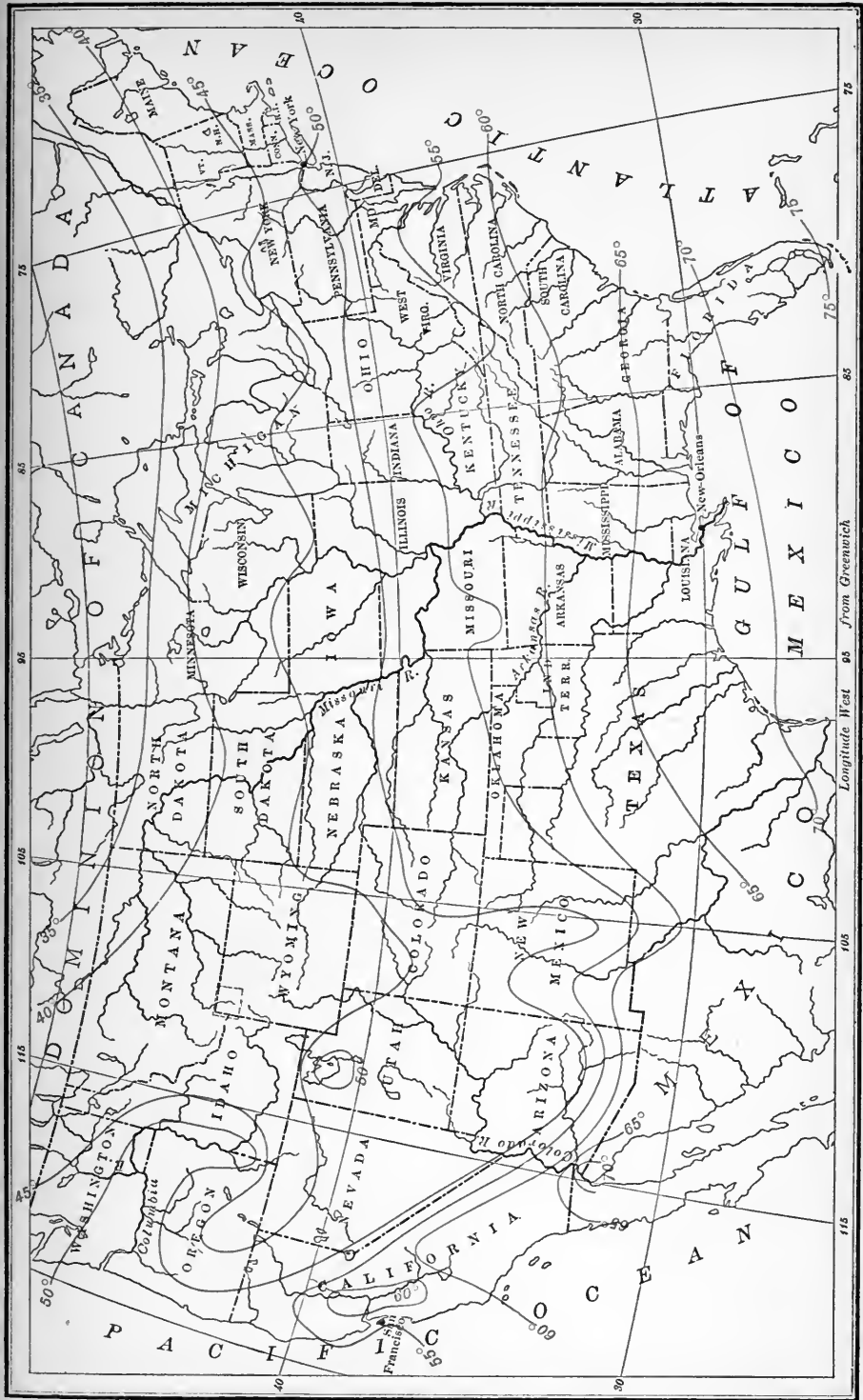
that may be of local or of distant origin. The sea-breezes on the coast, which have a most grateful and cooling influence during the heat of the day, will be referred to further on ; as will be, likewise, the cold local currents of air that, in mountainous regions, flow down the mountain sides into the valleys at night. Mountain ranges and ridges of hills cool the air and favor precipitation of its aqueous vapor ; thus, as we have already pointed out, especially by depriving winds of much of their moisture, they modify the temperature of districts situated leeward, increasing the difference between the maximum and the minimum reading of the thermometer. Cold icy winds sweeping down from the glaciers and snow-fields of neighboring mountain ranges may give rise to great and sudden variations in the temperature of a locality. Such winds, especially from relatively low mountains covered with snow only during winter, often constitute the chief drawback to the utility of health resorts that otherwise possess warm and sunny winter climates.

From what has been said in preceding paragraphs, it will be seen that temperature—both the mean annual temperature of a place and, what is especially important in regard to health resorts, the mean temperature for the various months and seasons of the year—is dependent on numerous conditions other than merely the distance of a place from the equator. Alexander von Humboldt was the first to construct charts of the distribution of temperature over the surface of the globe. He connected places having the same mean annual temperature by isothermal lines. Similar lines joining places having the same mean winter temperature and those joining places having the same mean summer temperature he termed isochimal (also called isochimonal or isochimenal) and isothermal lines respectively. Other observers made out isothermal lines for the different months of the year, and in regard to the choice of health resorts, these monthly isotherms are more important than the annual, the summer, or the winter isotherms. Into the detailed course of these isothermal lines, which are more regular and correspond more nearly to the lines of latitude over ocean than over continent, we cannot enter here. They are illustrated in Plates II, III, and IV.

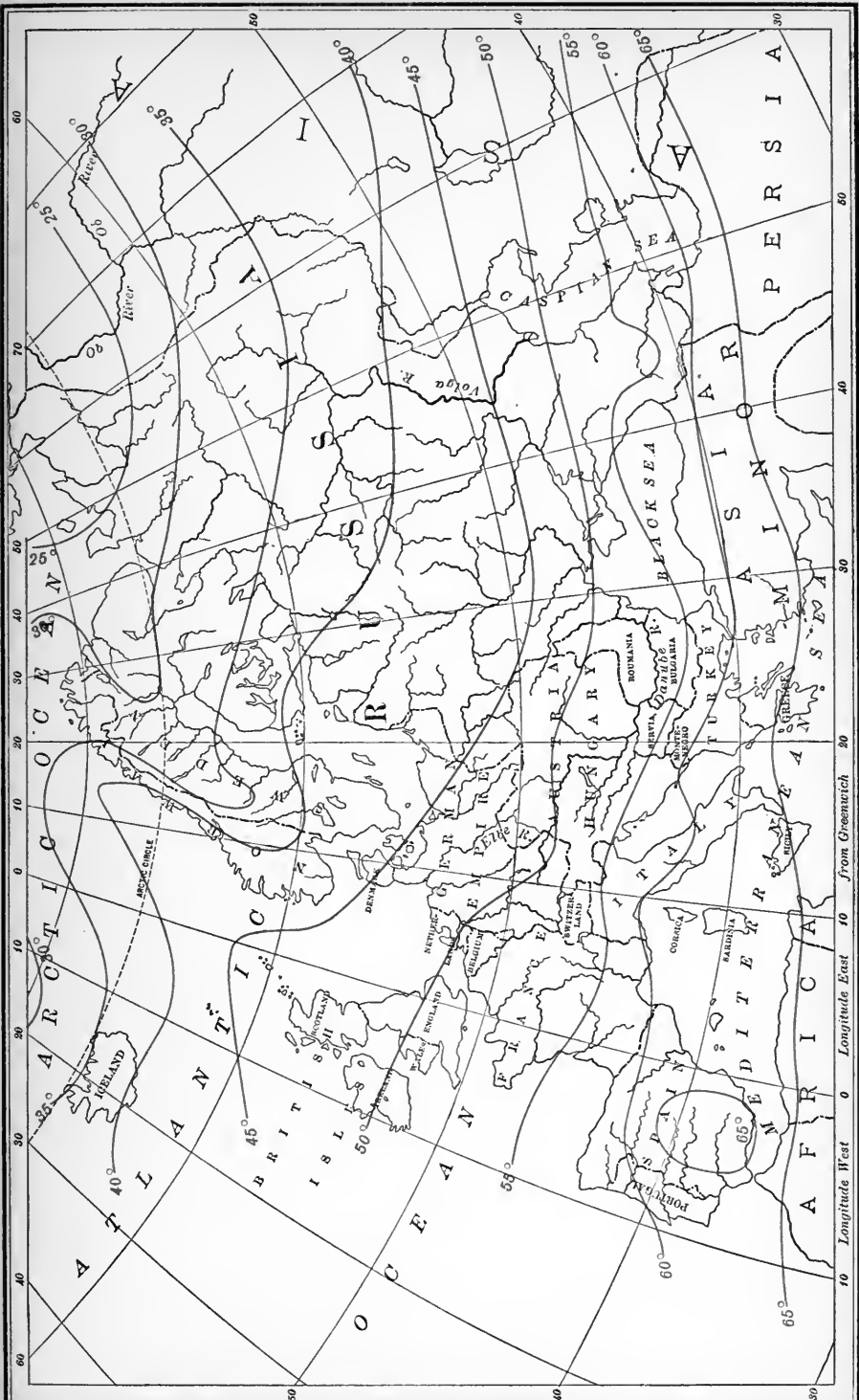
The effects of the temperature of the air cannot easily be separated from those of the humidity, sunshine, winds, etc. The tem-

perate zones are, of course, more conducive to health and longevity than are the arctic regions and the tropics. Many of the diseases and illnesses of tropical countries, however, that were formerly attributed to climatic factors are now known to be caused by various specific infections; many, too, being due in large part to the unsuitable food and drink that residents in hot climates often indulge in. These affections are, therefore, only secondarily due to climate, and, like infectious diseases elsewhere, are more or less preventable by general hygienic measures, by observing temperance in eating and drinking, and by choosing wholesome food and taking sufficient bodily exercise. On the whole, parasitic microbes (both saprophytic and pathogenic) grow best in hot moist places and least well in cold dry places. Moist heat and a high shade temperature have an oppressive effect on mind and body and, doubtless, lower the resistance of the body to the invasions of pathogenic microbes.

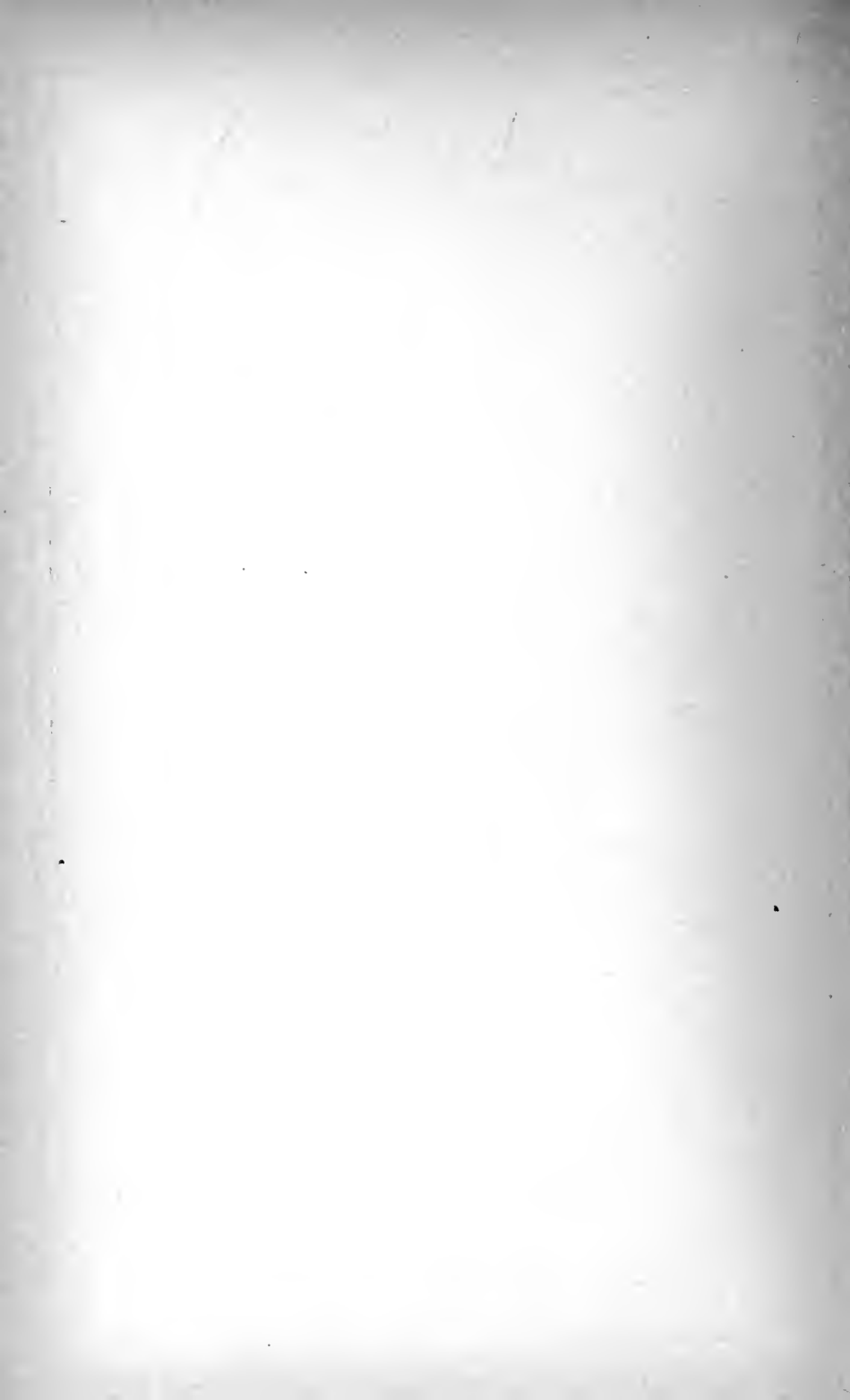
In temperate climates we find deaths from certain diseases (such as infantile diarrhea) particularly numerous during hot seasons, and from other diseases (*e. g.*, acute pulmonary complaints) especially numerous during cold seasons. The causes of death in the majority of these cases are more or less of microbic origin, but the temperature of the air has, at least, an indirect influence. During mild weather (moderately warm and not too damp) persons with chronic catarrhal affections, chronic muscular rheumatism, or rheumatoid arthritis often improve considerably; and patients with pulmonary emphysema and a tendency to bronchitis generally suffer less during warm and moist weather. Much depends on the constitution of the patient, those of strong constitution usually feeling better in cold weather, and those of weak constitution, in warm weather. S. Solis Cohen has called attention to the temperature relations of patients having insufficient automatic control of the vasomotor system, those with undue relaxation of vessels suffering excessively from heat, and those with undue constriction being extremely susceptible to cold. Dyspepsia and metabolic disorders, with a tendency to biliousness and gouty attacks, in persons of strong constitution are often relieved by cold dry weather. In regard to the choice of climates, as well as in most other respects, aged persons are to be classed with patients of weak constitution.

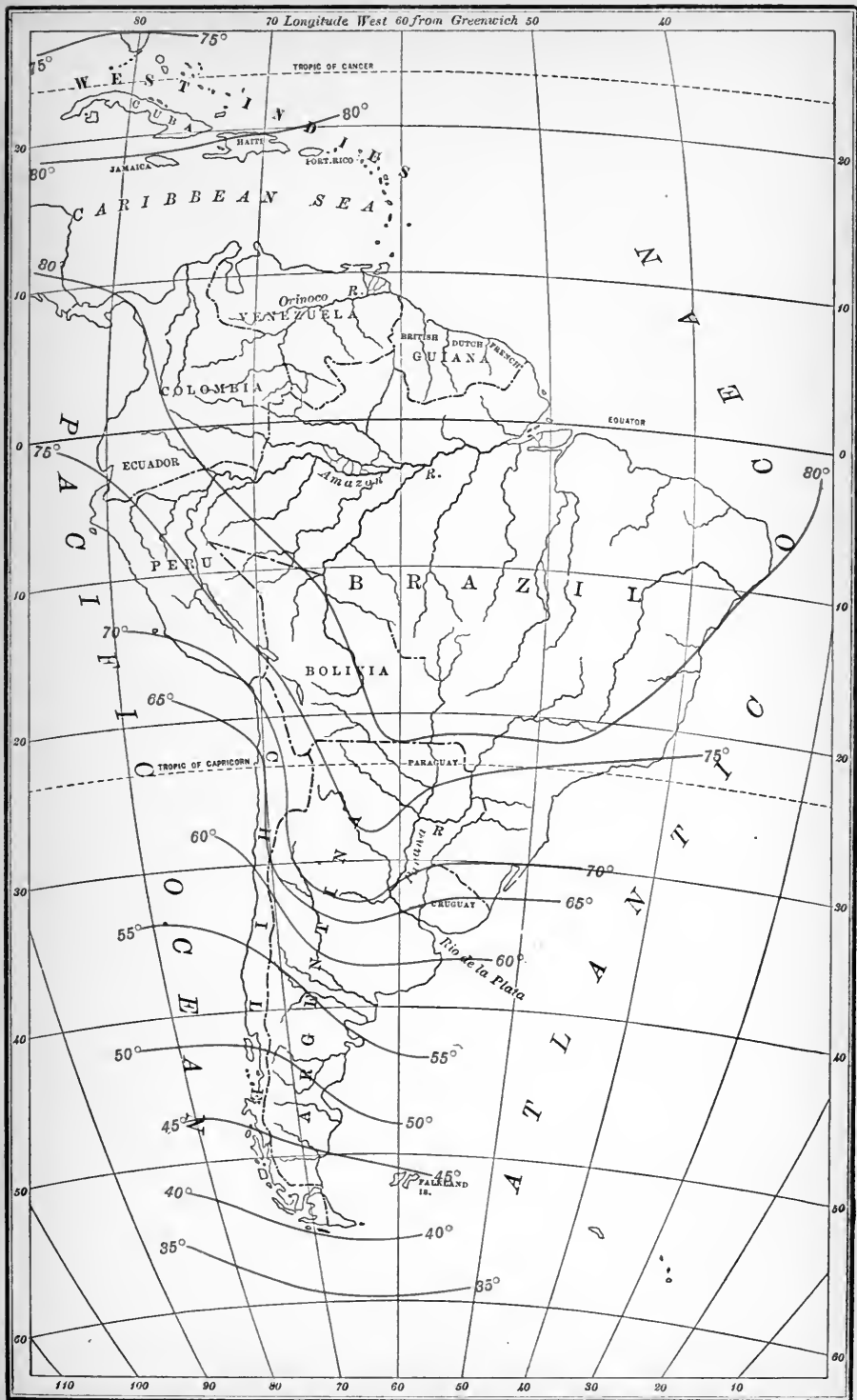


Mean Annual Temperature. (Fahr. Degrees)



Mean Annual Temperature (Fahr. Degrees)





Aged and feeble persons and those of deficient vascular tone find equable and temperate climates most healthful and do not well support the extremes of heat and cold. A long spell of very cold weather always carries off a large proportion of old persons, who succumb chiefly to pulmonary complaints. For persons of average strength, however, especially if they are natives of cold and temperate regions, a fair amount of cold weather is good. More heat is lost from the body in cold than in hot weather, and to make up for the increased loss of heat increased heat-production and increased metabolism are necessary ; and thus greater activity of all the heat-producing organs and tissues of the body is required. This vital exercise may be too severe for the old and feeble, for persons of originally weak constitution, and for those whose capacity for heat-production is lessened by permanent or temporary disease ; in such cases the increased demand made on their vital powers may exhaust them and lead to depression of functions. In corpulent and full-blooded individuals, however, whose organs require more exercise, it may be of great use. In some persons also, especially those of sluggish reaction, the necessity for greater heat-production may act as a general stimulus to their vital powers and make them more likely to resist infection ; in some cases—for example, in chronic tuberculous diseases in certain individuals, even when the patient is already infected—moderate cold may exercise an indirectly beneficial effect by stirring up the vital powers. A considerable variation in the temperature and other elements of the climate helps to harden the body—that is, it renders the powers of compensatory reaction of the organism more nearly perfect ; it favors activity and is conducive to a high standard of development both of body and mind.

The Influence of Light

We need not here enter into the great importance of light on the growth and development of plants. The influence of light and sunshine on the mind and on the general health of man is often remarkable. Many persons easily become depressed in the absence of sunshine, and some of the ill effects, both mental and physical, of residence in the dark dwellings of large towns may be due to the relative absence of light. John of Gaddesden, in Edward the First's

reign, used red hangings for the beds and rooms of his smallpox patients, and claimed to have prevented scars by this method. In recent years N. Finsen and others have used red light for a similar purpose. The chemical, or actinic, rays—those at the blue end of the spectrum, which are excluded by red and orange glass—seem, indeed, according to the researches of Bowles, Finsen, and others, to exert a more irritating influence on the skin than do the other rays. For certain purposes, therefore, and in some morbid conditions, especially when there are acute cutaneous manifestations, they must, so far as possible, be excluded; but their bactericidal action is probably greater than that of the other rays, and in chronic cutaneous affections they sometimes bring about a beneficial hyperemic or inflammatory reaction. Finsen has introduced recently an ingenious method by which these rays can be concentrated, either from sunlight or from electric light, and applied to the skin in the treatment of lupus vulgaris.¹ The chemical rays of the solar spectrum are much absorbed in passing through the atmosphere, and it has been said that the brilliant colors of Alpine flowers bear witness to the greater abundance of these rays at high altitudes.

In observations on the effect of light, natural or artificial, upon diseased conditions, whether of the skin or of other structures, it is difficult to determine how much of the effect is due to the action of certain rays or all rays on the cells of the body, and how much to some antagonistic action on parasitic microbes. The antiseptic action of sunlight, however, on the microbes exposed to it in the air and elsewhere has been proved by the experiments of many investigators. Since, therefore, in the selection of a climate for therapeutic purposes, the purity of the air is always a main consideration, the effect of sunlight, although it may be an indirect one so far as the patient's body is concerned, can hardly be overestimated. Among recent observers, Dr. Arthur Ransome has demonstrated the great

¹ Here we may allude to the mere warming effects of natural and artificial 'light baths' (all the rays included). Light rays seem to penetrate more deeply than heat rays, and, even if in the tissues of the body, all the light that penetrates becomes converted into heat, this power of deeper penetration is, perhaps rightly, adduced as one of the reasons for preferring the modern electric-light ('radiant heat') baths to ordinary hot-air baths. The subject is to be treated in a subsequent volume of this series.

value of light in regard particularly to the destruction of tubercle bacilli.

We need hardly discuss here the injurious effects of too much sunshine in tropical climates, and the well-known disagreeable effects on the skin—sunburn, etc.—of too prolonged exposure, especially when the sun's rays are reflected from glaciers and snow-fields. Nor need we more than mention the harmful effects of ordinary light on the skin—*e. g.*, summer rashes and the remarkable affection known as Kaposi's disease, or xeroderma pigmentosum—in the case of certain peculiarly susceptible individuals.

The duration of bright sunshine can be recorded daily by automatic methods, and thus the mean number of hours of sunshine, estimated by the same standard,¹ can be calculated for the various months and seasons of the year at all health resorts. The duration of actual sunshine can further be compared with the duration of possible sunshine, and the former can be expressed as a percentage of the latter; by such figures also an idea of the frequency of cloud and fog at any place can be obtained. Tables giving such data for various localities in their respective countries have been published by the British Meteorological Office and by the Swiss Central Meteorologic Institution. The sunshine percentage for 67 stations in the United States, taken by thermometric and photographic recorders, is given in the annual reports of the Weather Bureau.

Atmospheric Electricity

Every one is familiar with the electric discharges in the atmosphere manifested by lightning, and every one knows that lightning may occasionally kill. In stormy weather the quantity of ozone in the air may be increased, or it may be increased artificially by discharges from electric machines. Our knowledge in regard to the hygienic and climatotherapeutic significance of the electric conditions of the atmosphere is, however, very limited.

¹ The figures obtained by sunshine recorders of the Campbell or 'burning' type cannot satisfactorily be compared with figures obtained by instruments of the Jordan or 'photographic' type. This must be kept in mind when comparisons are made between different health resorts.

MOISTURE OF THE AIR

The quantity of aqueous vapor that the atmosphere can take up before it becomes saturated depends on the temperature. The higher the temperature, the more water-vapor it can hold. Obviously, therefore, other conditions being equal, the quantity of aqueous vapor in the air is likely to be greater in tropical regions than in those nearer to the poles, in hot weather than in cold weather, in summer than in winter, in the day than in the night. All the water-vapor in the atmosphere must be obtained by evaporation from the earth, and it is likely, therefore, to be especially abundant over or in the neighborhood of extensive evaporating surfaces, such as the ocean, inland lakes, marshes, and districts rich in rivers, while it will be less plentiful over large dry inland plains and deserts.

The moisture of the air of a locality is not, however, at all times due to local causes, but may be due to moist or to dry currents of air coming from afar. **Mountains and hills** cause warm moist currents of air to precipitate their moisture, and places situated to leeward of mountain chains have a drier atmosphere than places situated to windward. This effect of mountain ranges on the humidity of the air is well illustrated in the cases of the Dovre Fjeld Mountains of Norway, the Andes of South America, the Western Ghats and Khasi Hills of India, and the great chain of Himalayas; the same effect is shown by the difference in humidity between the western and eastern parts of Corsica and between the western and eastern coasts of Great Britain.

Absolute and Relative Humidity

Thus far we have been considering the **absolute humidity** of the air—that is, the quantity of aqueous vapor contained in a given volume of air. The **relative humidity** is the quantity of vapor in a certain volume of air expressed as the percentage of the amount that the same quantity of air at the same temperature and same pressure could possibly hold when completely saturated. The relative humidity must, therefore, always be considered with reference to the temperature. To emphasize this, S. E. Solly points out that if the relative humidity of the air at 40° F. be 60 per cent., it will be only

10 per cent. for the same quantity of aqueous vapor when the temperature of the same air is raised to 80° F. It is obvious, therefore, that when the temperature has just fallen, the relative humidity will generally be greater than when the temperature has just risen. It is, in fact, usually greater during the night and early hours of the morning than during the heat of the day.

When the air is saturated with moisture and the temperature is lowered, a quantity of the aqueous vapor is condensed in the form of fine drops of water, thus forming dew, mists, clouds, rain, snow, or hail. The **dew-point** is the temperature at which the relative humidity of the air becomes so great that dew is deposited. If the dew-point is high, the absolute humidity of the atmosphere is likewise increased, and there will be a tendency to the formation of mists and fogs. If the dew-point is low, mists and fogs will be of infrequent occurrence.

Precipitation takes place when moist air is cooled to a temperature below its dew-point. It is thus that over moist soils and vegetation there is a special tendency to the formation of dew, mists, and fogs in the night and early hours of the morning; and, too, that clouds and falls of rain and snow occur when warm moist air is chilled by contact with cold mountains or hilltops or by contact with cold currents of air. **Clouds** are of great importance in regard to climate, because they keep off the sun's rays and diminish radiation of heat from the earth. It is because of the frequency of clouds, fogs, and mists that relatively cold moist climates have sometimes a depressing effect on the minds of persons who have been accustomed to, and are fond of, a clear sunny sky.

Rainfall

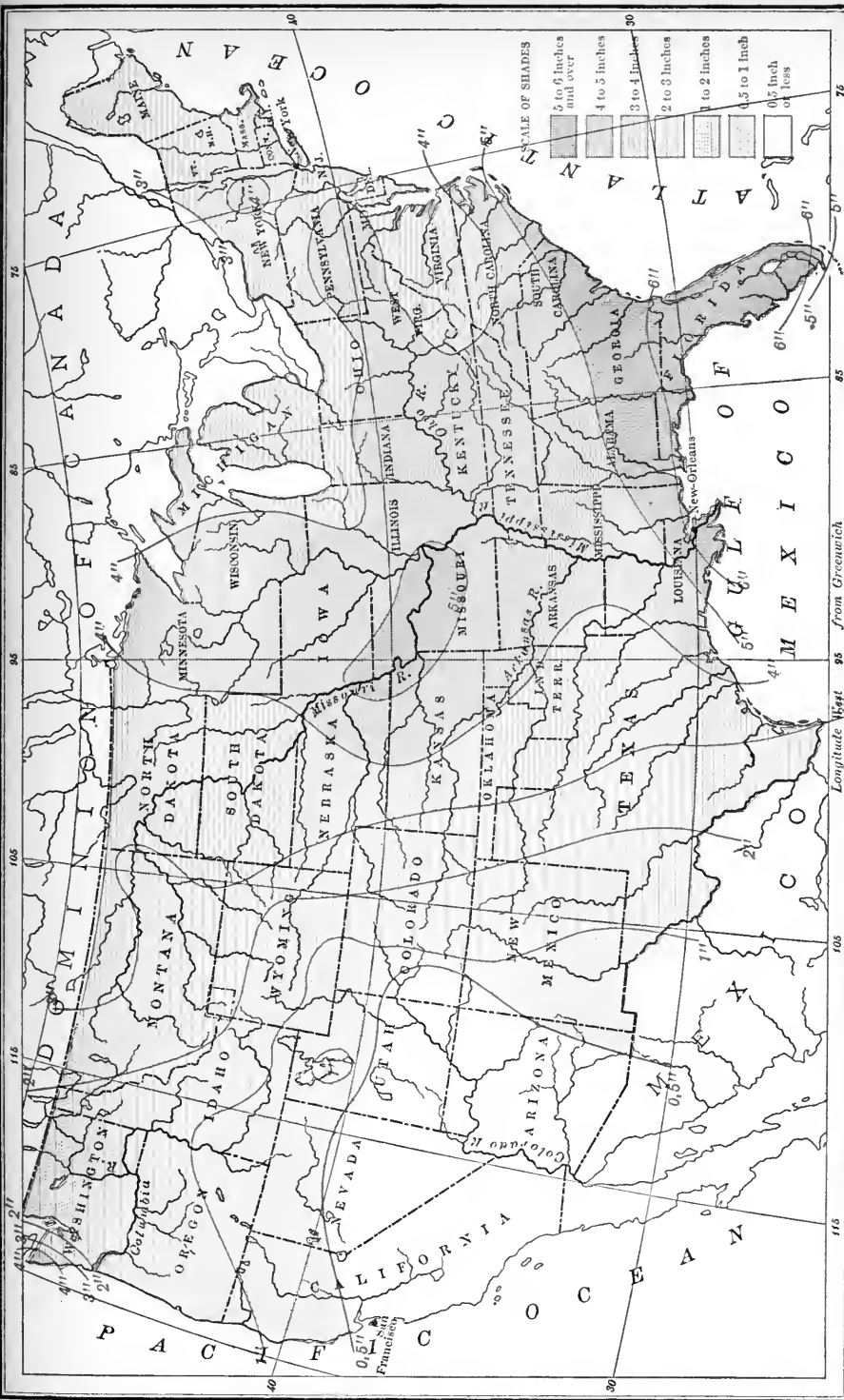
The quantity of **rainfall** depends chiefly on the evaporation from the surface and on the prevalent winds. Rain is, therefore, most abundant in tropical climates where there are large evaporating surfaces—*e. g.*, the ocean—to draw on; but over great deserts, as Sahara, there is no evaporation, and, as moist winds are heated by the dry, hot sand, there is but rare and slight rainfall, if any. Mountains, by their cooling effect, make moist air give up its moisture, and are the cause of the excessively great rainfall in certain districts where hills

or mountains intercept moist winds. This accounts for the great annual rainfall in the lake district of England. In the Western Ghats of India the annual rainfall may reach 300 inches at some points. On the southeastern slopes of the Himalayas the annual rainfall reaches several hundred inches. At Cherra Punji in the Khasi Hills there is said to be a rainfall of 600 inches. On the other hand, as already stated, by depriving warm moist winds of much of their moisture, mountain ranges exercise a drying effect on the climate of districts situated to their leeward. The existence in some countries, notably in India, and in some portions of the Pacific coast region of the United States, of distinct 'dry' and rainy or 'wet' seasons depends on the prevalence, at certain times of year, of dry or moist seasonal or periodic winds. Heavy rainfall and great humidity of air do not always accompany each other. Some districts with a fairly humid climate have very little rain,—as, for instance, Lima in Peru (mean annual rainfall nine inches),—and some with a large rainfall have a moderately dry air.

In the United States the heaviest yearly rainfall is in the vicinity of Neah Bay, northwestern Washington, averaging about 100 inches, with a maximum of 123 inches in 1886. In northwestern California, central Arkansas, and central Louisiana the annual rainfall usually reaches seventy inches. In southern California, near the coast, the air is generally moist, but the actual precipitation is light. There are frequent night fogs at Los Angeles and Santa Barbara, but they disappear early in the forenoon. The rainfall at Los Angeles, for example, varies from thirteen to thirty-two inches annually, but the annual relative humidity is 72 per cent. The annual mean of observations taken at 8 A. M. and 8 P. M. is 80 per cent.

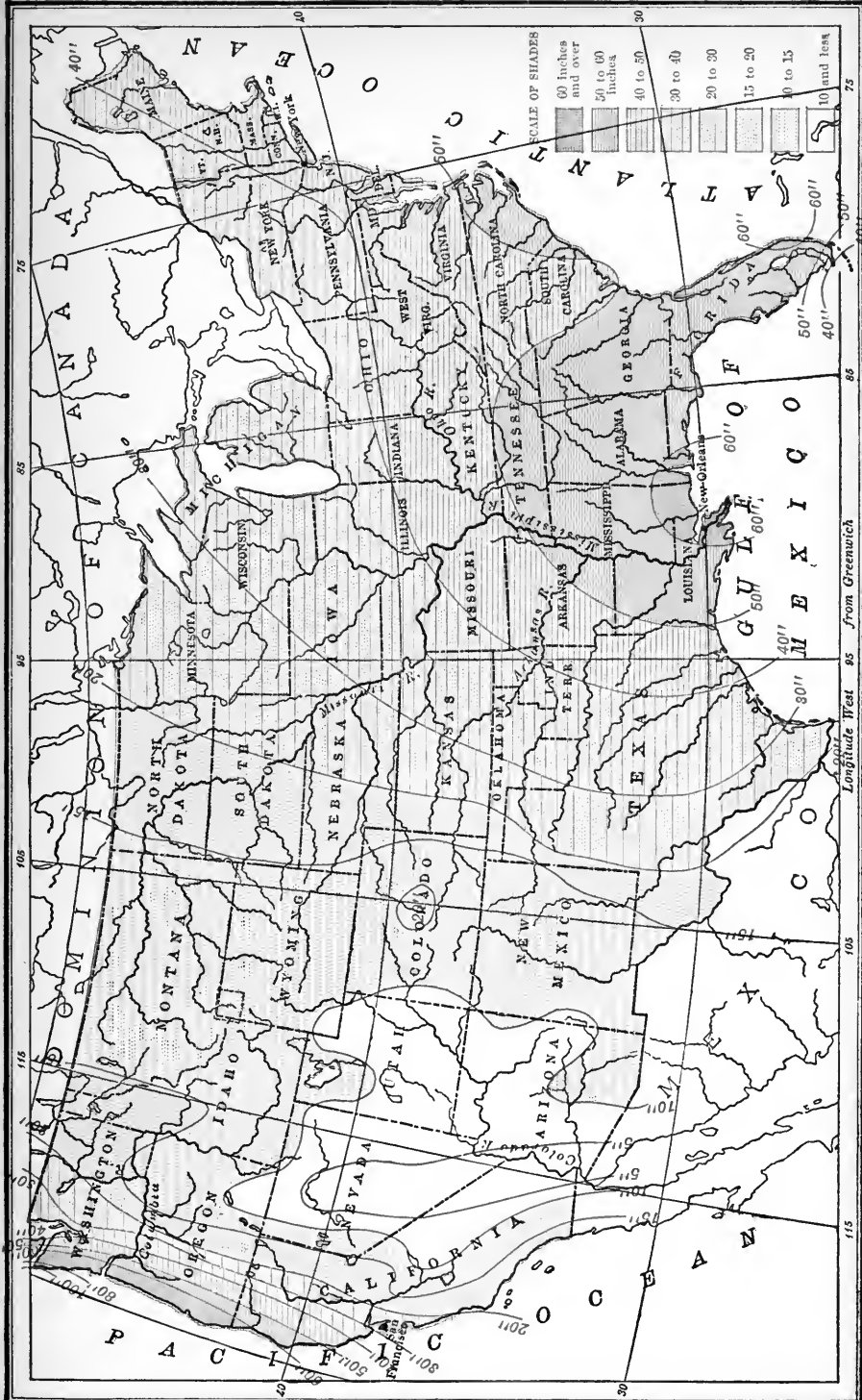
Charts of annual and of seasonal rainfall in important regions will be found in Plates V, VI, VII, VIII, IX, and X.

A good deal of the prejudice against rain and snow appears to be unfounded. Showers of rain cleanse the air by removing impurities and dust. Snow also cleanses the atmosphere, and during the time that it remains on the ground hinders the rising of dust and impure vapors; by reflecting light it increases the sun-heat and brightens the scenery, and by preventing the ground from becoming heated, diminishes the local currents of air (day and night winds).

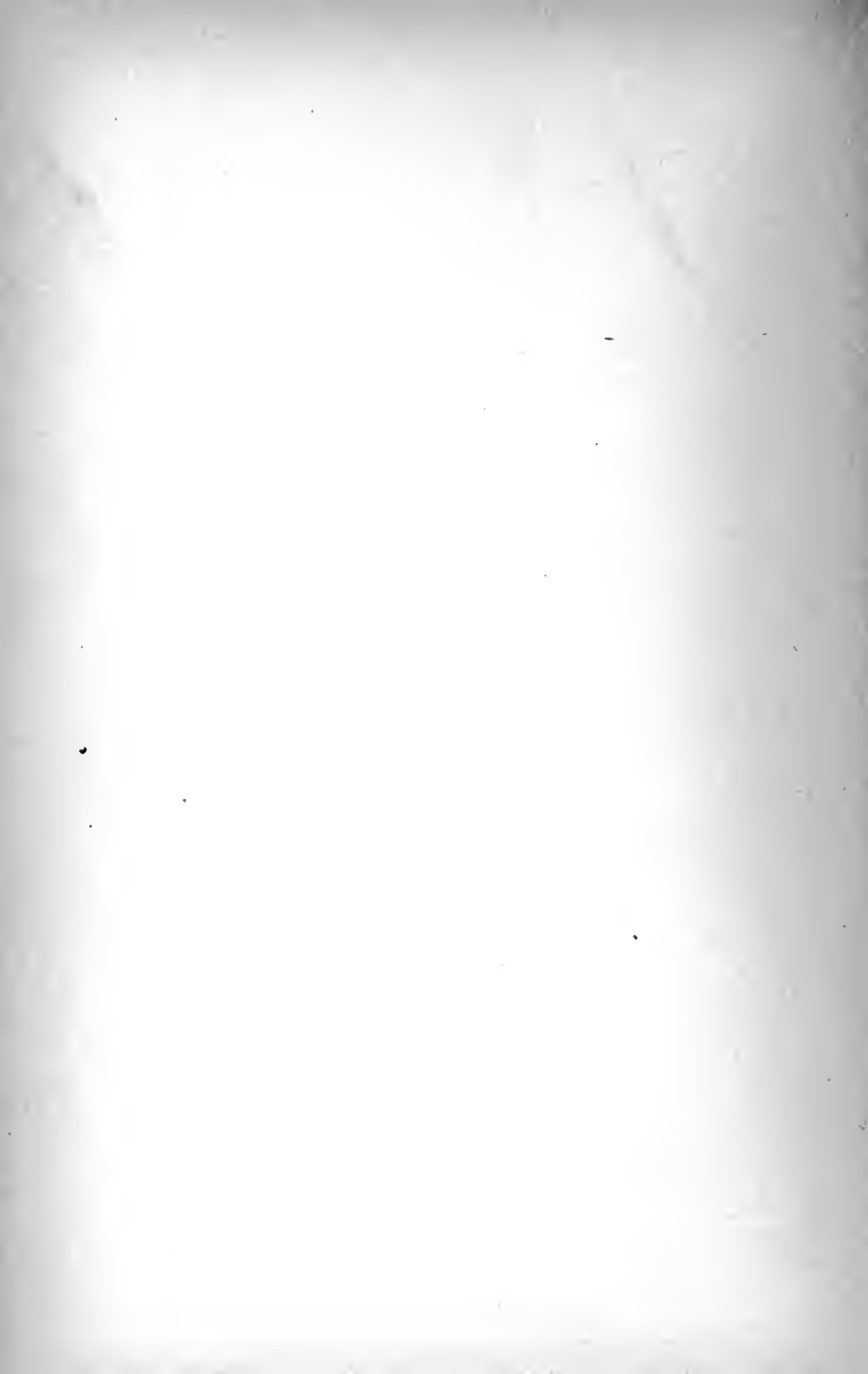


Mean Precipitation for June.





Mean Annual Precipitation (Rain, Snow, Hail etc.)



Thaws, however, are often objectionable, and some physicians are in the habit of sending from home certain patients, especially those affected with pulmonary tuberculosis, to escape an expected period of thaw; the special months varying with the locality and with the meteorologic changes of different years. The bad effects are due partly to the warm, moist air, which exercises a relaxing influence on the blood-vessels of the skin and mucous membranes, and partly to the micro-organisms and other noxæ set free by the melting of the snow or flourishing in the atmospheric conditions thus brought about.

Rain, by preventing the invalid from being much out-of-doors in the open air, may indeed constitute a serious inconvenience. The amount of time taken up by rainy weather is, therefore, of importance, and this does not necessarily correspond with the amount of rain. In tropical regions the rain falls in torrents, and, though the annual rainfall may be excessive, the time consumed by rainy weather may be less than in countries where much less water falls. To quote H. Weber and M. G. Foster: "It may even be said, with some exceptions, that the number of rainy days increases with the distance from the equator, while the amount of rainfall decreases." From a medical point of view, the **number of rainy days** and even the number of rainy hours are important, and in the selection of a health resort the season when it rains most frequently, and the hours of the day when the rain generally falls, should, if possible, be ascertained.

Effects of Atmospheric Moisture

Humidity serves to regulate the temperature of the air. If the air were really almost dry, the nights would be excessively cold and the days excessively hot. When speaking of the temperature of the air, we have already mentioned some of the effects of a high or a low degree of humidity. The degree of **relative humidity** is of great importance in all therapeutic classifications of climates. Solly says: "In classifying climates as dry and moist, it is important to notice whether absolute or relative humidity is intended, and this must often be inferred from the connection in which the words are employed. Relative humidity is important in respect to the liability

of the formation of fogs and dew, while, physiologically, the absolute humidity has often a greater significance. When statistics of relative humidity alone are given, it is necessary to take some standard temperature to make a fair comparison. Wendt computes the mean annual temperature of the United States as 55° F., which is probably nearly correct. Assuming, then, a standard temperature of 55° F., we can say that less than 50 per cent. of relative humidity is dry; from 65 to 75 per cent. is medium; from 75 to 85 per cent. is moist; and above 85 per cent., very moist." Solly also points out that in estimating the value of the relative humidity, the temperature should never be forgotten. On a sunny winter day with a shade temperature at noon of 40° F., a relative humidity of 70 per cent. would be very dry, and one above 90 per cent., very moist. On a summer day, however, with a shade temperature of 70° F., he considers a relative humidity of less than 30 per cent. very dry, and one over 70 per cent., very moist.

The **absolute humidity** of the atmosphere may be expressed as vapor pressure—that is, as part of the total pressure of the atmosphere included in reading the height of the barometric column. It is more conveniently recorded as the number of grains of water contained in a cubic foot of air, or, better still, according to the metric system, by the grams of water in a cubic meter of air. According to the observations of Dr. Chiaï¹ at Paris, either an absolute humidity of less than five grams or one of more than twelve grams in the cubic meter of air will exercise an injurious effect on man, acute affections of the respiratory organs being favored by the excessively dry air and nutritional and gastro-intestinal diseases by the excessively moist air.

In regard to the **physiologic and pathologic effects** of the moisture of the air, we quote the following observations of Sir H. Weber²: "The relative humidity has a particular relation to the skin, which, according to the degree of saturation of the air and its movement, yields up to it more or less moisture, and, owing to

¹ "Bulletin de l'Académie de Médecine de Paris," November 7, 1899.

² In von Ziemssen's "Handbook of General Therapeutics," English translation, vol. IV, page 36.

evaporation, more or less heat. If the air is moist, it is a better conductor of heat, but diminishes evaporation, the amount of wind being the same. By these conditions the skin is influenced in different ways. When the air is dry, the evaporation from the skin is increased according to the amount of movement in the air, and with evaporation a corresponding quantity of heat is lost. As a consequence, heat is much more easily borne when the air is dry than when it is moist, and more especially so if there is a wind blowing at the same time. In cold weather, when the air is dry, heat is also lost by evaporation; but this loss is not great, and may be much limited by clothing, unless there is a good deal of wind. When, on the other hand, the air is moist, the loss by conduction is much greater than in dry air, and is considerably increased by winds. Hence when a thaw sets in, the air is moist and frequently feels much colder, though it may be 20° or 25° F. warmer than during the preceding frost, when it was dry. This may partly account for the frequency of catarrhs when it is thawing and when the snow melts, though a still greater share in producing it must be attributed to the fact that the growth of micro-organisms is promoted in moist and comparatively warm air. Generally speaking, dry air is more bracing than moist air, and high temperatures, as mentioned above, are more easily borne in a dry than in a moist atmosphere; but dry air combined with very low temperatures irritates the respiratory organs and produces in them a tendency to inflammatory affections, particularly to pneumonia; while moist air combined with cold predisposes to catarrhs and bronchitis, and also to rheumatic and gouty affections." On the other hand, moist air combined with warmth exercises a soothing influence on the mucous membranes, and the strain upon the constitution is less severe. When exposed to it for a prolonged period, however, many persons lose appetite, and the functions of the digestive organs and of the nervous system become impaired. This is the so-called relaxing action of moist warm climates. A feeling of languor and a tendency to diarrhea may arise, even in healthy subjects, and there may be a generally diminished power of resistance toward harmful influences.

In comparing the relative drying effect of cold climates and of hot dry climates on the body, it must be remembered that a high

relative humidity of cold air corresponds to a very low relative humidity if this cold air be heated up to the temperature of the lungs (about 99° F.) or to the temperature of the zone formed by the clothing surrounding the body (about 89° F.). It is, however, only in warm dry climates that this drying effect on the body can be utilized in the treatment of renal affections. - The work required of the kidneys is, of course, diminished when the quantity of water passing off from the skin and the lungs is increased.

CHAPTER III

ALTITUDE AND AERIAL CURRENTS

Elevation and Latitude. Atmospheric Pressure. General and Local Winds. Movement of the Air.

The Influence of Altitude

In ascending a mountain, the higher one climbs, the colder the climate becomes, until a level of perpetual snow is reached. The profusion of vegetation undergoes a change corresponding to that of the climate, until finally it disappears altogether. For each 300 feet of altitude the atmosphere becomes about 1° F.¹ colder, and therefore the height above sea-level at which snow remains throughout the year varies in different countries, diminishing gradually as we pass from tropical regions and approach the poles. On the mountains of Kilimanjaro, in equatorial Africa, the snow-line is about 16,000 feet above sea-level; in Europe, on the Alps, it is about 9000 feet; in the northern part of Scandinavia it is only about 3000 feet; and in Spitzbergen it has descended to sea-level. It is, therefore, obviously impossible to classify climates into those of high altitude and those of low altitude merely according to their elevation above sea-level: the latitude, or the distance of a place from the equator, must likewise be considered. Thus, on Chimborazo, the lofty peak of the Ecuador Andes, the snow-line of which is about the same as that of Kilimanjaro, palms are said to grow at a level of 5000 feet and wheat at a level of 10,000 feet, which is an altitude above the snow-line of the mountains in Switzerland. In connection with the influence of the altitude of a place on animal and vegetable life, the elevation, configuration, and other features of the surroundings, and the prevalent winds, rainfall, and

¹ This law is subject to many variations, due to local conditions.

sunshine at different seasons of the year, are among the points requiring special consideration.

Other characteristics of high altitudes besides low temperature are :

1. **Low barometric pressure**, with consequent diminution in the density of the air, corresponding to the height of the place above sea-level.

2. **Dryness, clearness, great diathermance, and purity and stillness** of the atmosphere.

These qualities are often of high therapeutic importance. We shall return to this subject in discussing the therapeutic effects of climates of high altitudes.

Atmospheric Pressure

The pressure of the atmosphere at sea-level corresponds to that of a column of mercury of about thirty inches. It is, however, subject to more or less sudden change, and the average pressure varies somewhat at different places and at different seasons of the year. This can be demonstrated by charts in which the 'isobaric' lines are constructed after the manner of the isothermal lines.

The higher one rises in the atmosphere, the lower is the weight of the atmosphere that remains above him ; and because the air is less compressed it becomes less dense, or more rarefied, the higher he ascends. The atmospheric pressure likewise depends in part on the temperature and the proportion of moisture in the air. With increase of temperature the air expands and becomes lighter. Water-vapor is much lighter than air, and therefore a given volume of moist air weighs less than an equal volume of dry air at the same temperature and under equal pressure. A high temperature increases evaporation, and when, therefore, a high temperature is present over a moist surface, such as the ocean, both heat and excess of aqueous vapor combine to make the air light and to reduce the atmospheric pressure.

It is a well-known fact that when the column of quicksilver in the barometer falls, bad weather is threatened. This fall indicates that the atmospheric pressure over the region of the earth's surface in question is diminished, because the average weight of the air

above this region has become lighter. Whenever this occurs, the atmospheric equilibrium must be disturbed, for light air tends to rise and flow over in the upper and lighter parts of the atmosphere, currents of heavy (colder) air from surrounding districts flowing in to take the place of the ascending air. Moreover, the lightness of the air, as previously mentioned, is likely to be associated with excess of moisture, and when the ascending air reaches higher and cooler regions of the atmosphere, the aqueous vapor will be condensed and fall as rain or snow. Greater or lesser variations in specific gravity between different portions of the atmosphere give rise to various degrees of atmospheric disturbances ranging from gentle breezes to violent gales.

Movement of the Air

All disturbances of the air, whether gentle or violent, local or of great extent, are due, as previously explained, to differences in the specific gravity of different portions of the atmosphere, and are thus indirectly due to temperature and degree of humidity.

The diurnal and nocturnal breezes of the seashore and mountain valleys are among the familiar examples of **local winds**. Water is continually losing heat by evaporation from the surface, and the sun's rays penetrate more deeply into water than into soil; hence during the day a surface of water is heated more slowly than a surface of rock or soil, and at night, owing to the laws of convection and radiation, water is much less readily cooled. During the day, therefore, when the shore is hotter than the sea, the warm air above the shore rises and the cooler air from over the sea flows in to take its place, giving rise, at seaside places, to the slight disturbances of air familiarly known as sea-breezes. At night, exactly opposite conditions occur: the land cools more quickly than the sea, so that the heavier air over it moves out seaward (land breeze) to take the place of the warmer and lighter air over the water.

In mountain valleys the diurnal current of air (called the valley wind or morning wind) generally moves upward from the valley, and the nocturnal one (the mountain wind or evening wind) moves downward. These movements occur for the following reason: In the morning the slopes become heated earlier than the lower parts of the

valley, and consequently the colder air from below streams upward to take the place of the warmer air rising from the heated slopes. In the evening and at night radiation is less rapid, and the air is warmer in the depths of the valleys than higher up ; consequently the cold air passes down the sides of the mountains and down the valleys, to take the place of the warmer air, which tends to rise, because it is lighter. A site some distance up the slope is likely to be affected less by these local winds than is one in the depths of the valley.

Of great importance are the **general winds** connected with the fundamental circulation of air over the globe.

The heat and evaporation caused by the perpendicular rays of the sun give rise to a belt of low atmospheric pressure in tropical regions (north of the equator in summer ; south of the equator in winter), where currents of light air are continually ascending. Currents of heavier air flow in from belts of higher atmospheric pressure on each side of the belt of low pressure, to take the place of the ascending air. These are known as the trade-winds. Owing to the rotation of the earth from west to east, the trade-wind of the northern hemisphere is a northeastern wind, and that of the southern hemisphere is a southeastern one.

When it reaches the upper part of the atmosphere, the ascending air of the tropical belt divides, one part of it flowing northward, and the other southward. Moving in the upper regions of the atmosphere, away from the equator, these currents, when they arrive at the belt of high pressure, descend and reach the surface in temperate latitudes. A portion of the air then flows back toward the equator, while another portion travels onward toward the poles. In the northern hemisphere this latter portion, owing to the effect of the earth's rotation, takes a northeasterly direction, and thus the familiar southwestern wind of England is accounted for.

There are some important winds that blow almost exclusively at certain seasons of the year. Typical examples of these are the summer and winter winds, known as 'monsoons,' on the shores of the Indian Ocean. In winter the pressure of the air over the elevated cold table-lands of central Asia is high, and from this center the cold, heavy, dry air streams out in all directions and passes over India toward the ocean. In summer this process is reversed : the

center of Asia is heated by the summer sun, the air over it becomes lighter and rises, and currents of cooler air flow in from every side. In different countries, of course, the direction of the prevalent winds connected with this great periodic movement varies according to the position of the country with reference to central Asia. The seasonal easterly and westerly winds over the western part of Europe are connected with the Asiatic system. The great periodic differences of rainfall, which are so important a characteristic of many climates, are chiefly connected with the periodic variations in the direction of the prevalent winds.

The various **local winds of different countries** are of importance from the view-point of medical climatology. The disagreeable character of some of these winds often impairs seriously the climate of an otherwise admirable health resort. "When they come from tracts where the pressure is high and the temperature low, to where the pressure is lower and the temperature higher, they are felt as cold blasts, whereby the humidity of the air in the low pressure area is condensed into torrents of rain. One of the best examples of such a wind is that known as the 'mistral,' which descends from the high plateaus and plains of central and eastern France, and is felt as a cold and sometimes tempestuous wind along the shores of the Mediterranean.¹ When a low atmospheric pressure happens to arise on the borders of a hot desert region like those of Africa, Arabia, or the interior of Australia, it draws in toward it the hot air lying over the burning sands, which in the countries where it blows is extremely unhealthy. In Italy such a wind is known as the 'sirocco,' a hot, moist wind which raises a haze in the air and produces a sensation of extreme languor both in man and beast.² In Spain, where it receives the name of 'solano,' it sometimes comes across the narrow part of the Mediterranean laden with fine hot dust from the vast African deserts. In Africa and Arabia it appears as the dreaded

¹ The mistral more frequently occurs in February, March, and the beginning of April. It is a dry and violent wind, raising clouds of dust, and is very chilling, even when the sun is shining brightly.

² In Sicily, and especially in Palermo, the sirocco is much feared. It is a hot south or southeasterly wind, which may be moist or dry, according to the degree of moisture it has taken up in crossing the Mediterranean Sea.

'simoom,' a hot suffocating wind that sometimes rushes across the desert with such violence as to raise clouds of sand and sweep them in whirling masses for many miles. It thus heaps up vast mounds of sand, under which caravans of travelers may be completely buried. One of the armies of Cambyses, 50,000 in number, is said to have been thus engulfed in the sand when on its way to attack the oasis and temple of Jupiter Ammon. Again, on the coast of Guinea, during December, January, and February, a hot wind called the 'harmattan' blows from the interior out to sea."¹

The 'khamsin,' in Egypt, is a dry south or southwest wind. The word khamsin means fifty, and it derives this name from its frequent occurrence during the fifty days between the Coptic Easter and Pentecost—between the end of February and the end of April. It lasts from two to four days, and brings clouds of fine sand with it from the desert. This sand not only obscures the sun like a dense fog, but irritates the eyes and nasal mucous membrane, gets into the clothes, and penetrates into closed rooms. During spring the khamsin is a very hot wind, the thermometer rising, according to Canney, to 100° or even 108° F., but when the south or southwest winds occur at Cairo in autumn and winter, they are colder (cold khamsin). In the northwestern provinces of India hot winds occur that are described as sometimes producing violent whirlwinds that sweep up the dust and carry it in whirling columns into the upper air, whence it gradually finds its way to the earth again.

The 'foehn' of Switzerland is a warm and dry southerly or southeasterly wind, appearing with particular violence in the northeastern portions of the Alps, chiefly from late summer to spring. According to Wettstein (quoted by de la Harpe), out of 40.9 days on which the foehn blows in northern Switzerland, 9.1 are in winter, 17.3 in spring, 4.9 in summer, and 9.6 in autumn. Various theories regarding the origin of this wind have been adduced, but it still remains uncertain. De la Harpe² points out that this wind belongs exclusively to the Alps, from Geneva to Salzburg, but over this region is of very great climatic importance. It is chiefly felt

¹ A. Geikie's "Physical Geography," London, 1894, p. 94.

² "La Suisse Balnéaire et Climatique," second edition, Zürich, 1897.

in valleys having a south and north direction ; thus it blows along the Rhone valley from Martigny to the Lake of Geneva, reaching Montreux and even as far west as Lausanne. Its violence is greatest in the more elevated and narrow portions of the valleys, where it sometimes uproots trees and blows down huts. In one day the foehn may, owing to its dryness and warmth, melt as much snow as two weeks of sunshine. This wind helps to ripen grapes in autumn, and to its influence is due the growth of chestnut trees about the lake of Lucerne. When it blows in winter, the thermometer may rise to the summer level. It causes the barometric pressure to fall, and diminishes the relative humidity of the air, driving clouds away, but is often followed by rain, owing to subsequent cooling of the air to below the point of saturation. The effect of the foehn on invalids and even on healthy persons is depressing.

Some sections of the United States are subject to peculiar winds. In this connection we do not refer to the tornadoes that sweep through Kansas, Missouri, Iowa, Minnesota, Illinois, and neighboring States, causing great destruction ; nor to cyclones, commonly known as West India cyclones, which sweep the Gulf of Mexico and the Atlantic seaboard,—such storms as devastated Galveston and drowned six thousand of its citizens,—but we refer to what are known in the southwestern States as ‘northers,’ a sudden, bitterly cold wind, bringing snow and ice ; and a wind of an opposite character, the ‘chinook,’ a soft warm wind occurring in winter and spring in the northwestern States, and which brings rain, carries off the snow, and quickly moderates the air after severe weather. In Denver, Colorado, a chinook has been known to induce a rise of temperature of 57° F. in twenty-four hours,—a rise of 36° F. occurred in five minutes,—while the relative humidity sank from 100 to only 21 per cent.

Northers are met with from Texas to Montana. As warm weather approaches and vegetation advances rapidly under temperatures of 80° or 90° F., suddenly the north wind blows. In a few hours the most wintry weather is experienced, ice and all the features of a blizzard appearing. In eastern Montana the temperature has been known to register 108° F. in the sun ; later in the same

day showers have occurred, with lightning and thunder ; then have followed high winds, with snow at midnight, a temperature of 22° F., and all the characteristics of a heavy winter storm. The suffering entailed on human beings and on the lower animals by such changes may be very great, and should be fully recognized in dealing with the climates of that region of the United States.

Winds are great distributors of temperature and moisture over the surface of the globe. Some winds bring rain and clouds, while others bring dry weather. In some places the periodic alteration in the direction of the prevalent winds is sufficient to give rise to alternating dry and rainy seasons ; these are in strong contrast to each other. By preventing stagnation of the air, winds hinder the accumulation of organic and inorganic impurities at all points to which they can gain access. Thus, winds, together with rain and light, act, on the whole, as purifiers of the atmosphere, although some of them may bring with them annoying dust, organic impurities, and even pathogenic microbes. When carried about by winds, living micro-organisms are soon likely, however, to be destroyed by the effects of exposure to light, etc.

By the evaporation they cause, and, in the case of moist winds, by the heat-absorbing qualities of their moisture, winds have a chilling effect on the body, which, when at all excessive, may debar invalids from taking sufficient open-air exercise, and, likewise, winds that bring constant rain and dust may prevent persons from being out-of-doors sufficiently. On the other hand, cool breezes, such as those usually present along the sea-coast, have a most grateful and refreshing influence in hot weather. Such moderate movements of the atmosphere, by withdrawing heat from the surface of the body, gently stimulate the metabolism and thus exert an indirect beneficial effect on the various organs of the body. The quantity or force of wind that invalids can endure depends on their previous habits and on other factors modifying their individual powers of reaction.

In regard to **health resorts**, the character and strength of the local and general winds should always be investigated ; so, also, the times of day and the seasons of the year at which they are prevalent ; whether their occurrence is fairly constant or subject to great and unforeseen irregularities ; and whether they give rise to sudden vari-

ations in temperature and humidity and are accompanied by clouds and storms, etc., or not. The relative amount of shelter afforded at the different sites in the neighborhood is, of course, most important.

Dr. A. Haviland and others have shown that regions exposed to high winds tend to have a greater mortality from **pulmonary tuberculosis** than the more sheltered districts in the neighborhood ; in other words, high winds increase the mortality from phthisis. This observation can be explained by two facts : (1) The inhabitants in windy districts generally prefer to live in stuffy rooms, keeping their doors and windows shut, and thus suffer from deprivation of fresh air and the effects of rebreathed air. (2) There is a direct injurious influence of high winds sometimes noticed in persons not suffering from any actual disease, but more commonly observed in individuals of feeble constitution and in those predisposed to bronchitic affections. Shelter from winds is, therefore, a most important consideration in the selection of a site for the sanatorium or open-air treatment of consumptives.

CHAPTER IV

SOIL AND GENERAL TOPOGRAPHY

Moisture. Vegetation. Position. Woods, Mountains, Lakes, and Seas.

The Nature of the Soil and Surface, and the Aspect, Surroundings, etc., of a Region

The influence of the soil on the climate and health of a district requires little discussion. Micro-organisms seem to preserve their vitality best in moist air and in districts that have a damp, imperfectly drained soil. Malaria, which, a generation back, was prevalent in certain parts of England, has been banished by the drainage of the fens and marshes. The prevalent tendency is to explain this by the abolition of favorable breeding-places for mosquitos, in particular those of the genus *Anopheles*, which have been demonstrated to be intermediate hosts of the plasmodia of malaria. The exclusive rôle of the mosquito as a carrier of malarial infection has not, however, been proved, and there may be other factors not yet demonstrated. Bowditch, Buchanan, and others have shown that drainage of wet ground may have a decided effect in diminishing the mortality from other microbic diseases, such as tuberculosis. A damp soil and the proximity of marshy ground and stagnant water, according to general observation, favor a tendency to chronic rheumatism and rheumatoid arthritis, although the exact connection between the dampness and the morbid conditions is not quite apparent. Owing to evaporation, the air over wet ground is colder than that over dry ground, and the mean temperature of the land has been found by Buchan to be somewhat elevated by drainage. The relative coldness and the prevalence of mists and fogs, together with the consequent diminution of sunlight, may be responsible for some of the injurious effects that might otherwise be attributed merely to the dampness of the soil. For many persons it is most important that the ground be dry and permeable (sandstone), and

that a site be chosen on a slope, where drainage is naturally facilitated. By artificial sanitary arrangements much can, however, be done to render a somewhat unsanitary site healthful.

When the ground is covered with **vegetation**, as in pasture-land, the grassy covering prevents the soil from becoming heated by the sun's rays so readily as in the case of bare sand. This circumstance and the constant evaporation from vegetation render the air above the ground cooler and moister. Thus, in taking the temperature over a tract of arid, sandy soil and over meadow-land beside it, Sir H. Weber found a difference of more than 30° F. When, however, the grass is dried up, the difference is, of course, much slighter. Radiation at night is much greater on meadow-land, in consequence of the large radiating surface and sharp points afforded by the blades of grass. Thus, after sunset, rapid cooling of the surface and the air about it takes place, and there is frequently a precipitation of mist, dew, or hoar-frost. Leigh Canney¹ found that the temperature over a cultivated area in Upper Egypt fell to the freezing-point seventeen times during January and February, while the temperature of a site half a mile distant, on the roof of a hotel, fell to only 38° F. on one occasion. He also found that the relative humidity was 13.7 per cent. higher during the day in the cultivated fields than in the neighboring desert, and during the night the difference was still more marked (about 40 per cent.). The influence of forests on climate will be referred to further on.

In winter, when the meadows are covered with **snow** and when the marshy land, as well as the whole soil, is frozen, the presence of vegetation and of stagnant water, of course, no longer affects the temperature and humidity of the air. A covering of snow, as already mentioned, hinders the rising of dust and impure vapors from the ground; it reflects light; in clear weather it increases the brightness of the scenery and the warmth in the sun, and, by preventing the ground from becoming heated, it diminishes the local currents of air.

The position of a locality in regard to **sunshine** and **shelter** from winds is important. On sunny slopes, in the northern hemisphere,

¹ "Winter Meteorology of Egypt," London, 1897.

facing south, the full amount of light is obtained, whereas at the bottom of deep valleys and in certain positions with regard to hills and mountains, a large part of the daily sunshine may be cut off by the neighboring heights. In some mountainous and hilly districts the brilliance of the light may be very much increased by reflection from white chalky cliffs, bright sandstone surfaces, snow-fields, etc. During the heat of summer, an aspect away from the sun—*i. e.*, toward the north, in the northern hemisphere—is preferable for many persons.

The influence of **woods and mountains** on climate, especially in regard to winds, moisture, and rainfall, should be specially considered.

In regard to the influence of **forests**, the main facts or tendencies may briefly be summarized as follow :

The ground and the air in a forest are moister, and the ground is some degrees colder, than elsewhere. The difference between the day and the night temperature is less marked. Rain is more frequent. The ozone of the atmosphere is said to be increased. The trees diminish the movement of the air, and likewise cut off some of the light. E. Ebermeyer, who has studied the foregoing characteristics, has observed that in pine-forests they are less marked than in forests of deciduous trees, and in the latter they are naturally less noticeable in winter than in summer, when the trees are in foliage. There are, doubtless, other modifications in forest air whose nature has not been accurately determined, possibly due, in part, to the effect of the active chemical changes taking place in the leaves. The exhalations from the trees and shrubs must likewise be considered in regard to the influence of forest air, and in pine forests the aromatic substances given off may possess an antiseptic influence. A forest or clump of trees may form a valuable protection against local or general winds if situated in the desired direction. On mountain slopes, as H. Weber has observed, a clump of trees may be sufficient to shelter the part of the slope below the trees from the chilling effect of the cold currents of air that stream down the mountain sides at sunset.¹

¹ See Bulletin No. 7, Forestry Division, United States Department of Agriculture, "Forest Influences," p. 193, Washington, 1893.

Mountains exercise a great influence on climate according to their height, their size and shape, and their position in regard to the prevalent winds. They intercept or alter the direction of winds, and modify the character of the latter by extracting moisture and altering temperature. The extent of their influence depends on the completeness of the shelter they afford a place, and whether they protect it from cold or hot winds and from dry or moist winds. When covered with glaciers and snow-fields, mountains may themselves be the source of the cold currents of air that stream down the slopes and valleys and have a chilling effect on adjoining districts. When warm, moist winds come into contact with hills and mountains, their temperature is lowered, and consequently a large part of their aqueous vapor is precipitated as rain or snow. When warm, moist winds from the ocean come into contact with a mountainous coast region, the precipitation is particularly great. This explains the excessive rainfall in the lake district of England and in parts of the northwestern coast of Scotland, where the warm and moist southwesterly winds from the Atlantic meet with a mountainous coast and discharge their moisture. The excessive rainfall on part of the mountainous western coast-land of Norway is similarly caused. In India the warm, moist monsoon blowing from the Indian Ocean over the range of the Western Ghats yields a very heavy rainfall, amounting annually, on the summits of the range, to about 260 inches. In such cases the country lying to the leeward of the mountains often receives comparatively little rain. Thus Poonah, lying to the eastern or lee side and close to the foot of the Western Ghats, has a rainfall of only about thirty inches. Similarly, the warm, moist winds (southwest monsoon) coming from the Bay of Bengal yield an immense quantity of rain in passing over the Khasi Hills and the Himalaya Mountains, and to the north of this range pass over the plains of Tibet as a cool, dry wind.

The proximity of the sea and of large inland lakes modifies the climate by rendering it more humid and more equable. Local diurnal and nocturnal breezes are likewise produced as already explained. The perpetual movement and purity of the air, its moisture and the presence frequently of salt-water spray, constitute the

special climatic features of a coast-line exposed to the open sea. For climatic **treatment**, the tonic and stimulating effects in cool and cold regions, and the tonic and sedative effects in warm regions, make such districts useful in many varieties of chronic pulmonary and nervous affections and in convalescence from acute illness. On the other hand, there are certain **dangers** to be guarded against. Not only is it a mistake to send those who need the effects of cold to warm seacoast regions, and vice versâ, but also may it be productive of much harm to expose to the moisture and peculiar atmospheric effects of the immediate seacoast those inclined to rheumatic or neuralgic affections or having actual inflammatory processes in the respiratory tract. This subject, mentioned here for emphasis, will be further considered under Marine Climates.

CHAPTER V

CLASSIFICATION OF CLIMATES AND THE CHARACTERISTICS AND GENERAL EFFECTS OF THE DIFFERENT CLASSES OF CLIMATES

Sea and Coast (Marine) Climates. Climates of Small Islands. Inland Climates of High Altitude. The Effects of High Altitudes. Inland Climates of Moderate and Low Altitudes. Inland Lake Climates. Warm Dry Inland Climates. Cold Dry Inland Climates.

Climates may be classified by latitudes or by isothermal lines, by the mean annual temperature, or by the mean temperature for summer or for winter, or for the therapeutic season—*i. e.*, the months during which a climate is utilized for medical purposes. The relative humidity has been used as the basis of classification by many authors. Some writers on medical climatology adopt a nomenclature based on the therapeutic effects of different regions. Thus, Hilgard Tyndale classifies climates as sedative or stimulating, and the editor of this system has suggested a division into protective and invigorating climates.

All methods of classification have their special advantages, but all present great difficulties, and we shall here adopt a scheme similar to that employed by Sir H. Weber in his work on "Climatotherapeutics":¹

I. Sea and coast climates.

II. Inland climates.

A. Of high altitudes.

B. Of moderate and low altitudes.

By this method of classification we get three main divisions, which are very convenient from the medical point of view, and

¹ Ziemssen's "Handbook of General Therapeutics," English translation by Dr. H. Port, London, 1885.

admit of certain further subdivisions being made. Thus, among marine climates the comparatively drier health resorts, such as those of the Western Riviera, may be separated from moister marine localities, such as Funchal, in Madeira; among inland climates of low altitude, the dry desert climates, such as those of Upper Egypt, form a special group in themselves.

The characteristics and physiologic and therapeutic effects of the various classes of climates may be studied with reference to their action upon the healthy, upon the ill in general, and upon those suffering with special affections.

SEA AND COAST CLIMATES (MARINE CLIMATES)

During the day the sun's rays penetrate the water deeply; the total amount of heat absorbed is greater than that on land, but, as already pointed out, the surface of the sea continually losing heat by evaporation, it does not become so readily heated as the land. During the night, however, so soon as the uppermost layers of water become cool, the warmer layers beneath take their place, and thus, by convection, the surface of the sea maintains its warmth better than the surface of the land. Moreover, radiation from the sea into space is checked by a layer of vapor. All this serves to explain one of the most important characteristics of sea air—namely, its equability.

Besides equability, the chief features of a purely marine or ocean climate—that is, the climate met with on an ocean voyage—are: The endurable degree of humidity, the abundance of light, and the freedom from dust, microbes, and other impurities. The mean relative humidity on the open ocean is 73.5 per cent. of saturation, and the air is generally less moist than at most seaside places. The midday temperature is seldom higher than 85° F. The sea-breezes are refreshing, and heat is complained of less on the ocean than it might be at the same temperature on land;¹ even at the tropics it is seldom found to be very oppressive, excepting during

¹ S. S. Cohen points out that in certain cases of pulmonary tuberculosis in which the body-temperature is easily affected by the environment, a pyrexia that has been persistent and uncontrollable upon land will quickly subside at sea.

a total absence of wind. Besides the direct therapeutic effects of ocean air, the mental rest usual during a long voyage and the change of surroundings must, likewise, be taken into account. This subject will be further discussed under ocean voyages.

Climates of Coasts and Small Islands

These climates have more or less in common with the purely marine climate of the open ocean, but differ much among themselves according to their distance from the equator, the prevailing winds, the configuration of the coast, etc. Small islands in the midst of the ocean, such as the Scilly Islands, Puerto Rico, Bermuda, and the Bahamas, have a climate almost purely marine. The small Monach Islands (latitude of the light-house $57^{\circ} 32'$ north) in the Outer Hebrides are so completely under the influence of the Atlantic and the warm Gulf Stream that, as Buchan points out, they experience warmer winters than Ventnor (latitude $50^{\circ} 34'$ north), in the Isle of Wight, though their summer temperature is, of course, lower. On the other hand, the climates of the Mediterranean and Baltic coasts are modified by their positions in regard to the neighboring lands, and thus differ greatly from the climates of the open western coast of Europe.

Generally speaking, **coast climates**, like ocean climates, are characterized by purity of air and by greater humidity and equability than inland climates. According to the force of the waves and the character of the shore, the air will be charged with a varying quantity of salt-water spray. The local winds, however, constitute perhaps the distinguishing feature of coast climates. This perpetual movement of the air, the causes of which have already been explained, helps to account for the stimulating effects of many seaside health resorts. The experiments that Professor F. W. Beneke,¹ of Marburg, carried out on the little island of Norderney (on the North Sea coast), in the inland town of Marburg, and at various Swiss mountain resorts, showed that heat was lost more rapidly from any warm body on the seashore than from a similar

¹ "Zur Lehre von der Differenz der Wirkung der Seeluft und der Gebirgsluft," "Deutsche Archiv für klinische Medizin," Leipzig, 1874, vol. XIII, p. 80.

warm body at inland places, or even at high mountain localities. This fact is probably due in part to the movement of the air on the coast and to its moisture, and possibly also to the diminished loss of heat in the rarefied atmosphere of high altitudes. Increased loss of heat from the body must be compensated for by increased heat-production, and consequently seaside resorts like Norderney necessitate increased activity of the heat-producing organs of the body. The stimulating effects of sea-bathing, so often associated with a stay at seaside health resorts, must likewise be mentioned in this connection.

From a **therapeutic** point of view, seaside health resorts may be divided roughly into a warmer group, visited chiefly during winter, and a colder group, used mainly for summer residence. The warmer group present great variations in humidity; among the more humid, Madeira, the Canary Islands, the west coast of Corsica (Ajaccio), and the West Indian Islands and Bermuda, may be classed, while the resorts of the Western Riviera are types of the drier and less equable climates. Among the colder resorts are those of the north-western coast of Europe, places on the Baltic Sea, Nova Scotia, Cape Breton, and the coast of Maine. The climates of the Baltic coast resorts, however, resemble somewhat those of the shores of large inland lakes. Some seaside resorts, such as those of New Jersey, occupy a middle position and are much visited both in summer and winter.

Sea air is helpful in debilitated and anemic patients and in cases of insomnia and mental exhaustion from overwork. It seems to have a specially good effect on the growing tissues of the young, and is of the greatest benefit in scrofulous and weakly children. Owing to its good effects on the general health, sea air, with or without sea-bathing, is often useful in a variety of conditions upon which it exerts no direct influence. Among these are leukorrhœa and amenorrhœa, and some cases of sterility and impotence.

The more bracing climates are suitable for persons of stronger constitution, but for patients with low reactive power the resorts of milder character must be chosen. The therapeutic uses of the different marine climates will, however, be further considered under ocean voyages and with the description of seaside health resorts.

INLAND CLIMATES OF HIGH ALTITUDE

From a medical point of view, as has already been mentioned, it is impossible to classify climates into those of high altitude and those of low altitude merely by their elevation above sea-level. The latitude of a place and the character of its surroundings—for instance, whether or not it is encompassed by much greater heights; whether or not it is well sheltered from winds; and whether or not the position is a sunny one—must likewise be taken into account.

For present purposes, places whose main climatic characteristics roughly correspond to those of elevations above 3500 feet in the Swiss Alps will be classified as climates of high altitude.

The Chief Characteristics of Climates of High Altitude

The climatic factors of high altitude resorts most important from a medical view-point may briefly be given as follow:

1. **Diminished atmospheric pressure and diminished density or greater rarity of the air.** At a height of 16,000 feet the pressure of the atmosphere is barely half as high as it is at the sea-level, and consequently a given volume of air contains only half the quantity of oxygen that it does at seacoast health resorts.

2. **Low degree of absolute and relative humidity of the air.** It is clear that, owing to the cold at high altitudes, the absolute humidity of the air must be less than at warmer places of low elevation. The question of relative humidity at high altitudes has been much discussed. It varies widely at different times of the day, being low at midday and high at sunset.

It must be remembered, however, that a high relative humidity of cold air corresponds to a very low relative humidity if the cold air be warmed up to the temperature of the lungs (about 99° F.) or to the temperature of the zone of clothing surrounding the body (about 89° F.). This is important in considering the drying effect of mountain air on the body.

3. **Absence or Great Infrequency of Mists.**—Mists are confined chiefly to the lowest parts of the mountain valleys, and seldom extend far up the slopes of the mountains. Clouds, however, are more frequent in mountainous districts of moderate elevation than

over lowlands. In the higher regions they are of less common occurrence.

The relative frequency of clouds in some districts at certain elevations is an important fact in regard to the climate of localities situated above or below such 'cloud levels.' The height of the cloud level depends on the distance of the place from the equator and on the nature of the surroundings (such as the proximity of higher mountain chains, low plains, or large lakes), and varies somewhat according to the season of the year.

4. Greater transparency and higher diathermance of the air. These qualities result from the relative absence of clouds and mists and the low degree of absolute humidity. Owing to this the sun's rays are more powerful than in low altitudes, where the air is more humid. The greater abundance of light has doubtless an important influence on the physical and mental condition of invalids, but it also helps largely to render the air aseptic. The excess of ozone in mountain air may be mentioned in the same connection.

5. Lower Temperature in the Shade.—The coldness of the air necessitates increased heat-production to maintain the temperature of the body. It thus increases the activity of the heat-producing organs, a fact that is of great importance in persons of stronger constitution.

6. Greater Difference Between the Temperature in the Sun and That in the Shade.—With this is generally associated a greater diurnal range of temperature, which is due to the rapid and unopposed radiation from the ground through the dry, clear atmosphere into space.

7. Greater Purity of the Atmosphere.—The freedom of mountain air from organic and inorganic¹ dust and the absence or rarity of micro-organisms are doubtless due, in part, to the relative sparseness of the population at high altitudes with the concomitant absence of factories, and partly to the influence of light. Chemical rays—those at the blue end of the spectrum—are said to exert a greater bactericidal power than the other rays; and it may

¹ The dustiness of the roads in the dry atmospheres of high altitudes may, however, sometimes constitute more than a trivial annoyance to visitors.

be noted that these chemical rays are particularly abundant at high mountain regions, as shown by the rapid action of the light on photographic plates and by the brilliant tints of gentians, campanulas, and many Alpine flowers. In this connection it is interesting to remember that Pasteur found the air over the glacier of the Mer-de-Glace very much freer from organisms than the air of the neighboring village of Chamonix.

8. Relative Stillness of the Atmosphere.—The degree of motion in the air varies considerably according to the surroundings of a place and to its position on a slope, in a valley, or on a plateau. As has already been explained, the daily local winds are a characteristic feature of mountain climates. In winter, however, when there is a covering of snow, the ground can not be heated during the daytime, and the local winds are therefore much diminished.

The Physiologic Effects of High Altitudes

Mountain sickness is now generally attributed to the lessened quantity of oxygen ¹ in the air at high altitudes, the consequent diminution of oxygen in the circulating blood causing a kind of asphyxia of the tissues. The fatigue of muscular exertion, however, as well as neurovascular idiosyncrasies and temporary conditions of the health, doubtless play a great part in the production of these symptoms.

Many persons experience some degree of distress on arriving at high mountain resorts. This may last for from three or four days to a fortnight or longer before acclimatization takes place. Thus there may be a certain difficulty in breathing, a tendency to headache, insomnia, and constipation of the bowels; dryness and irritability of the throat and thirst often are present. These effects may occur at any season of the year, and can be explained by the rarity and dryness of the air.

The diminished density of the air at high elevations necessitates increased **respiratory movements**, which favor the development of the muscles of respiration and ultimately promote the expansion of the chest and lungs. An actual increase in the thoracic measurements has often been observed as a result of residence in high

¹ There are 130.4 grains of oxygen in one cubic foot of dry air at sea-level; 108.6 grains at 5000 feet above the sea (T. 32° F.).

mountain resorts. Dr. C. T. Williams¹ says there is an expansion of the thorax in various directions, with increased mobility of the thoracic walls, and an increase in circumference of from one to three inches at different chest levels. He thinks that this widening of the thorax is most marked in those who take much exercise at high altitudes, and that it does not always persist after a return to residence at sea-level. Sir H. Weber and Dr. M. G. Foster² say: "A further result of this deeper manner of breathing is thoroughly to open up all the air vesicles, and thus to prevent any accumulation of secretions in them. After a more prolonged residence at high altitudes, a state is reached which has been termed 'hypertrophy of the lung.' The chest is enlarged to some extent and is hyper-resonant; the breath-sounds, instead of being weak, are puerile or exaggerated, but expiration is not prolonged. Whether this be merely a form of emphysema or an actual increase in the respiratory area of the lungs we can not say; but after considerable experience, both of the natives of the high Alpine valleys and of consumptive patients, we can assert that this condition is very rarely associated with the ordinary symptoms of emphysema."

By increasing the respiratory movements, high altitudes likewise mechanically aid the **circulation** in the blood- and lymph-vessels of the thoracic and abdominal cavities.

Increase of **heat-production** and, consequently, an augmented **metabolism** are rendered necessary by the cold, dry air of high altitudes; and that metabolism is actually stimulated is evidenced by the larger volume of carbonic acid gas given off by the lungs. Increased appetite, better digestion, and an improvement in the general nutrition of the body are the results of these bracing influences in suitable cases. These bring about an increased **resistance to disease**, that, in the early stages of a chronic infectious process, such as pulmonary tuberculosis, enables the body better to cope with the parasites that have obtained lodgment and to prevent new invasions; opposes further progress of the lesions and intoxications; and favors cicatrization and ultimate recovery.

¹ "Aëro-therapeutics," London, 1894, p. 110.

² Allbutt's "System of Medicine," 1896, vol. 1, p. 273.

In regard to the effect of high altitudes on the blood, there is still much controversy. Many observers have found that, after taking up a residence at a high mountain resort,¹ the number of red corpuscles in the blood rapidly increases and continues to increase for some time. F. Miescher and F. Egger suggested that the want of oxygen in the blood, produced by the rarefied atmosphere, stimulated the functions of the red bone-marrow and so brought about an increased formation of blood similar to that following severe loss of blood by hemorrhage. A. Gottstein, E. Meissen, and G. Schroeder believed that the chamber of the Thoma-Zeiss hemocytometer was a source of error in counting the corpuscles. Meissen and Schroeder therefore invented a chamber that is termed Meissen's "Schlitzkammer," and that is certainly not affected by atmospheric pressure, and, by using this, they arrived at results very different from those obtained by the original Thoma-Zeiss instrument. Quite recently, however, Theodor von Pacht has employed Dr. George Oliver's hemocytometer, which is likewise independent of atmospheric pressure. By this means Pacht confirmed the old observations, and found that the proportion of red cells in the blood increased with the increase of altitude. The proportion of cells continues to increase for two or three weeks after arriving at a high mountain resort like Arosa, in Switzerland, and it then remains stationary. To what extent the phenomenon is due to greater concentration of the blood in the dry atmosphere of high altitudes, to an altered distribution of blood corpuscles,—resting cells being washed out into the general circulation,—or to a new formation of corpuscles, still remains unsettled.

Therapeutically, high altitude resorts are useful in the following conditions: In inherited tendency to tuberculosis (as a preventive measure); in early pulmonary tuberculosis, when it occurs in persons who present no special counterindication and whose

¹ A short account of this subject is given in the "British Physician," London, vol. 1, p. 296. See also "Medical Climatology," by S. E. Solly, Philadelphia, 1897, p. 109; a review of the whole subject by Dr. G. Schroeder, in "Zeitschrift für Tuberkulose," Leipzig, 1901, vol. 1, p. 505; and Dr. Oliver's "Blood and Blood Pressure," London, 1901, p. 72.

constitution is likely to be favorably influenced ; in convalescence from acute diseases ; in physical and mental exhaustion from overwork, worry, want of exercise, and town life ; in malarial affections and tropical cachexia ; in chronic glycosuria ; in many cases of nervous asthma ; in tendency to bronchial catarrh, with or without asthma, in children and young persons ; in the milder degrees of simple anemia, and in other morbid states in which stimulation of the functions of organic life is desirable. W. Erb, of Heidelberg, in "Volkmann's Sammlung klinischer Vorträge," 1900, No. 271, draws attention to the great value of a winter sojourn in high mountain resorts for many patients suffering with neurasthenia, hysteria, certain psychic disorders, etc.

The various therapeutic uses of high altitudes will further be referred to in detail when the choice of climatic treatment in special diseases is being considered. The editor would here, however, set forth briefly some of the principal **counterindications** to treatment by high altitude. Some relate to the patient ; others to the disease.

As to **the patient**, first is the possession by him, in any marked degree, of an erethistic or neurotic **temperament**. In such persons mountain sickness may be severe and acclimatization tardy, if, indeed, it be ever attained. Insomnia is likely to develop, and pyrexial tendencies to be exaggerated. Secondly, weakness of the **heart**, or congenitally small size of that organ, or a tendency to disturbance of the cardiovascular balance by slight causes is likely, under the influence of atmospheric rarefaction, to lead to acute or chronic cardiac dilatation. Thirdly, **age** is an important factor : persons in whom the tissues, and especially the heart and vessels, have lost their elasticity,—that is to say, in the average case, those who have completed the fifth decade,—are unequal to the demands of altitude for readjustment of the organism to its environment, and should not, certainly for the first time, be sent to elevated stations. Fourthly, the capacity for **muscular exertion** without undue fatigue must be considered. Those permanently or temporarily much reduced in muscular strength should not be subjected to the strain of altitude except with great caution and after weighing of all the facts.

Counterindications are likewise furnished by certain **pathologic states**. Consumptives with a tendency to rapid breaking down of

tissue, associated with high fever, should not be sent to altitudes; nor should those with acute phthisis or phthisis florida, or those with advanced disease or those with persistent high temperature, even in the early stages, or when there is but slight structural change demonstrable. Intermittent attacks of high temperature do not counterindicate resort to altitude unless the pyrexial paroxysm be excessive or the patient be of the erethistic type. Hemoptysis in itself furnishes no indication either for or against treatment by altitude. Those of sluggish constitution are usually benefited in respect to this, as to all other symptoms, while the erethistic are injured. The general physical conditions in the lungs are also to be considered, especially as to the location and extent of softening, with respect to the distribution and extent of protective fibrous tissue, in so far as these conditions may be deemed susceptible of demonstration. Structural disease of the heart, atheroma of the vessels, aneurysm, emphysema, acute or advanced nephritis, obviously render a sojourn at altitude unwise.

Certain precautions are necessary in making the journey from low to high stations, and the converse. Patients suffering from advanced disease or possessing structural or temperamental peculiarities or idiosyncrasies verging on the prohibitive types had best break into easy stages the ascent to such elevations as the Colorado resorts or Davos; and even more necessary is it to break the returning descent. High altitudes should not be first sought in cold or in very hot weather; nor should the departure take place during winter. Thus it is best to go during the early autumn, and to make no needless change in place of sojourn before the spring. Many persons, however, especially those with pulmonary disease, should make the restorative altitude station a place of permanent residence. For those who must earn their livelihood, this is the great advantage of the Rocky Mountain¹ plateau, with its numerous highly developed communities and its opportunities for 'ranching,' over the Swiss Alps and the Andes.

¹ The "Rocky Mountain Industrial Sanatorium Association," recently organized by physicians and public-spirited citizens of Colorado, with a general advisory board consisting of physicians of all sections of the United States, marks a decided step in advance in public provision for the care of the self-supporting class among tuberculous patients.

INLAND CLIMATES OF MODERATE AND LOW ALTITUDES

In the classification of resorts of **moderate elevation** are placed those whose climate roughly corresponds to that of localities in the Swiss Alps between 1500 and 3500 feet above sea-level. The climates in this group present characteristics similar to those of high altitude, but in a lesser degree, because the air is generally warmer, and the humidity of the air somewhat greater in proportion to the increased barometric pressure; they are not so free from mist; the insolation is less intense; the snow does not cover the ground for so long a period. Their climates are therefore less stimulating and tonic than those of high altitudes, but they are better suited for patients with a tendency to dilatation of the heart and with slight degenerative changes in the vascular system, with pulmonary emphysema or renal disease, and for the majority of persons of advanced age. They are also better borne by patients with irritable nervous constitutions who become sleepless or lose appetite while at higher elevations.

It must not be forgotten that places of considerably lower altitude than the limit mentioned may often possess many of the bracing qualities of mountain resorts. This often depends on lower temperature, with consequent lower absolute humidity of the air, and a certain degree of variability of the weather. Thus, the climate of resorts in northern Europe at an elevation of from 600 to 1500 feet is often much more bracing than is that of places at elevations of from 2000 to 3000 feet in Italy or southern Switzerland, especially in or near the lake districts. A great deal depends on whether the surroundings are or are not much higher than the place itself. In islands like Great Britain, localities at elevations of only from 500 to 800 feet, especially when not surrounded by higher hills, usually exercise a more bracing effect than do places at three or four times the elevation in southern Europe. In this connection, however, the greater prevalence of wind, rain, and moisture in the British climate and the shorter duration of sunshine must be taken into consideration, rendering English localities less suitable in many cases.

Inland climates of plains (so-called typical continental climates)

in the temperate zones differ from climates of locations under the influence of the ocean by being drier and less equable, having colder winters and hotter summers. Thus, Moscow, in the interior of the continent of Europe, has a difference of 52.5° F. between its mean January and mean July temperature, while Glasgow, nearly in the same latitude, but close to the Atlantic Ocean, has a difference of less than 20° F.

In health resorts of **low elevation**—that is, below the elevation corresponding to 1500 feet in the Swiss Alps—the variations in climate due to the latitude or isotherm in which the place lies, the mean temperature for the different seasons, the prevailing winds, the distance from the sea, and the purity of the air are most important points to be considered. The climate of this group of places is likewise greatly influenced by the proximity of mountains, inland lakes, and large forests, and by the position, quality of soil, and facilities for drainage. The salubrity of the air may be affected by neighboring factories and densely populated towns.

Among the climates of low elevation there are three groups that will now be separately considered—namely, the climates of the shores of large inland lakes, the warm desert climates, and the cold dry inland climates.

Inland Lake Climates

The climates of places situated on the shores or on islands of large **inland lakes** have certain features in common, although, of course, in many respects they differ widely according to the nature of the surroundings, the line of latitude or isotherm in which they lie, etc. Owing to the large evaporating surface, the air is more humid than at most inland places, though not necessarily excessively rainy; and the climate is more equable. During winter there is often more mist than at other inland places of about the same degree of dryness of the soil. The daily range of temperature is less variable, and the winters, if the lakes are large and deep and remain unfrozen, are warmer, while the summers are cooler, than at other inland places of low altitude at an equal distance from the equator. At Alpena, near the great North American Lake Superior, Lake Michigan, and Lake Erie, the July temperature is only 69° F.,

while at St. Paul, Minnesota, which lies westward nearly in the same latitude, it is 73.8° F.

The large surface of water gives rise to local currents of air, diurnal and nocturnal, like those of the seashore, and during hot summer weather the cool day-breeze from the lake is very refreshing. If the configuration of the surrounding district is mountainous, as in the Swiss and Italian lakes, the local winds of mountain localities will often prevail. Reflection of light from the surface of the lake generally increases the brightness of the aspect. The shelter from winds is often so insufficient as to render these places unsatisfactory as winter resorts for invalids, although the winter climate may be sufficiently warm; in autumn and spring, however, they are often useful and frequently constitute what are termed intermediate stations, where persons may spend some weeks on their way from a warm winter resort to a northern (in the northern hemisphere) or Alpine summer resort, or vice versâ.

Warm Dry Inland Climates (Desert Climates)

Over very large areas of dry ground the atmosphere must, necessarily, likewise be dry. This dryness renders the air more transparent and translucent, prevents the formation of fogs and clouds, and diminishes rainfall. During the night heat is rapidly radiated through the dry atmosphere into space, and consequently the difference between the diurnal and the nocturnal temperature of the air is very great. The abundance of light, the dryness of the ground and air, and the absence of population render the air free from organic impurities and microbes.

According to H. Weber,¹ the characteristics of desert climates are purity of the air, richness in ozone, great warmth of the sun, abundant light, dryness of the air, and great scarcity of rain. The greatest drawback of the desert is the occurrence of violent winds, frequently accompanied by clouds of dust that obscure the sun like a dense fog; this dust gets into the clothing, irritates the eyes and

¹ Paper read at the International Tuberculosis Congress in Berlin, "British Medical Journal," June 3, 1899. See, also, F. M. Sandwith, "Egypt as a Winter Resort," London, 1889, and H. E. Leigh Canney, "The Winter Meteorology of Egypt and its Influence on Disease," London, 1897.

nasal mucous membrane, invades closed rooms, and is deposited on furniture and other articles within them. In Egypt such dust-storms are not limited to the periodical khamsin winds (chiefly encountered in March and April), but occasionally blow for from one to three days at any time of the year. Another disadvantage of desert regions is the absence of shelter, the traveler being compelled to provide his own tents and servants. In selected cases, however, great benefit may be derived by residence in tents during the winter or occasionally for several entire years. The climate is suitable in many cases of chronic pulmonary tuberculosis, chronic bronchitis with profuse expectoration, albuminuria, rheumatoid arthritis, convalescence from pneumonia and bronchitis, insomnia from overwork, etc.

The great **American desert** lies partly in Arizona, Utah, Nevada, and California, and is a region that can never be made available as a health resort. The soil is entirely different from that of the Egyptian and Arabian deserts, being strongly alkaline and much more irritating to the mucous membranes. The wells are charged with salt or borax, and the whole region is mentioned only to be condemned. The very names of these localities, such as Death Valley, Dry Valley, Mont Diablo, etc., are repellant. This region is the hottest and most arid portion of North America.

The subject of the desert climate and its therapeutic uses will be discussed with the health resorts of Egypt.

Cold Dry Inland Climates

As typical examples of cold dry inland climates of low altitude must be mentioned the winter climates of large plains in the colder latitudes, where the ground remains frozen over during the winter months.

These climates, which may be called almost **cold desert climates**, in contrast to the warm desert climates just spoken of, have not been extensively used for therapeutic purposes; but Sir H. Weber reports good results obtained in Labrador in the case of some missionaries and clerks suffering with pulmonary tuberculosis of the first and the beginning of the second stage. These were, however, favorable cases, for the patients were all originally of strong

constitution, had but a limited family history of tuberculosis, were free from other disease, and had good circulations. Dr. Heron, at a meeting of the British Balneological Society in 1897, quoted the striking effects of bright cold weather in tuberculous natives of the Hudson Bay territory. Pulmonary tuberculosis is not rare among the poor Indians in this region. During the summer those affected remain in their hovels without energy to exert themselves—‘coughing their lives away.’ With the approach of winter, however, a change for the better often occurs; the Indian then regains energy, takes to his snow-shoes and goes hunting, and soon becomes unrecognizable as the wretched being that was confined to his wigwam during the summer. It must not, moreover, be overlooked that some of the good effects that high altitudes exert in suitable phthisical cases are doubtless due to the dry, bright, cold winter weather.

Cold inland climates are **unsuitable** for persons who lose energy and appetite and feel wretched in cold weather, and for those who have a sort of idiosyncrasy in regard to cold—for instance, as it is almost needless to mention, patients with paroxysmal hemoglobinuria, a rare disease in which the attacks are sometimes induced by exposure to cold.

PART II

DESCRIPTION OF HEALTH RESORTS

PART II

DESCRIPTION OF HEALTH RESORTS¹

Strict classification being impracticable, the descriptions of health resorts in the following pages will be arranged in part according to their geographic grouping, and in part according to their climate. Digressions will sometimes be made, however, for convenience of discussion. Before describing the health resorts upon land most frequented, we shall discuss briefly 'the ocean as a health resort,' or, rather, the value of sea voyages for climatotherapeutic purposes.

¹ In a great many instances the accuracy of descriptions of health resorts has been verified by personal visits. A greater number of the places mentioned have been visited on various occasions by Sir Hermann Weber, whose support and guidance have been invaluable. Acknowledgment must likewise be made to the great help obtained from the writings of authors, as H. Reimer, E. de la Harpe, T. Gsell-Fels, R. Flechsig, E. H. Kisch, Conrad Clar, Julius Glax, J. Burney Yeo, C. T. Williams, S. E. Solly, D. H. Cullimore, J. A. Lindsay, Leigh Canney, M. G. Foster, P. Schivardi, and others. New summer and winter resorts are constantly being opened, and in the following pages some omissions will doubtless occur, although every endeavor has been made to render the survey as complete as possible.

CHAPTER I

OCEAN CLIMATES AND SEA VOYAGES

England to North America. England to Madeira and Canary Islands. England to West Indies. England to South America. England to South Africa. England to the Far East. England to Australia and New Zealand. San Francisco to Australia. Return Trip from Australia. Slow Steamers Between the United States and Europe. New York to Norwegian and Baltic Ports. New York to West Indies and South America. New York to Madeira, the Azores, Mediterranean and Black Sea Ports. New York to Australia, South Africa, China, and Japan. San Francisco to Tahiti. San Francisco and Vancouver to Hawaii and the Far East. Alaska Coasting Trip. The Ocean Climate and its Effects. Ocean Sanatoriums. Indications and Counterindications for Ocean Voyages.

The pure ocean air can be obtained only during an ocean voyage, and for the maximum effect, one of the longer voyages—of about from six to sixteen weeks' duration—must be chosen. Among those most suitable for therapeutic purposes are voyages to Australia and New Zealand, that around the Cape of Good Hope, and that to the Cape of Good Hope itself. The voyage around Cape Horn has the disadvantage of encountering storms and severe cold. For wealthy persons, when a physician can be obtained to accompany them, tours in private yachts can often be rendered beneficial.

It will best serve the purposes of this work to consider first some of the most available trips from and to England, and afterward those from and to New York and San Francisco, the great ports respectively of the Atlantic and Pacific coasts of the United States. These will serve as types, and the modifications necessary for other trips and other countries may readily be learned by consulting local travel offices.¹

¹ The editor desires to express his obligations to the courtesy of Mr. T. H. Garlick,

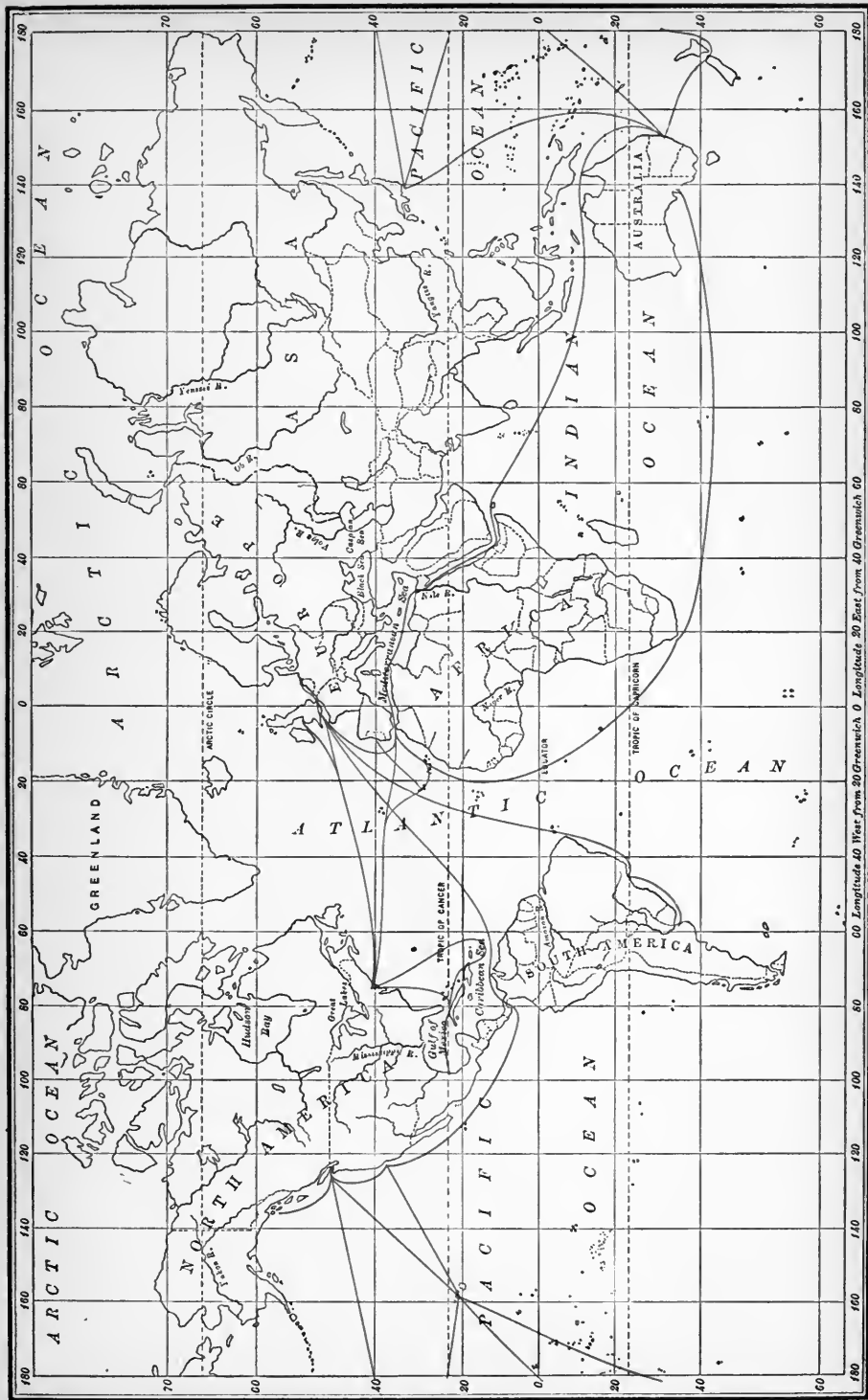


Chart showing principal Ocean Routes.



VOYAGES FROM ENGLAND

Voyages on steamships between England and North America are too brief to be of benefit to patients for whom the sea air is indicated. For those, however, who require merely a holiday, with change of surroundings, this trip offers great attractions, and may often be recommended.

Voyages from England to Madeira and the Canary Islands are likewise too short to give the full benefits of the ocean climate. Moreover, on account of the storms for which the Bay of Biscay and the English Channel are noted, there is a likelihood of encountering an unusual amount of rough weather during the voyage. In the case of 'good sailors,' this very roughness of the sea has its special attraction. In persons suffering from the effects of overwork, with resulting mental depression, tours to these beautiful islands may have a strikingly good effect.

Voyages from England to the West Indies are too short, for many patients, to be of service, and are unsuitable to others on account of the warmth and humidity of these islands. Some constitutions, however, are benefited by a warm atmosphere, and in such cases these voyages can be made use of. The arrangements on the Royal Mail steamers are excellent. A disadvantage, unfortunately, in many of the islands, is the presence of endemic diseases. In the island of St. Thomas endemic diseases are nearly always present, but Barbados is generally free and may be selected for a sojourn. Jamaica and Demerara may be visited when they are free from yellow fever.

Voyages from England to Brazil and the Argentine Republic are somewhat longer and can likewise be undertaken in the Royal Mail steamers. The journey to Pernambuco consumes seventeen or eighteen days; that to Bahia, from eighteen to twenty days; that to Rio de Janeiro, about twenty-two days; and that to Monte Video and Buenos Ayres, twenty-six days. Localities on the coast between Pernambuco and Rio de Janeiro should not be

the representative in Philadelphia of Messrs. T. Cook & Son, and to that of Messrs. Peter Wright & Sons, of Philadelphia, in revising the data here given of ocean trips from the United States.

visited during the warm months of the year, on account of the heat and the frequent occurrence of endemic diseases; from Rio de Janeiro, however, more elevated and healthful regions can be reached. An extension of the journey to Buenos Ayres and Monte Video on the River La Plata is much to be recommended, and by this means a longer sea voyage is secured and a cooler and more bracing climate, with satisfactory sanitary and social conditions, is encountered. In many cases a prolonged stay can be made in these districts.

Among the **shorter sea voyages**, that from **England to the Cape of Good Hope** probably offers the greatest advantages. The voyage in the steamships consumes nearly three weeks, and the six weeks on the ocean required for the outward and homeward passage are sufficient for many cases. In the case of Americans going by this route, there are the voyages from New York to Liverpool or Southampton and return, additionally. The arrangements on the ships of the recently combined Union-Castle Line are excellent, and the life on the ships is a source of great recreation to many. Frequently a long stay is made in South Africa before returning home. Though Cape Town itself is windy and dusty, there are localities at no great distance, such as Wynberg, Rondebosch, and Constantia, where a pleasant stay can be made. Caledon, with its hot springs, can be reached in two hours by rail from Cape Town. Natal, the Orange River Colony, and the Transvaal have many localities of high altitude that are suitable in the lighter cases of pulmonary tuberculosis and that can easily be reached from Port Elizabeth or from Durban. Reference will be made to these stations when considering the health resorts of South Africa.

The **voyage from England to the East Indies, China, and Japan** can seldom be recommended, because the passage through the Mediterranean and the Red Sea exposes the patient to very sudden changes in temperature. There are certain patients, however, who suffer constantly from catarrhs and rheumatic pains while in the colder latitudes, these disturbances disappearing entirely in warmer climates. Instead of the usual winter tour to the south of France, Italy, and North Africa, these persons may, for a

change, visit the eastern countries on one of the large ships of the Peninsular and Oriental Steam Navigation Company.

The voyage from England to Australia and New Zealand is that generally recommended when it is desirable to obtain the full effects of the ocean climate. The voyage takes about six weeks in steamships, and about from ten to fourteen weeks in sailing ships. There are several routes from England to Australia, the East Indian one being by way of Gibraltar, the Mediterranean, the Suez Canal, the Red Sea, and the Indian Ocean to Australia. The sudden changes of temperature to which the patient is exposed while passing through the Mediterranean and the Red Sea constitute a disadvantage from a therapeutic point of view, especially in phthisical cases. A second route is that across America by rail, between New York and San Francisco (the railway journey lasting several days and nights), and thence across the Pacific Ocean, by way of Honolulu, to New Zealand and Australia. A third route is across the Isthmus of Panama, thence to San Francisco, and from there to New Zealand and Australia, as in the second route. These routes each have their disadvantages: the long railway journey from New York to San Francisco in the one, and the unwholesome climate of Panama in the other.

A fourth route, and that most suitable for therapeutic purposes, is by way of the North and South Atlantic Oceans, around the Cape of Good Hope, to Melbourne, in Australia. By this route the ship, after leaving the English Channel, remains in the open ocean during the entire passage. The voyage may be made in a sailing ship, a steamship, or in a sailing ship having steam machinery for use when required. The patient should leave Europe or North America some time between the end of September and the beginning of November, and should return between the end of May and the latter part of June. The disadvantages of the voyage are the liability to sea-sickness and the uniformity in the food, there being a lack of fresh vegetables and fruits. The heat may be severe during the long calms that occur in the equatorial regions, during which sailing ships must remain at rest unless provided with steam machinery. In the interval between the outward and the homeward voyage Hobart Town, in the island of Tasmania, is a

suitable stopping-place. Melbourne itself is less suited, and though most beautifully situated, Sydney is too hot during the summer for most visitors. One of the more elevated localities that can be reached from Sydney may, however, be found available. According to most medical authorities, the best results are attained by commencing the homeward voyage in from six to eight weeks after the arrival; the interval on land should not, however, be too brief—probably not less than three weeks.

Steamships seldom return to England from New Zealand and Australia by way of the Cape of Good Hope. The return journey may be made in one of the following ways: (1) In a sailing ship around the Cape of Good Hope; (2) in a sailing ship around Cape Horn; (3) in a steamship and across the Isthmus of Panama; (4) in a steamship to San Francisco and thence by rail to New York; (5) in a steamship through the Red Sea, Suez Canal, and the Mediterranean. The fifth route is the most pleasant for patients with sound lungs, who are not severely ill, but it is somewhat dangerous for tuberculous patients, owing to the sudden change from the heat of the Red Sea to the uncertain climate of the Mediterranean, where cold, violent winds are not rarely encountered. The voyage around Cape Horn is unsuitable for most patients, owing to the severe weather during the colder seasons of the year. The most suitable route is that around the Cape of Good Hope, but it must be observed that the voyage in a sailing ship back to England or North America may last from ten to as many as forty days longer than the outward voyage, because the winds are not so favorable. On account of winds the return voyage is usually made in a somewhat warmer latitude, and not infrequently a visit is made to the Cape of Good Hope and the island of St. Helena, where fresh food, especially fruit and vegetables, can be obtained. If, however, for any reason the voyage be made by way of the Suez Canal and the Red Sea, the time must be chosen carefully, so as to avoid passing through the Red Sea during the hot months, and with a view to escaping the monsoon in the Indian Ocean.

Some of the most practicable or most desirable voyages from Atlantic and Pacific ports of the United States may now be mentioned.

VOYAGES FROM AMERICA

From the United States to the Continent of Europe or the British Islands the voyage by slow steamer may be made at moderate cost, giving the traveler from ten days to a fortnight upon the sea, each way. When this trip alone is too short, it may be made simply part of the excursion, which is to be continued from an English port to South America, Africa, Australia, or elsewhere. One can go by any of the following routes :

The Philadelphia-Liverpool Service of the American Line includes several good steamers that carry only cabin passengers and make the trip in about ten or eleven days. The steamers of the Red Star Line, under the same management, ply between Philadelphia or New York and Antwerp in about the same time. The Allan State Line and the Anchor Line, both from New York to Glasgow, maintain a good service between these ports. Their steamers go from port to port in from ten to fourteen days. The Atlantic Transport Company has large steamers that carry freight and cattle, but give very good accommodation to passengers on the upper deck. They sail from New York direct to London in about ten days. The Wilson Line steamers, from New York to Hull, have limited accommodation for first-class passengers only, and occupy about ten days on the trip.

From New York to Germany the North German Lloyd and the Hamburg-American Line still maintain what is called the 'regular service.' These steamers consume from eleven to fifteen days, according to the vessels, in making the trip from New York to Bremen and Hamburg, respectively. The Holland American Line to Rotterdam also has some slow steamers that take about two weeks to make the voyage, and carry only one class of passengers—namely, cabin.

Special summer cruises in European waters, and chiefly, but not exclusively, coasting trips, are offered by the Hamburg-American Line, American passengers going first from New York to Hamburg. These cruises are made in what are called twin-screw yachts, of some 450 to 600 feet long, and fully equipped for the comfort of passengers. They vary somewhat from year to year, and include land trips from

various ports touched at ; but passengers who so prefer may remain on board during the short stays in port. Among such trips are :

In May, a twenty-one days' trip around the British Isles, and return to Hamburg.

Early, and again late, in July, cruises of three weeks' duration to



ROUTES OF THE CRUISES TO NORWAY AND THE NORTH CAPE AND SPITZBERGEN, AND THE CRUISE TO THE BALTIC SEA AND THE CAPITALS OF NORTHERN EUROPE.

Norway and the North Cape and return to Hamburg, through the Lofoten Islands, etc. One of these cruises is prolonged several hundred miles past North Cape to Spitzbergen.

About the middle of August, a three weeks' trip to the northern capitals, the Baltic Sea, and the Kiel Canal, and return to Hamburg.

From New York to Scandinavian ports direct there is only one line. The Scandinavian-American steamers to Copenhagen, etc., take about fourteen days.

From New York to the West Indies and Central and South America is often a desirable trip in winter—that is, from



ROUTE OF THE CRUISE TO THE WEST INDIES AND THE SPANISH MAIN.

November to March or April. It may be prolonged, when desired, by a stay at Barbados or other fever-free point. Under the rule or influence of the United States the sanitation of the islands formerly governed by Spain has been improved and may be ex-

pected to become still better. A good service is maintained by the Quebec Steamship Company, whose vessels sail about every ten days from New York and visit all the Windward Islands. All steamers call at Barbados, and many proceed to Demerara, British Guiana. The itinerary to be followed cannot be stated definitely until about a week before the departure from New York. To the first port of call the time is about six days; the round trip occupies about thirty days. Passengers holding round-trip tickets can stop off at any of the islands and return on any vessel of the line. The steamers of the United Fruit Company Service, between Boston or Philadelphia and Jamaica, call at two or three ports in Jamaica, and make the round trip with these stoppages in about two weeks. The Ward Line has a regular service to Havana and **Mexican ports**, stopping at Progreso and Campeche, where connections are made for Frontera, etc. The round trip takes twenty-five days. The Atlas Line runs a service of steamers to Central America by way of Kingston, Jamaica, touching at Savanilla and Carthagena, and occasionally at Port Limon, making the round trip in about twenty-five days. The Red "D" Line also runs fine steamers from New York to Venezuela, calling at Puerto Rico. The voyage each way is about ten days, but the round trip occupies nearly three weeks. Toward the end of January the **special yacht** of the Hamburg-American Line makes a five weeks' trip to the West Indies and the Spanish main, the itinerary including ports in Haiti, Santo Domingo, Puerto Rico, St. Thomas, Martinique, Trinidad, Venezuela, Curaçao, Jamaica, Cuba, and New Providence. The call at Nassau, New Providence, has been included in this program, with the special view of enabling those who wish to prolong their stay in a warm climate to do so. From Nassau there is good, direct, and frequent connection to Miami, Florida. The Panama Railroad Steamship Line runs steamers from New York every week to the Isthmus of Panama, where rail is taken across and connection made with another steamer for San Francisco. The time occupied in going from New York to San Francisco is twenty-eight days, and it is usually a delightful sea trip. The steamers go up the Pacific coast and call at many Mexican ports of interest. There is also a service of the Royal Dutch West

India Mail Line, sailing about every two weeks, that takes in the following points: Port Au Prince, Jacmel, Guanta, Petit Goave, Curaçao, Cumana, Aux Cayes, Puerto Cabello, Carupano, Aquin, La Guayra, Trinidad, Demerara, and Paramaribo. This trip lasts about thirty days.

There is also a direct line from New York to Trinidad, the time from port to port being about eight days.

The ships of the Lamport and Holt Line sail twice a month to South America, as far south as Santos, where connections are made for Buenos Ayres and Montevideo.

From New York to Madeira, the Azores, and the Mediterranean

There are two lines of freight steamers of the same type as the vessels last named that make a bid for passengers between **New York and Portugal**, stopping at the **Azores and Madeira**. These are the Empresa Insulana de Navegação and Linha de Vapores Portuguezes. The round trip is made in about a month. The Prince Line also maintains a freight-passenger service to Italian ports, calling *en route* at the Azores.

The **voyage from New York to Mediterranean ports** may be made under favorable auspices during the autumn and winter months, the patient remaining in southern Europe or northern Africa during the winter, and returning in the spring; or he may return with the vessel. The round trip occupies from thirty to seventy days. There are both regular and special sailings.

The Hamburg-American Line and the North German Lloyd maintain throughout the year a first-class service to Genoa, calling at Gibraltar and Naples. The time occupied in this trip is about eleven or twelve days—say four weeks to go and return. From New York to Naples there is also an Italian line of slow steamers that take about fifteen days. From Naples or Genoa one so desiring may go by rail to a Swiss or Tirolean resort for the winter.

Toward the end of January, the Hamburg-American yacht makes a **special cruise to Madeira, the Mediterranean, and the Orient**, according to the following itinerary: Funchal, Gibraltar, Algiers, Genoa, Villefranche, Syracuse, Malta, Alexandria, Jaffa, Smyrna,

Constantinople, Athens, Palermo, Naples, Genoa, and return to New York. The trip lasts nearly ten weeks.

Early in March the same line offers a **cruise to the Mediterranean and the Black Sea**, with the following itinerary: Madeira, Gibraltar, Genoa, Villefranche (Nice, Monte Carlo), Palermo, Constantinople, Sebastopol and Balaclava, Aloupka, Yalta, Batoum (Tiflis), Trebizond, Athens, Naples, Algiers, Lisbon, and return to Hamburg *via* Cherbourg and Southampton. The duration of this trip is likewise about ten weeks.



ROUTE OF THE CRUISE TO THE MEDITERRANEAN PORTS, EGYPT, AND THE BLACK SEA.

Passengers on one or other of these cruises who wish to extend their stay in a milder climate may leave the vessel at Algiers or at Genoa for a sojourn at the Riviera, or at Alexandria for a stay in Egypt. These trips are especially to be recommended for convalescents from influenza, for those needing rest and recreation, for some diabetic patients, and for certain cases of early tuberculosis, of asthma, and of recurrent bronchitis and 'winter catarrh' of the air-passages.

From New York to Australia and South Africa, as also to

China and Japan, there are several lines maintained, primarily for freight business, but they supply accommodations of a kind to a limited number of passengers. These ships, however, are not built for passenger service, and the accommodations may be of varying degrees of excellence or the reverse. They are mostly, if not all, English 'tramp' steamers, taken by American firms on time charter, and everything would depend upon the character of the particular vessel, management, and master. It would be a somewhat hazardous undertaking for a delicate invalid to engage a berth on a vessel of this kind, but suitable arrangements could at times be made for patients who could endure a little 'roughing it.' Sailing ships are even more varied in their character. The voyage around Cape Horn is objectionable during the southern winter.

Voyages from San Francisco and Other Pacific Ports

From **San Francisco to Hawaii** there is a local service of the Oceanic Steamship Company, making the trip in six or seven days. These fine steamers also continue to **Australia** by way of Auckland, New Zealand. The voyage from San Francisco to Sydney occupies about twenty-two days.

From **San Francisco to Tahiti** the Oceanic Steamship Company has a monthly service. The voyage consumes about twelve days each way. The round trip from San Francisco and return can be made in about thirty-three days. There are a number of sailing vessels making this trip and occupying about three months in the voyage. The temperature upon the sea is in the neighborhood of 85° F. during most of the trip, at nearly all seasons, but is not usually oppressive. In summer the heat in port is unbearable for Europeans unless they remain inactive.

From **San Francisco and Vancouver to the far East** the combined service of the Pacific Mail, the Occidental and Oriental and Toyo Kisen Kaisha form a weekly service, plying between San Francisco, Yokohama, and Hong-Kong. The duration of the voyage to Hong-Kong is about twenty-eight or twenty-nine days. The vessels of the Canadian Pacific Line from Vancouver to the same ports are a little quicker, as they do not go *via* Honolulu, but take a northern route. The accommodation on all these steamers is

exceedingly good, and they have in many cases promenade deck accommodation that would be suitable for invalids. These cabins are usually sold at an extra cost. There are numerous sailing vessels from San Francisco to Hawaiian, Chinese, Japanese, and Australasian ports, on some of which comfortable accommodations and tolerable food are to be had. Voyages of from three weeks to four or five months can be taken on these ships by persons able to endure a certain degree of discomfort; and they are especially to be recommended in cases of early pulmonary tuberculosis in men of robust constitution.

While a voyage upon the Pacific Ocean is pleasant at almost any season, the best time to visit Japan is in the fall or spring.

For the **Alaska coasting trip**, on the excellent steamers of the Pacific Coast Steamship Company and other lines, much of which is on the open sea, passengers take ship at San Francisco and Puget Sound points. The steamers call at the principal ports in Alaska, and at Muir glacier during the excursion season, between May and September. This is an extremely attractive trip for those needing rest or relaxation, and able to enjoy natural beauties. The round trip to Sitka and return is about fifteen days from Seattle; from San Francisco, four or five days longer; to Nome from Seattle is about ten days each way. There are also a number of sailing vessels, on which fair accommodation can be obtained, making irregular trips between San Francisco or Seattle and Alaskan ports.

THE OCEAN CLIMATE AND ITS EFFECTS

The **characteristics of the ocean climate** have already been described. They are considerable humidity and equability of the atmosphere, with freedom from dust, microbes, and other impurities. On the ship's deck, of course, there is abundance of light, but, unfortunately, this is not the case in most of the cabins. During a long ocean voyage the difference between the maximum and the minimum temperature in the shade on the same day is seldom more than 4° or 5° F. Even within the tropics, except during total absence of wind, the ocean air is seldom felt to be oppressively hot, as it might be at the same temperature on land; the midday

temperature is rarely above 85° F. The mean relative humidity is said to be about 73.5 per cent. of saturation.

The **therapeutic effects of an ocean voyage** should be sedative, but not relaxing or depressing, and at the same time tonic, being thus suited to certain lesser conditions of 'irritable weakness.' The pure sea air increases the appetite, improves the general nutrition, and induces healthy sleep. Other beneficial effects associated with an ocean voyage, and that relieve the nervous system, are the change of surroundings, the altered mode of life, and the freedom from troublesome letter-writing and the ordinary cares, excitements, and worries of home life.

Unfortunately, there are also disadvantages in sea voyages ; these led Jules Rochard to say that : " If the right sort of ship could be sent to the right place in the right kind of weather with the right sort of patients a great deal of good might result." Patients who attempt a long ocean voyage should be tolerably 'good sailors'—should not be too severely ill nor too weak. There must be a fair degree of resisting power, and the organs of digestion and assimilation must be able to meet the demands of the increased metabolism caused by the ocean air. Women generally feel the necessary discomforts of life on shipboard more than men do, and this method of treatment is seldom suitable for them. The sleeping cabins and general accommodations should be as satisfactory as possible, and the dietetic arrangements good. The patient should use as great care in selecting the vessel and cabin as he would do were he choosing a house to live in. He should himself inspect the accommodations that are offered him, or intrust their selection to one well acquainted with ships and voyages. There should always be a physician on board whose advice can be obtained when required, and in many cases, as in those with mental complications, the invalid should not be allowed to undertake the voyage unless he be accompanied by a special attendant or by a physician.

The **disadvantages of voyages** are the liability to experience rough weather and the possibility of prolonged sea-sickness, monotonous dietary, and the narrow, confined, dark cabins. On long voyages the lack of fresh vegetables and fruit is a drawback, and the difficulty in the case of patients who require large quantities of

milk is only measurably overcome by the use of the various 'precipitated' and 'desiccated' preparations of this necessary food that are now to be obtained in the shops.

Many of the drawbacks of sea voyages could be overcome by the introduction of specially built ships, such as Sir H. Weber suggests,¹ so constructed as to constitute a form of **sanatorium**. The cabins of such ships should be unusually large, and each patient should be allowed to occupy a separate room. All substances that tend to decompose in very hot weather should be avoided. The general hygienic arrangements should be considered fully, and a trustworthy physician and specially trained attendants would, of course, be necessary. Diversion could be provided for patients by good music, etc. Healthful and interesting places should be visited, according to the season of the year, thus giving the patients an opportunity to land and to obtain a supply of fresh food. The Mediterranean or West Indies could be visited during the winter, and localities on the northwestern coasts of Europe or the northeastern coasts of America during the summer; if found advisable, the route could be altered during the voyage, according to circumstances. The expense of such sanatorium voyages would, however, limit their use to the wealthy classes.

'**Ocean sanatoriums**' of this kind might be adapted to receive special classes of cases. Thus, some could be reserved for convalescents and persons exhausted from overwork, worry, etc.; others might accommodate dipsomaniacs and persons who must be restrained from obtaining alcohol, morphin, etc.; while yet other vessels might be fitted out as special sanatoriums for the treatment of pulmonary tuberculosis, the arrangements and regulations as to diet, medical supervision, and the avoidance of the spread of infection, the disposal of sputa, etc., being modeled on those in force at land sanatoriums for consumptives; and, as suggested by the editor of this system, facilities could be provided for special forms of treatment—hydrotherapeutic, pneumatic, electric, etc.

Voyages on private steam or sailing yachts meet some of the conditions that would be obtained by our ideal ocean sanatoriums,

¹ "Zeitschrift für diätetische und physikalische Therapie," Leipzig, 1899, vol. III.

although they are employed usually for brief tours. The cabins are generally well arranged, and the patient has the advantage of remaining among his family or friends. Although yachting is chiefly indulged in by healthy persons, it may be utilized as a method of treatment in many cases of mental depression and overwork requiring rest, pure air, and a change of surroundings.

Indications for Ocean Voyages

Some of the most important indications for ocean voyages will here be considered briefly. Great benefit often follows this method of treatment in cases of **overwork**, **worry**, and **insomnia**, with resulting depression and mental 'breakdown'; in those suffering from **irritable weakness of the nervous system** and **neurasthenia**, when there is sufficient resisting power; in **delayed convalescence**; in various **scrofulous conditions**; in **asthma**; and in **suspected tendency to pulmonary tuberculosis**.

Sea voyages are often useful in the milder and quiescent forms of **pulmonary tuberculosis**, provided the patient's general condition be such as otherwise to fit him for life on shipboard. Long voyages are to be preferred to all other methods of treatment in the case of male patients who have a taste for the sea, who are strong physically, or who possessed an originally strong constitution and were infected by 'chance,' or when weakened by overwork, worry, improper hygienic conditions, or acute diseases. In more advanced stages of consumption ocean voyages may improve the general health in quiescent cases; even exhausted patients, with large cavities in their lungs, may, at times, be benefited greatly. S. Solis Cohen considers persistent high fever in phthisis an indication for treatment by sea air, and cites cases in which he has observed great amelioration and prolongation of life result. He also urges ocean voyages, to be followed, perhaps, by a sojourn in a suitable climate as the objective point, in early cases of pulmonary tuberculosis, especially when announced by hemorrhage; and in the case of a patient otherwise improving, in whom a limited local softening or area of moist râles persists.

In **chronic catarrhal conditions of the larynx and air-passages**, in **chronic rheumatic states**, and in **rheumatoid arthritis**

sea voyages to warm climates are frequently useful—as, for instance, a winter voyage to the West Indies, the Argentine States, or the Mediterranean. Voyages often have a beneficial effect on persons who are very susceptible to **catarrhal attacks** ('colds') and **rheumatic pains**, by increasing the power of resistance to the cause of these attacks. **Hay-fever** never occurs during sea voyages. Certain patients suffering from **asthma**, with or without a tendency to hay-fever, are greatly benefited by sea trips, and others may be unfavorably affected. Experience gained by a sojourn at the seaside may guide the decision as to the probable effect in the particular case.

Some **chronic forms of diabetes mellitus** are ameliorated by an ocean voyage, especially those cases that occur in elderly persons and those partly due to business cares and other mental disturbance or strain, benefit following from the relief from worry and the changed surroundings. In some instances of early diabetes in patients of the same classes the editor has seen benefit from a six weeks' or three months' trip upon the sea. The winter voyages to warm regions—for example, the cruise from New York to the West Indies or that from New York to the Mediterranean ports—are those that he recommends in such cases. The patients must be cautioned, however, not to expose themselves on land excursions to any danger of chilling, and care must be taken to arrange for a suitable dietary.

By improving the general health, sea voyages may be of considerable utility in some cases of **chronic catarrh of the urinary bladder**, in the **chronic results of gonorrhoea**, and in minor forms of **impotence**; in the last-mentioned cases, however, the necessary temporary abstinence from attempts at sexual intercourse probably augments the beneficial action of the sea voyage. In **dipsomaniacs** prolonged voyages on ships where alcoholic drinks cannot be obtained may effect a cure, for a time at least.

Certain **precautions** of a general nature must be observed in the therapeutic use of sea voyages. Patients should remain in the pure air of the deck as long as possible, and should always be warmly clothed. A tendency to sea-sickness may sometimes be overcome by not giving way too readily, and by leaving the close cabins for the open deck. Often a timely enema will bring an attack to a close,

although cathartic drugs have failed to produce any effect. Great moderation in diet, together with the use of aperients, is necessary in many persons to prevent constipation and biliousness during the voyage. It is always well to empty the bowel by a dose of calomel the day before going on board, and by taking a brisk saline the morning of sailing. The use of strychnin or of picrotoxin in doses of $\frac{1}{100}$ of a grain every hour for ten or twelve hours daily, during two or three days preceding departure and for the first week of the voyage, is highly commended by some physicians, and the editor believes the practice to be beneficial in many cases. In his experience, phthisical patients are less liable to sea-sickness than is the average landsman. Exercise should be indulged in as much as the conditions on board ship allow, and the skin should be cared for by regular and systematic baths, friction, etc. In addition to the care in choosing vessel and cabin, already emphasized, due attention must be given to the matter of congenial companionship and to the provision of sources of intellectual interest and means of occupation as recovery progresses and the inclination to mental activity returns. This is especially necessary when prolonged voyages are undertaken.

Certain affections or morbid tendencies are unfavorably influenced by ocean voyages, and their existence must be taken into consideration in weighing the advantages or disadvantages of a sea trip in the individual case. Thus in **gouty patients** the attacks and exacerbations are, on the whole, more frequent at sea than inland; the appetite and metabolism are probably increased, so that the work of the kidneys, liver, skin, and intestines is augmented in getting rid of the waste-products; and these organs are sometimes unequal to the increased demand. This possibly explains the tendency to bilious disorders and neuralgic and gouty attacks produced in some persons by sea air. **Hemorrhoids** not rarely manifest themselves during sea voyages, being due, perhaps, to insufficient exercise, overeating, and the scarcity of fresh vegetables.

Counterindications to Sea Voyages

Voyages should not be recommended to patients suffering with cholelithiasis or chronic catarrhal disorders of the stomach and

intestines, especially when originally induced by habitual overindulgence in food and drink. In chronic congestion of the abdominal organs from various causes great caution should likewise be observed.

Sea voyages are counterindicated when they cause a continued tendency to sea-sickness and when the diet on board ship leads to persistent loss of appetite ; when there is great general weakness ; in all grave diseases of the heart and blood-vessels ; in the great majority of cases of advanced tuberculosis ; when there is a marked tendency to hemoptysis ; in epilepsy ; when there is a tendency to maniacal attacks ; in periodic insanity ; when there is an inclination to commit suicide ; when the strong light on the sea cannot be borne ; and in the rare cases in which a sea trip produces insomnia.

CHAPTER II

MEDITERRANEAN CLIMATES

The Western Riviera. The Eastern Riviera. Southern Italy. Sicily. Corsica. Malta. The Balearic Islands. Venice. The Austrian Coast. The Ionian Islands. The Eastern Part of the Mediterranean and the Black Sea. Algiers. The Coast of Morocco.

There is a great diversity in the climates of various parts of the Mediterranean coast, and for this reason, as well as for convenience, they have been arranged in different groups. They are all, however, under the influence of the Mediterranean Sea, which differs from the Atlantic Ocean in being free from polar currents, these being excluded by the shallow Straits of Gibraltar. Beyond the Straits the temperature reaches only about 36° F. at a depth of from 1500 to 2000 fathoms. In the deepest waters of the Mediterranean, at a corresponding depth, the temperature rises as high as about 55° F. It is chiefly owing to the warmth of the waters of the Mediterranean that the health resorts along its shores are in general warmer than other regions at a similar latitude. At different points along the coast the shelter from winds varies according to the proximity, size, and configuration of the mountains that extend over a considerable portion of the coast. The amount of rainfall depends largely on the same conditions, and is peculiar in character, an almost rainless summer being followed by a rainy autumn, and, in some places, by heavy rainfall in winter. The humidity of the air varies widely at different times of the day, particularly in warm, bright weather and in the relatively drier climates of the Western Riviera, where the sudden coolness and dampness that occur at sunset necessitate great care on the part of invalids. The far-famed Western Riviera constitutes the first group of Mediterranean climates to be considered.

THE WESTERN RIVIERA

The 'Riviera,' or 'Western Riviera,' or 'Riviera di Ponente,' is the narrow strip of coast-land between Toulon and Genoa. It is from 43° to 44.5° latitude north. It is mostly from one to four miles in width, open to the Mediterranean on the south and southeast. It has a dry soil,—chiefly of chalk,—and is sheltered more or less by mountain ridges on the northeast and northwest. The position of the various localities on the bays and headlands and the nearness and configuration of the mountain slopes behind them give rise to considerable differences in the character, force, and frequency of the winds to which they are exposed. Excellent descriptions of the Riviera climates and health resorts have been given by Henry Bennet, C. T. Williams, E. I. Sparks, M. G. Foster, and others.

The **chief characteristics** of the Riviera climate are its winter warmth, its relative dryness and small number of rainy days, and its brightness—qualities that render it cheering to the mind and stimulating to the body. The mean temperature for the three cold months (December to February) is from 47° F. to 49.8° F. For the six winter months (November to April) it averages about 51° F., the mean relative humidity being about from 65 to 70 per cent. of saturation. The rainfall amounts to from twenty-eight to thirty-one inches during the year, a great part falling during October and November. During the six winter months one hundred days or more may be expected to be fine enough for most invalids to be in the open air for several hours. At some parts of the coast direct reflection of light and heat from the rocks contributes to the warmth of the climate. From this circumstance Beaulieu has obtained the name of 'Petite Afrique,' 'Little Africa.' As everywhere on the seacoast, the alternation of the land- and sea-breezes causes sufficient circulation of the air.

Among the **unfavorable features** of the Riviera should be mentioned the frequency of high winds and the troublesome dust, very little of the latter, however, being of an organic nature. The winds are worst in the spring, when they assume more or less the character of the well-known mistral, mentioned in Part I. The great difference between the temperature in the sun and that in the shade,

and the rapid fall of temperature, with increased relative humidity of the air, at sunset, are in so far disadvantages that they increase the danger of chill. Invalids must return home before sunset, although some of them may go out-of-doors again afterward. Mosquitos too may prove a nuisance, but in these localities are not a serious detriment. Visitors who expose themselves unduly to chills are likely to contract ordinary 'colds' or suffer from bronchial catarrh, or, still more frequently, from attacks of diarrhea, colitis, or, sometimes, colitis with dysenteric symptoms. Many of the evils attributed to the climate of the Riviera would be avoided if patients would seek advice and obtain direction from a local physician at once on their arrival, instead of waiting, as is so often the case, until a cold or an exacerbation of their illness compels them to do so.

The Riviera **season** lasts from the end of October to the end of April, but most invalids from the north of Europe should not return to their own climates until the beginning of June. They should spend some weeks at a so-called intermediate station, such as Montreux, Glion, Lugano, Locarno, Villa d'Este, Cadenabbia, Menaggio, Varese, and some other places on the Swiss and Italian lakes. A sheltered inland resort, such as Baden-Baden, may likewise serve as an intermediate station for this purpose.

The **patients** for whom the climate of the Riviera is **best suited** are those who require more sunlight, warmth, and dryness of air and a more open-air life than they can obtain in colder winter climates. Among these patients are many persons of relatively weak constitution, and those whose powers of resistance have been temporarily or permanently diminished by previous disease, injuries, or old age. In such cases the warmer winter climate, the longer time that can be spent in the open air, and the psychic effect of the sunshine and flowers, increase the mental and physical activity and improve the general health. The Riviera is likewise suited for ordinary **chronic pulmonary tuberculosis, catarrhal conditions of the respiratory organs**, the lingering effects of **pleurisy** in feeble persons, and a variety of **chronic affections associated with deficient powers of reaction**. The nature of the disease is not, of course, exclusively to be considered, but the individual peculiarities of the patient must be studied. Owing to the action of the climate on the

nervous system, excitable patients may suffer from sleeplessness, and neuralgic and mental disorders may be aggravated; disadvantages that are felt less at places situated on elevated ground, somewhat remote from the shore, like Grasse, and in the sunny and less windy climate of Pau. Patients with **dry catarrh of the respiratory organs** and **laryngeal irritability** will find the moister climates, such as Ajaccio and Madeira, more suitable. In regard to **phthisical cases**, when there is no special irritability or other reason to prefer a moister climate, such as Madeira, the Riviera is suitable for those for whom high altitude resorts are too cold, but who are well able to travel and who do not require a still warmer and drier winter climate, such as that of Egypt. A drawback in regard to phthisical patients is the tendency they have to live after the manner of the ordinary pleasure-seeking visitors who frequent the Riviera. The institution of sanatoriums where patients could be placed under strict medical control, would overcome this drawback.

HYÈRES.—This place is beautifully situated, about three miles from the sea, and has a luxuriance of southern vegetation and as fine palms as are to be found on the Riviera. A disadvantage is that the mountain barrier on the north is not complete, thus giving ready access to the northwest wind, or 'mistral.' During the spring, therefore, when this wind is common, Hyères is less suitable for delicate invalids than are the more sheltered localities on the Riviera. For excitable, nervous persons, the distance from the sea is an advantage. Sea air and air from the snow-covered mountains are both felt less than at Nice, so that, as Sturge points out, Hyères occupies an independent therapeutic position among Riviera resorts. Sir H. Weber has known many patients to be relieved of **nervous cough**, **asthma**, or **neuralgia** at Hyères, with whom San Remo, Mentone, Bordighera, or Cannes did not agree.

COSTEBELLE, about two miles south of Hyères, lies nearer to the sea, and, owing to the trees, is better sheltered from cold winds; it is also somewhat less dry. It possesses only hotels, and is finely situated near the top of the southern slope of a hill, in the eastern part of Mont des Oiseaux, covered with pine and 'maquis.' It is thus tolerably protected from the northwest wind (mistral), but less so from the northeast wind; the latter, however, is not so fre-

quent, and is, on the whole, less injurious at this part of the coast than is the northwest wind. On the peninsula of GIENS, to the south of Hyères, is a sanatorium for **scrofulous children**.

ST. RAPHAEL lies on the coast of the bay of Frejus, and is not entirely protected from cold winds. The breezes that prevail prove welcome during the hotter months. VALESCURE lies a little further inland, on sloping ground, to the northeast of St. Raphael; it is fully exposed to the mistral, but the Esterel hills, picturesque reddish crags between Cannes and St. Raphael, afford a slight protection from the northeast winds; the pine trees are too widely scattered to afford shelter. These places are both somewhat colder than are the health resorts of the Riviera further eastward.

CANNES, brought into favor by the first Lord Brougham, is one of the most attractive spots in Europe, and has increased very much in size during the last twenty years. It is a large town,—the largest of the mere health resorts on the Riviera,—and presents somewhat different varieties of climate in its various quarters. Its sea-frontage is very extensive, and looks toward the south. Cannes lies on two bays, an eastern and a western, that are separated by a promontory with a hill, on which the old town is built. In scenery the western bay is the finest, but the eastern is somewhat better sheltered from the mistral. The houses of the eastern part of Cannes extend further inland and stretch out for two or three miles among the pine trees on the slopes of the hill toward Antibes. The coast is studded with villas from La Bocca on the west, to near Antibes on the east—that is, for five miles or more. Invalids who find it harmful to live too close to the sea may reside at one of the hotels or villas further inland—for instance, in the somewhat more elevated region of Canet, two miles north of Cannes. Cannes is not sufficiently sheltered for very delicate patients who cannot endure winds. These patients are more comfortable in localities that are better protected, such as the eastern bay of Mentone and Beaulieu. On the other hand, though high winds are not rare (particularly the mistral in February and March), the bracing character of the climate is an advantage in most cases.

GRASSE, celebrated for its luxuriance of flowers and its manufacture of perfumes, is beautifully situated on the hills, at an altitude

of about 1000 feet, nine miles inland from Cannes, and is sheltered by considerable heights from the west, northwest, north, and northeast. The air is fresh, the views and walks are delightful, and the accommodations at the Grand Hotel are good. In regard to shelter, Grasse has the advantage over Cannes. Many cases of **insomnia**, **neuralgia**, and **asthma** are relieved at Grasse after having been aggravated at the seashore. Patients who have been spending the winter in the lower and hotter parts on the coast will find Grasse a useful intermediate station during the spring. It is connected by railway with both Cannes and Nice.

ANTIBES, on the coast between Cannes and Nice, to the east of the small headland of Antibes, is not sufficiently sheltered to be suitable for delicate invalids, but for many persons who require open-air life and rest from mental work, rather than any special protection from winds, it is well suited. It commands a beautiful view of Nice and the Baie des Anges.

NICE has a bright and invigorating climate, the mean temperature for the three winter months being 48° F., but its high winds¹ and the fact that it is the largest town on the coast and a great winter pleasure resort, attracting especially the gay class of visitors, render it unsuitable for most invalids. The Promenade des Anglais,—*i. e.*, the magnificent sea-front of the western or newer quarter,—as well as the greater part of the town, is much exposed to winds and dust, but the suburbs of Carabacel and Cimiez are more sheltered, further removed from the sea, and somewhat less dusty. They are more suitable for nervous and delicate persons who suffer from **digestive disturbances**, **insomnia**, etc., when residing at the seashore. Cimiez, about three miles to the north, is situated on higher ground than Nice, and, in a general way, bears a relation to Nice similar to that which Cannel does to Cannes. On the whole, Nice offers great advantages to the large class of persons, including most of those with **senile debility**, who require merely a dry, sunny climate with social attractions and facility for outdoor recreation. During the warmer weather there is good sea-bathing to be had at Nice.

¹ The lofty mountain ridges, which are especially near the coast at Nice, are covered with snow during the winter months, and probably, as Dr. Sturge points out, exercise a great influence on the winter climate of the town, giving it some of its bracing quality.

The temperature of the sea-water in winter is generally between 53° and 61° F., and in summer between 64° and 75° F.; the lowest recorded temperature seems to be 46.4° F.¹ The water of the Mediterranean is slightly more salt than that of the Atlantic Ocean and the North Sea, and about twice as salt as the average Baltic water, or still more so. On most parts of the Mediterranean coast, just as on the Baltic, there is no regular tide, and bathing arrangements are thus facilitated.

VILLEFRANCHE (Villafranca) is situated in the bay of Villefranche, and is better sheltered and warmer than Nice. The Villefranche railway station is two and a half miles distant from Nice.

BEAULIEU, one mile further on the railway between Nice and Monte Carlo, is a small strip of land between the sea and high rocks, which shelter it from the north and northeast and partly from the northwest. It is famed for its olive, lemon, and orange trees, and the irradiation by the sun's rays, partly reflected from the grayish rocks, has given to Beaulieu the title of 'Petite Afrique.' The villa of the Marquis of Salisbury helps to give the place a special interest for the English.

EZE (Italian, Eza), the next station on the way to Monte Carlo, is situated on a very limited strip of ground, which is, perhaps, even better sheltered than Beaulieu. Behind it rise the steep rocks (about 1300 feet above sea-level) on which is situated the old village, with the picturesque ruins of a castle founded by the Saracens in the ninth century.

MONTE CARLO has a sheltered position and abounds in very beautiful scenery. It forms the eastern side of a bay, of which the western side is the lofty rocky headland crowned by the picturesque old castle and town of Monaco. LA CONDRAMINE, facing south between the promontories of Monaco and Monte Carlo, lies on the shore and on the slopes of a semicircle of hills. In regard to climate, the bay of Monaco rivals the eastern bay of Mentone. Although the gaming tables that make Monte Carlo famous interfere with its usefulness as a health resort for serious cases, the gay and varied life is an advantage for some persons. LA TURBIE, at

¹ Figures from information kindly furnished by Dr. J. E. Brandt.

an elevation of 1600 feet, and the magnificent scenery of the famous 'Corniche' road between Nice and Mentone, may be reached by a short excursion on the mountain railway from Monaco.

MENTONE (Menton).—J. H. Bennet, the founder of the English colony at Mentone, introduced the place to the English public by his writings on the Riviera, and it is now probably the best known genuine health resort of the Riviera. The mean temperature for the six winter months, November to April, is about 51.5° F. A rocky promontory on which the old town is built divides the bay of Mentone into an eastern and a western portion. The western bay of Mentone is not so well sheltered as the eastern bay, but, owing to the hills being less steep and more distant from the sea, there are more walks, and invalids have the opportunity of living further from the shore.

On the other hand, the eastern bay of Mentone shares with Beaulieu the advantage of being the most sheltered and warmest winter resort on the Riviera. The strip of land along the shore is, however, very narrow, on account of the proximity of the steep rocky slopes to the sea, and consequently there is no choice of walks and the dwellings are all close to the water. In spite of its advantages for invalids who particularly require the greatest degree of warmth and shelter that the Riviera has to offer them, many find it relaxing, and the western bay is preferable for the majority of visitors. In the VALLEY OF GORBIO, two and a half miles from Mentone and the seashore, in a sheltered position on the side of the valley, at an elevation of 820 feet above sea-level, the Gorbio **sanatorium for consumptive patients** has been established. The unhygienic but picturesque and ancient town of Gorbio is situated on a hill much higher up the valley.

CAP MARTIN, in the commune of Roccabruno, between Mentone and Monte Carlo, two miles west of Mentone, should be mentioned, as it now possesses one of the best hotels on the Riviera. It lies at an elevation of about 150 feet above the Mediterranean, and is surrounded by a large pine forest with an undergrowth of rosemary, myrtle, lentiscus, cistus, etc. It has the great advantage of being almost free from dust, and exercises a more soothing influence on the nervous system than does either Mentone or Monte

Carlo. The pine forest, with its undergrowth, gives shelter from wind and sun and lends fragrance to the air. If the land were to be had, good sites could be selected in this neighborhood for sanatoriums for cases of serious pulmonary disease.

VENTIMIGLIA, an interesting, steep, cramped old Ligurian town, with a more modern district, is the first railway station on the Italian side of the frontier. It is not a health resort, and the valley of the Roya, running north and south, gives free access to the north wind.

BORDIGHERA, the nearest health resort on the Italian side of the frontier, is somewhat more exposed than the eastern bay of Mentone, and, on the whole, has a more bracing climate than Mentone and San Remo. It is increasing in size. The newer hotels and villas lie away from the sea, in olive plantations, at the foot of hills that afford protection from the north and east; a mountain spur likewise shelters them from the northwest winds, to which the seaside portion of the place, containing the railway station, is exposed; they are, therefore, more sheltered and less dusty. The villas of the neighboring Borghetto are protected from the wind. The mistral is said to reach Bordighera as a deflected wind from the west, modified by its passage over the sea. To the east of the health resort is the picturesque old town of Bordighera, on a steep hill rising from Capo San Ampeglio. The palms and olives of Bordighera are famous.

OSPEDALETTI, about half-way between Bordighera and San Remo, is spread out along the shore in a sheltered position, where the strip of coast-land is narrower than at Bordighera.

SAN REMO, eight miles to the east of Bordighera, consists of the quaint old Ligurian town, built on an eminence, and the visitors' quarters, the real health resort, on each side, situated in the midst of olive groves. The mean temperature for the three winter months, December to February, is 48.1° F. For the six winter months, November to April, it is about 50.5° F., rather lower than that of Mentone; the mean relative humidity is about 68 per cent. of saturation. The bay has a southerly, or rather a somewhat southeasterly, frontage. It is well sheltered from the north and northwest, so that the mistral is not so much felt; the east wind,

however, is frequent. Many new hotels and villas have been erected, both in the eastern and the western portion of the town, partly perhaps since the late Emperor Frederick made a trial of the climate. The eastern portion is that most frequented by Germans; the western, by the English. San Remo is as suitable as any other resort on the Riviera for most **pulmonary cases**, but invalids requiring a special amount of shelter will generally fare better on the eastern bay of Mentone or at Beaulieu. H. Weber believes that **chronic rheumatic subjects** more often derive benefit at San Remo than at the other Riviera resorts.

ALASSIO, twenty-eight miles from San Remo, lies amid beautiful scenery, on a portion of coast having a southeasterly frontage. The old town proper, with the hotels and most of the villas, is close to the sea, but the surrounding semicircle of hills, especially the slopes facing the south and southwest, already partly occupied by villas, afford warmer and more suitable sites for delicate invalids during winter, the town itself being exposed to the east and northeast. Alassio has not increased in size nearly so much as San Remo. The cost of living is as yet less at Alassio than in England. During a summer season of about eight weeks' duration the place is thronged with Italians who visit it for its sea air, its sandy shore, and its good bathing.

PEGLI, six miles west of Genoa, is, for convenience, included in this group, but climatically, as well as geographically, it occupies a kind of half-way position between the western and the eastern Riviera. It has a more equable and sheltered climate than Genoa (see chapter on Large Towns of Europe), which is windy and rainy, but is distinguished by the greater relative humidity of its climate from the Riviera resorts further west. Pegli faces nearly due south, and is fairly sheltered from the north and northwest, and though its accommodations and medical arrangements are insufficient for serious cases, it is suitable for patients requiring but little attention, and may be used as an intermediate station in spring by persons who, after wintering at one of the more western resorts, are on their way to the Swiss and Italian lakes. Owing to the excellent electric tramway connection, Pegli has become practically a suburb of Genoa.

THE EASTERN RIVIERA.

The 'Eastern Riviera,' or the 'Riviera di Levante,' comprises the coast of the Gulf of Genoa (44.5° to 43.5° latitude north), from the termination of the Western Riviera at Genoa, to Pisa. The winter climate of this district is, on the whole, moister and colder than that of the Western Riviera, but somewhat warmer and drier than that of Venice and the Austrian Adriatic localities (Abbazia, etc.). The coast-line of the Eastern Riviera has a southern or south-western aspect, and, except at Nervi, the wall of sheltering mountains is less complete and further removed.

NERVI, seven and one-half miles from Genoa, is the most important health resort of the Eastern Riviera. The proximity of the mountains to the shore is an advantage as regards shelter from winds, but helps to limit the walks for invalids. The mean daily range of temperature for December is said to be only about 4.7° F. The mean temperature for the three winter months seems not to be agreed on, but is probably slightly higher than that of the neighboring city of Genoa (47.4° F.). Nervi is sheltered from the northwest, north, and northeast, but is somewhat exposed to the southeast wind (sirocco), which is felt chiefly in November. On the whole, in regard to shelter and natural advantages, this health resort rivals the majority of localities on the Western Riviera. One of the principal features of the place is the path constructed along the picturesque rocky coast, well sheltered and entirely free from dust; it is one of the finest seaside walks of its kind in Europe, and resembles the longer one at Abbazia. Most of the land belongs to private villas of wealthy Italian noble families, but the Eden Hotel, well situated on the slope, and some other hotels, afford good accommodations for the visitors, who, at present, consist chiefly of Germans. Some of the villas at Nervi lie high up on the hills, away from the shore. Nervi is better sheltered than Pegli, and its evergreen foliage is finer; owing to the excellent electric tramway connection, Nervi, like Pegli, may be regarded as a suburb of Genoa.

Further on the way to Pisa we pass SANTA MARGHERITA, ten miles from Nervi, and, close to it, RAPALLO, considered by some

the most beautiful locality on the Eastern Riviera. These places both lie on the bay of Rapallo, and are sheltered on the north. Next we come to CHIAVARI and SESTRI-LEVANTE, and, further on, to SPEZIA, which is half-way between Genoa and Pisa. Spezia is an important port and naval arsenal, besides a summer bathing resort and climatic winter station. It is situated on the somewhat level ground bordering the gulf of Spezia, and faces southeast. A semi-circle of mountains protects it from cold winds. Its public promenade, called the 'Marina,' and the good roads in the vicinity are advantages for invalids. The mean winter temperature—December to February—is 46.6° F. VIAREGGIO, thirteen miles from Pisa, is used for sea-bathing during summer and as a climatic resort in winter. It lies on flat ground, with hills at a considerable distance to the east, but it has the advantage of being partially surrounded (from northeast to southwest) by a large pine forest, the 'Pineta,' that affords protection from winds during the cold months, and from sun during the hot months. For delicate invalids, however, none of these resorts rivals Nervi.

PISA now lies six miles from the sea, and hence is not, strictly speaking, a marine health resort. It is less frequently recommended as a winter resort than it was in former years. Its mean winter temperature is about 4° F. below that of the Western Riviera. It lies on flat ground, with the Pisan Hills at some distance. The shelter afforded by these hills is defective, owing to the gap to the east, through which the Arno flows, and cold winds are less rare than they were formerly reputed to be. The relative humidity is rather high,—about 75 to 80 per cent. for the winter,—and the annual rainfall has been reported as about fifty-one inches. The sky is not seldom cloudy, but fogs are almost entirely absent. There is less sunshine than on the Riviera coast, and the facilities for outdoor exercise are not very good. On the whole, Pisa may be said to have a fairly equable, moist winter climate, with little wind, but relatively rather dull. At the mouth of the Arno is a small sea-bathing resort—BOCCA D'ARNO. The great Tuscan port of LIVORNO (Leghorn), eleven miles from Pisa, furnishes a season of sea-bathing for Italians.

Further southward is the Tuscan island of **Elba**, between the coast of Tuscany and Corsica. The scenery of Elba is mountainous

and varied. Monte Capanne, the highest point of its mountains, reaches 3340 feet above sea-level. PORTOFERRAJO (latitude $42^{\circ} 48'$ north), the chief town, is beautifully situated on a bay at the north of the island, and has a mean temperature of 49.5° F. for the three winter months, but is too windy a place for delicate invalids. In the warmer months there is sea-bathing. Portoferrajo is reached in five and one-half hours by steamboat from Leghorn, and in two hours from Piombino.

SOUTHERN ITALY

NAPLES (latitude $40^{\circ} 46'$ north), owing to its beautiful position and its historic associations, has irresistible attractions for many persons, and may be chosen as a resort for distraction and recreation. The accommodations are good, and the city has become much more healthful since the drainage has been improved and the overcrowding in the poorer quarters diminished; especially since 1885, when a pure water-supply was obtained from the Serina springs, which in Roman times were used for the famous Claudian Aqueduct. The mean temperature for the three winter months is 48.1° F.; for the three summer months, 73.7° F. There is a good deal of rain, and very poor protection from winds; the 'tramontana' (north wind) is the one most prevalent. The months in which most rain falls are October and November. In January, the coldest month (mean temperature about 46.8° F.), there is relatively little rain. On the whole, dry, sunny weather during winter is the rule. The residences on the southeastern slope of the ridge extending from the Castel San Elmo to Posillipo, especially those near the Corso Vittorio Emanuele and the Via Tasso, are preferable to those in the lower sections.

CASTELLAMMARE DI STABIA and SORRENTO are pleasant resorts for spring and autumn, but are exposed to cold northwest winds, which blow especially in spring. Their position on the southern coast of the bay of Naples shelters them from the south winds, owing to the high mountain ridge extending from Monte San Angelo to Punta di Campanella. The accommodations at both resorts are good, and their sunny climate will prove attractive to persons returning to northern Europe in April, after having spent the winter months

in Egypt or Algiers. The Hotel Quisisana and the neighboring houses have an excellent situation on the high ground above Castellammare. Castellammare is also used by the Italians as a mineral water health resort and a sea-bathing place during the summer.

AMALFI, on the northern shore of the bay of Salerno, is partly protected from the cold north wind by the mountains behind it, and therefore affords better shelter in the spring, when the tramontana occurs most frequently, than do the previously mentioned localities on the bay of Naples. It is one of the sunniest towns in Italy, its situation being healthful and its winter climate exhilarating. The accommodations are good, but more limited than those to be obtained at Naples and Sorrento. There are few level walks excepting on the dusty highroad, which constitutes a disadvantage for some patients. The twelve miles of coast-line between Amalfi and Salerno offer several picturesque sites having similar climatic advantages, but they are as yet without good hotels.

SALERNO itself has lost its fame as a health resort, owing to its defective hygienic arrangements and the risk of contracting malaria. LA CAVA DEI TIRRENI, 980 feet above sea-level and six miles inland from Salerno on the railway to Naples, is a spring, summer, and autumn resort of more healthful character, although Dr. Johnston-Lavis reports that it is windy, cloudy, and dusty in the winter. The neighboring CORPO DI CAVA is situated higher up, in the midst of woods. The islands of ISCHIA and CAPRI are too much exposed to be used as climatic resorts for invalids during winter; they are, however, beautiful places for those who seek recreation. Ischia has several thermal springs, famous since ancient times, as well as natural vapor baths and excellent facilities for sea-bathing in summer. It was celebrated for the therapeutic use of hot sand-baths in **chronic affections of the joints, etc.**, but in recent times this method of treatment has been introduced at several spas on the Continent of Europe.

SICILY

Sicily possesses advantages for the same class of cases as does southern Italy. The brightness of its climate and the historic and antiquarian interest of its towns should be useful in many cases

requiring merely change and recreation, for persons who have developed **glycosuria**, in **mental depression** from business worry and brain fatigue, and for old persons whose brain and other organs are likely to derive healthy stimulation from the objects of interest.

PALERMO, CATANIA, SYRACUSE, and ACIREALE are too hot in summer for natives of northern regions, and in winter are sometimes too much exposed to winds. Their cheerful character, however, acts favorably on the nervous system, and thus counterbalances the disadvantages of wind and dust, except in the case of the most delicate invalids.

GIRGENTI, the ancient Agrigentum, will one day, when better accommodations have been provided, take a prominent place among this class of health resorts. In regard to beauty, all resorts must yield to TAORMINA, the ancient Tauromenium, which is situated on an abrupt hill on the eastern coast, about 380 feet above Giardini, a station on the railway between Acireale and Messina. The hill on which it lies is continuous with the northeastern slopes of Mount Etna. The views of the sea and opposite shores of Italy are magnificent. The elevation of Taormina above sea-level is an advantage for some persons; so, likewise, are the slight elevations of Acireale and parts of Palermo.

TERMINI-IMERESA, on the northern coast of Sicily, the 'Thermæ Himerenses' of the Romans, twenty-three miles from Palermo, possesses hot muriated waters, and although the thermal establishment is small, the place may in the future become a useful health resort.

Near PALERMO (latitude $38^{\circ} 6'$ north), the capital of Sicily, a **sanatorium for consumptives**, the VILLA IGIEA, has recently been opened; it is beautifully situated on the coast to the north of the city, in the famous Conca d'Oro. It faces south, and is sheltered at the back by Monte Pellegrino, which protects it from the north wind. The apartments for patients are all in the front of the building, looking out on the sea.

The mean temperature for January ¹ is 51.6° F. at Palermo and

¹ See "Sicily as a Health Resort," "Lancet," June, July, August, 1897. According to Hann, the winter monthly means at Palermo are 54.1° F. (December), 51.8° F. (January), 52.7° F. (February).

49.5° F. at Catania. Catania and the east coast of Sicily have a slightly colder and drier winter climate than Palermo. The hot sirocco, which is supposed to come from the dry African desert, having picked up its moisture in crossing the Mediterranean, is an occasional disagreeable and depressing factor of the Sicilian climate, but it is rare during winter.

In regard to temperature, the winter climate of Palermo and the coasts of Sicily takes an intermediate position between that of Egypt and that of the Riviera. It is colder, moister, and more equable than that of Cairo, and warmer, moister, and more equable than that of Nice. Owing to its relatively high degree of humidity, however, it is better compared with the climate of Corsica (Ajaccio) and of the Canary Islands and Madeira. The winter temperature of Palermo is slightly higher than that of Ajaccio, but lower than that of Orotava in Teneriffe and Funchal in Madeira. In relative humidity the climate of the Sicilian coast probably corresponds to that of Ajaccio on the west coast of Corsica; the latter is, however, rather more sheltered. The climate of Madeira is, of course, much moister than that of either Ajaccio or Sicily.

CORSICA

AJACCIO (latitude 41° 54' north) has an equable, moist, warm winter climate, considerably moister than that of the Riviera. The mean temperature for the three winter months has been variously estimated as about 49.7° to just above 52° F., which is slightly higher than that of Riviera localities, while the relative humidity is about 80 per cent. Although the humidity is high, the number of clear, fine days is great and there are only about fifteen thoroughly rainy days in the three winter months. The town lies on the northern shore of the gulf of Ajaccio, which is open to the Mediterranean on the southwest. It is almost completely protected from north and east winds by the mountains behind it, the mild winds from the southwest being prevalent. Besides the shelter from wind, the freedom from dust and mosquitos, the situation on granite, and the beautiful walks and drives in the neighborhood must especially be noticed. The air has a peculiar aromatic odor,

due to the dense 'maquis,' or Corsican 'bush,' that covers all the surrounding hills, and is composed chiefly of arbutus, cistus, lentiscus, lavender, rosemary, myrtle, and heath. Napoleon is reported to have said, while at St. Helena, that with eyes shut he could recognize Corsica by the aroma of the air. The accommodations at Ajaccio are excellent and somewhat less expensive than is usual on the Riviera. The principal hotels are situated at an elevation of several hundred feet above the sea.

Only such patients should be sent to Ajaccio as are likely to tolerate the moist sea climate. The place is well suited for invalids whose disorder is not of too serious a character, and who do not require much supervision. As a winter station it has not as yet been visited much by English-speaking people, but many of the large class of persons who at present pass the winter at Cannes, Hyères, etc., might visit Ajaccio for a change, provided they be content with less gaiety and fewer social amusements. Indeed, some patients who, on the Riviera, suffer from **sleeplessness** and **neuralgic pains**, will find the more equable climate of Ajaccio more beneficial. The season best suited for invalids is from the beginning of November to the middle of April. Ajaccio is likely to come into more general use when better steamers are provided for the passage, from Marseilles, Livorno, or other ports.

Of the **mineral springs** in Corsica, those of OREZZA are best known. This place lies at an altitude of 1960 feet, among the mountains of the northeastern part of the island. The mineral waters are gaseous chalybeate, sometimes, however, containing a small quantity of hydrogen sulphid. They may be used for the same class of **anemic patients** as the waters of Spa, Schwalbach, etc. Besides Orezza, there are other localities in the mountains that can be visited during summer by invalids who need not be, and are not, very particular in regard to accommodations and medical supervision; the most important of these is the HOTEL DE LA FOCE, about 3500 feet above sea-level, in the forest of Vizzavona, two miles from the station of Vizzavona, on the railway between Ajaccio and Corte. The hotel is suitable as a summer residence for persons who wish to spend several years in Corsica without leaving it during the summer.

The SANGUINAIRES, small rocky islands outside the gulf of Ajaccio, have an extremely marine climate, which might perhaps be utilized in some cases if there were better accommodations.

MALTA

VALETTA (latitude $35^{\circ} 53'$ north), the capital of the island, has a warm, moist, and equable winter climate, but is too much exposed for those seriously ill. The mean temperature for the three winter months is about 56° F. There is practically no shelter from the violence of the winds, of which the northwest is the prevalent one. The damp, hot sirocco (southeast wind) often blows, especially in spring and autumn, and visitors complain of its relaxing effects. Valetta is picturesque and interesting, but though the water-supply and sanitation of the town itself have been improved, the drainage of the Sliema suburb is said to be defective. Its poor sanitary reputation, together with the violent winds, the absence of shade, and the scarcity of good walks are likely to keep invalids away.

THE BALEARIC ISLANDS

PALMA, the capital of Majorca, is built on a bay facing south, and is protected by the northwestern mountain chain from the cold winds to which the Balearic Islands are exposed. It has a warm, moist, equable winter climate, with a mean winter temperature of about 52.5° F., and may at some future time be visited by English invalids. The accommodation is limited.

VENICE

Venice (latitude $45^{\circ} 25'$ north) is not so warm as either of the Rivas and is too much exposed to winds. Its winter temperature is not much warmer than that of Meran and Montreux. The eastern Alps (the Friulian Mountains, etc.) on the north are too distant to afford protection, and the north and northeast (bora) winds are much felt during the winter and sometimes during the spring months. The promenades to the south of the town (Piazza San Marco, Riva degli Schiavoni, and Giardino Reale) are sheltered, however, to a certain extent by the town itself. Sudden changes between the

cold, dry north or northeast winds and the moist, hot south wind (sirocco) are trying to delicate patients, owing to the sudden variation in the temperature and moisture of the air. The mean temperature for the three winter months is 38.6° F.; for the summer months, 73.4° F. The mean relative humidity for winter is about 80 per cent.¹ The annual rainfall is about 35 inches, and the number of rainy days between the commencement of October and the end of April is about 50.

Venice does not quite deserve its former reputation in **phthisis**, but its freedom from dust is a great advantage, and cases of **arrested phthisis** with a tendency to irritable cough, and some cases of **nervous irritability**, may be recommended to Venice, especially in March and April, when other places also have great defects. The pleasantest month at Venice is perhaps May.

The good accommodations and artistic repute of so renowned a city should attract many persons in need of **recreation** only. Characteristic of the place is the absence of dust, noise, horses, carriages, carts, and cycles.

Certain **drawbacks** should be mentioned. The mosquitos are troublesome. Rheumatism is quite prevalent, and it is absolutely necessary for invalids to avoid rooms situated near the ground floor or deprived of direct sunlight. Pains, biliousness, and hemorrhoids in the goutily inclined and plethoric, are doubtless encouraged by the salt, damp air of the lagoon and canals and the general sedative action of the climate.

LIDO, a flat island forming part of the long barrier that separates the 'Laguna Viva,' surrounding Venice, from the open Adriatic Sea, may be regarded as part of Venice, for it can be reached in about a quarter of an hour by steamboat from the Riva. It has an excellent sandy beach on the open Adriatic, with a southeasterly aspect, and would be a capital sea-bathing resort for the warmer months were it quite free from malaria. Though there is a certain

¹ The mean relative humidity for the three winter months, December to February, may be compared with that of some other places, as given in Hann's "Klimatologie," second edition, 1897, vol. III, p. 57: Meran 78, Gorizia 74, Lugano 77, Cannes 72, Pau 74, Palermo 71 per cent.

amount of tide at this part of the Adriatic coast, the bathing establishment is a large wooden structure raised on posts, similar to those in favor on the German Baltic coast.

THE AUSTRIAN COAST

The localities on the Austrian Adriatic coast have a higher relative humidity and are rather colder than the Riviera resorts. Their climate is more changeable, and most of them are subject to disagreeable winds, especially the cold 'bora,' or northeast wind, worst in winter and early spring.

TRIESTE (latitude $45^{\circ} 40'$ north), at the head of the Adriatic, the chief Austrian seaport, is too much exposed to the bora during the winter season, and though it can be used for sea-bathing during the summer, is very hot and rather too large a town for a health resort. On the coast-land, about twenty miles to the northwest of Trieste, is the thermal muriated spring (100.2° F.) of MONFALCONE, alluded to in the "Natural History" of Pliny. Near Aquileia, on the north of the entrance of the gulf of Trieste, is GRADO, with a **marine sanatorium** for children; and on the southern shore of the gulf, one and one-half miles to the south of Pirano, are the sea-baths of PORTO ROSE.

GORIZIA (German, Görz), though twelve miles from the north Adriatic coast, may be mentioned here, as the climate is influenced by sea-breezes. It is a large town with an ancient castle, beautifully situated on the Isonzo, at an altitude of 280 feet, on a plateau surrounded by hills, except at the southwest, where it is open toward the coast. It is not far from the Italian frontier, and the language of the inhabitants is Italian. In summer the heat is rather oppressive. The mean winter temperature is about 39° F., the same as that of Venice and Arco, and somewhat warmer than that of Meran and Montreux. The relative humidity is about 72 per cent. (Reimer). There is fair shelter from cold north winds, but this shelter would be improved if the surrounding hills were clothed with pines. Though the winter climate is not a warm one, it is sunnier than that of England. The Austrian physicians recommend the place for its good air in **convalescence** from acute diseases,

some pulmonary affections, etc. The chief season is from February to April or May.

ABBZIA is the best known of the Austrian Adriatic health resorts. It is situated on the east coast of the peninsula of Istria, and commands a magnificent view across the gulf of Quarnero toward the port of Fiume and the islands of Veglia and Cherso. The strip of coast with an easterly or southeasterly frontage on which Abbazia and the neighboring health resorts of VOLOSCA and LOVRANA lie is called the 'Liburnian Riviera,' and is well sheltered toward the west by the heights of the Monte Maggiore (4580 feet); against the bora, or northeast wind, descending from the bleak plateau of the Karst,¹ the protection is deficient, though better than that at Fiume and Trieste. Following are meteorologic data, as given by Dr. Julius Glax, calculated from the records of fourteen years. Mean monthly temperatures, commencing with January: 40.6° F., 41.2°, 46.6°, 54°, 61.5°, 67.6°, 72.1°, 71.8°, 65.7°, 57°, 48.9°, 42.6°; mean annual temperature, 55.8°; absolute maximum, 96.8°; absolute minimum, 21.6°. The mean relative humidity is 78 per cent. for the year; 80 per cent. for winter. The annual rainfall is about 66 inches, and there are about five days in the year on which snow falls. The northeast wind (bora) is prevalent during winter, and the southeast (sirocco) during summer. The sirocco gives rise to no dust, but when it is violent, it may, by dashing the waves against the rocky shore, give rise to so much spray that Glax compares the air along the shore on such occasions to that of an inhalation chamber full of a pulverized muriated mineral water. We need not describe Volosca and Lovrana separately: the former adjoins Abbazia on the north; the latter lies about four miles to the south, but may, later on, by the building of more villas along the coast, become united with Abbazia, which, however, will remain the fashionable center of the group. The vegetation of the Liburnian

¹ The 'Karst' or 'Carso' is a dreary, undulating limestone plateau that extends from Gorizia to Fiume and Abbazia and can be well studied around the railway station of St. Peter (1900 feet above sea-level), between Gorizia and Fiume. The ground is strewn with fragments of limestone and poorly covered by grass, underwood, and small, recently planted pines. In former times pine forests probably afforded shelter from the 'bora,' which sweeps the Karst and has been known to overturn a loaded wagon.

Riviera is partly deciduous, but also consists partly, and at some places almost entirely, of evergreen laurels; here and there are pines. A characteristic of the whole region—and a very agreeable one—is the practical absence of mosquitos, just as at Ajaccio in Corsica. Abbazia can, likewise, boast of its pathway or promenade, constructed for a distance of three miles along the rocky shore, resembling the marine walk at Nervi, near Genoa. On the sloping ground near the health resort there are paths suitable for graduated uphill walking exercise ('Terrain-Cur'). Abbazia is much frequented during summer, when its establishments for sea-bathing are in great requisition. In winter, notably in February, it likewise attracts many visitors and invalids, and during fine clear weather is delightful. The mean temperature for the three winter months (about 41.5° F.) is rather higher than that of Venice, but in regard to warmth and dryness, the 'Liburnian Riviera' falls considerably short of the true (Western) Riviera. There is good hotel accommodation. A curious amusement at Abbazia is feeding the sea-gulls, which are almost as tame as the pigeons of St. Mark at Venice.

Along the eastern Adriatic coast, further south, are CIRKVENICA and the islands of LUSSIN (with the towns of LUSSIN-PICCOLO and LUSSIN-GRANDE), LISSA, and LESINA. Cirkvenica is reached in an hour and a quarter by ship, and three hours by carriage, from Fiume. It is protected by the Velebit from the cold bora, and by the island of Veglia from the hot sirocco. The sands are excellent for bathing. The islands of Lissa and Lesina have, of course, a rather more marine and equable climate than the actual coast; their mean annual and mean winter temperatures are naturally somewhat lower than those of Corfu. RAGUSA is a beautiful and interesting town, but is, unfortunately, exposed to the sirocco. Hann (1897) gives the following mean temperatures for the colder months, which we have converted into degrees Fahrenheit:

	<i>November.</i>	<i>December.</i>	<i>January.</i>	<i>February.</i>	<i>March.</i>
Lussin-Piccolo,	52.9	46.6	45	45.5	49.3
Lissa,	57.2	51.3	49.6	49.8	52
Lesina,	55.6	49.3	47.3	48.4	51.4
Ragusa,	56.8	50.8	48.6	49.8	52.9

THE IONIAN ISLANDS

The Ionian Islands have a higher mean annual temperature than the islands of the Austrian Adriatic. In summer they are too hot, and in winter the weather is too changeable to be adapted for real invalids. A place like Corfu, however, owing to its great beauty of scenery and the exhilarating effect of the sky, may well be made use of in some cases of **hypochondriasis**, **mental depression from overwork**, and **diminished resisting powers** from old age, especially during spring and autumn. Corfu can also be employed as an intermediate station between Egypt and central or northern Europe.

CORFU (latitude $39^{\circ} 37'$ north) lies on the eastern coast of the island of which it is the capital, and is about nine miles distant from the mountains of the opposite Albanian shore. According to the Austrian Adriatic Commission's Meteorologic Station (1868-'79), the mean annual temperature is 63.9° F.; the coldest month is January, with a mean temperature of 50.5° F., and the hottest month is August, with a mean temperature of 78.6° F. The mean temperature for the three winter months, as given by Hann, is about 51.6° F. A drawback of the Corfu climate is its raininess (the annual rainfall is about 50 inches, and the number of rainy days is about 104—chiefly in autumn and winter), but the rainy weather has one advantage—it renders the place less dusty than many health resorts in the south of Europe. The roads dry quickly after rain. There is much sunny weather. The winds are sometimes strong.

Corfu became much better known as a health resort when the late Empress of Austria chose Gasturi, about four miles from the town, as a winter residence. A good many consumptive patients formerly visited the island, but it can scarcely be said to be well suited to this class of cases. There is much pulmonary tuberculosis among the natives, and the disease is doubtless favored by the unhygienic dwellings of the poorer classes. At Corfu, as elsewhere, the establishment of a sanatorium for consumptive patients, under medical supervision, might be of great use.

Invalids of various classes who require little medical supervision might often be recommended to spend the winter in this beautiful place, where the accommodation is good and the excellence of the

roads, which were provided by the former English administration, allow of many pleasant excursions. Most of the walks are hilly. Corfu is reached in about twelve and a half hours from Brindisi, and in two days from Trieste. The best hotels are situated on a plateau about ninety feet above the harbor. A few villages situated on the hills might be used for summer residence—for instance, Agi Deká, about 900 feet above sea-level, facing toward the north.

Among the other Ionian Islands may be mentioned ZANTE, which has a similar climate but less satisfactory accommodation.

THE EASTERN PART OF THE MEDITERRANEAN AND THE BLACK SEA

ATHENS and CONSTANTINOPLE will be referred to in the chapter on Large Cities of Europe.

THE BLACK SEA

In the CRIMEA and at ODESSA, and in various places on the northern shore of the Black Sea, are brine lakes, or 'limans,' the salt mud from which is used for mud-baths. Such places can, therefore, independently of their climates, be regarded to some extent as health resorts. Sea-baths are employed at several of these localities.

ODESSA (latitude $46^{\circ} 22'$ north), the great Russian seaport, situated on a bay of the north coast of the Black Sea, is built on a terrace from 100 to 150 feet high. The mean temperature for the year is 48.5° F.; for January, the coldest month, 23.2° F.; for July, the hottest month, 73° F. The annual rainfall is only about 14 inches. Odessa possesses sea-bathing places, as well as three salt lakes (limans), with important establishments for furnishing mud-baths.

Among the Crimean resorts frequented for their mud-baths are SAKI, MOÏNAK, SEBASTOPOL, TCHOKRAK, and KERTCH. The so-called 'natural mud-baths,'¹ as administered at the old-established resort of Saki, are peculiar. The mud, taken from the liman on the previous day, is laid on a slab so as to form what is termed a 'medallion,' and is heated in the sun. On this medallion the

¹ See "Les Stations de Boues Minérales de la Russie d'Europe," by Professor A. Scherbakov, Moscow, 1897.

patient lies at full length, and the attendants rapidly cover him with the mud, leaving his face and neck free; in some cases, however, the thorax and abdomen are covered only by a folded sheet. A sunshade protects the patient's head, to which is kept applied a fresh-water compress, frequently renewed. In about twenty minutes or less the mud is washed off with warm salt water, and the face and delicate parts of the skin are bathed with fresh water. The patient is then wrapped up and must lie down for about two hours, during which time abundant sweating takes place. In wet weather, when, owing to the absence of sunshine, the 'natural mud-baths' cannot be prepared, the so-called 'diluted mud-baths' are given indoors. On the average, about twelve mud-baths constitute the course; these are often followed by brine baths and sea-bathing. More than one mud-bath is never allowed on the same day, and in delicate subjects the doctors prescribe one only every second day. They are given under strict medical supervision. The mean temperature of the natural mud-baths varies according to the sunshine, etc.; the outside temperature may rise to 122° F. or even higher. The Crimean treatment has a reputation in Russia for **muscular rheumatism, rheumatoid arthritis, and chronic articular affections, chronic affections of the pelvic organs in women, scrofulous conditions, and syphilis.** In the treatment of the last, ordinary antisyphilitic methods are usually associated. The physicians regulate the diet and general regimen of the patients undergoing the treatment.

THE MEDITERRANEAN

BEYROUT and its neighborhood are sometimes visited by invalids in the late spring. On the SLOPES OF THE LEBANON above Beyrout, H. Weber and M. G. Foster mention ALAI and BRUMENA as satisfactory resorts. Such places can be regarded as useful resorts during late spring, summer, and autumn for residents in the large cities of Asia Minor, and for some of those who have spent the winter in Egypt and do not wish to return to Europe at once.

ALEXANDRIA, owing to the influence of the Mediterranean, has a moister and more equable climate, with a cooler summer and slightly warmer winter than Cairo. The mean annual temperature

is 69° F.; the mean winter temperature, 60° F.; the mean daily range, only about 8° F. Though Alexandria itself is not a health resort in any sense of the term, RAMLEH, a modern resort on the coast, about four miles to the northeast, is a sea-bathing place during summer. Dr. Sandwith recommends Ramleh during April, when the weather often is pleasanter than in Cairo, in the case of invalids for whom Europe is not yet warm enough. Here, he says, they will find refreshing sea-breezes instead of the liability to the khamsin wind in Cairo, a temperature not too high, and a degree of humidity not excessive. Canney thinks Ramleh suitable in the first half of May, and regards April as the best month for invalids at Mena House and Helouan.

ALGIERS

ALGIERS, on the Mediterranean coast, about half-way between TUNIS and TANGIER, is situated in $36^{\circ} 45'$ latitude north—*i. e.*, just slightly further north than Malaga, in Spain, and slightly further south than the southern point of Sicily. The mean winter temperature from December to February is about 54.4° F. The mean temperature for the six winter months, November to April inclusive, which constitute the invalid's season, is said to be about 60° F., slightly lower than that of Funchal, in Madeira, and probably 1° or 2° F. higher than that of Catania and Palermo in Sicily, and about 10° F. higher than that of the Western Riviera. The humidity of the air is greater than that of the Western Riviera, and less than that of Tangier and Madeira. The daily range of temperature is greater than that of Madeira. The mean annual rainfall is 32 inches—three-fourths of it in the six winter months. The number of rainy days during winter is large,—about from 45 to 65,—but appears to vary much in different years. The rain, however, usually falls heavily and ceases suddenly, and, owing to the porosity of the soil, the ground does not long remain wet. The sirocco, a dry, hot, dusty, southwest wind from the desert, against which Algiers is not entirely protected by the mountains, seldom blows during the winter months; the prevailing wind is the northwest wind from the Mediterranean.

The old Moorish town of Algiers is not sufficiently advanced in its sanitary arrangements and drainage facilities to be recommended for invalids, but the MUSTAPHA SUPÉRIEUR not only adopts European methods of sanitation, but it occupies a better position than the old town. This favorite suburb lies on the slopes of the hills above the lower town; it faces the east, and is sheltered from the northwest by rising ground. Its hotels and villas afford excellent accommodations. The quarter of EL BIAR is higher and more bracing, but at present offers no hotel accommodation. The hills about Algiers are not dry and arid, as has been supposed by some, but are covered with flowers, heather, evergreen shrubs, eucalyptus trees, pines, etc. There are beautiful walks and drives in various directions. The weather is very uncertain, however, so that visitors during different winters may get totally different ideas of the climate.

Many cases of **emphysema**, **irritable cough**, and the lingering effects of **pleurisy** and **pneumonia** derive benefit from a winter season at Algiers. Early chronic cases of **phthisis** may sometimes be sent thither when, for any reason, high altitudes are not well borne, and both Egypt and the Riviera are too dry; but there is at present no sanatorium for such cases. **Aged and delicate persons** for whom an interesting, warm, sunny winter resort is all that is needed, might spend the whole or part of the season at Mustapha just as well as in Egypt or on the Riviera.

BLIDA, a station on the railway between Algiers and Oran, about thirty-one miles to the southwest of Algiers, is beautifully situated at the foot of the Lesser Atlas range. It is more bracing and less sheltered than Algiers, and is a good place during March and April for a change after leaving that town. There are pleasing walks and fair hotel accommodation.

HAMMAM R'IRHA, about sixty miles southwest of Algiers and about fifteen miles from the coast, is situated on a terrace of the Lesser Atlas Mountains, at about 2000 feet above sea-level, an hour's drive from the station of Bou-Medfa, on the railway between Algiers and Oran. The mean temperature for the six winter months, November to April, is said to be about 55° F.—that is, 5° lower than that of Algiers. The difference between the

winter and the summer mean is relatively small. The shelter is not very perfect, and the cold northwest wind is sometimes severely felt. The number of rainy days is considerable.

The place is chiefly known for its hot baths, which are open all the year, but most frequented in spring and autumn; the temperature of the hottest spring is about 158° F. They were employed by the Romans, and are now used for **chronic gouty** and **neuralgic cases**, etc., like the baths of Wiesbaden, Aix-les-Bains, and Bath, in Europe. The French have a thermal military hospital there.

Winter visitors to Algiers might spend part of the spring at Hammam R'Irha when they find Algiers unpleasantly hot. For the hardier kinds of invalids suffering from the results of overwork, mental worry, or from imperfect convalescence after acute diseases, the whole winter season would probably be suitable. Residents at Algiers sometimes make use of Hammam R'Irha as a convenient and relatively cool and refreshing summer resort. There are many excursions to be made in the neighborhood.

ORAN, on the coast between Algiers and Tangier, is less sheltered than Algiers, and has not the elevated hotels and sheltered hill-walks of Mustapha Supérieur. There is a good hotel in the somewhat French-looking modern commercial town. The annual rainfall at Oran is about sixteen inches. By railway Oran is 261 miles from Algiers. About two miles to the west are the 'Bains de la Reine,' employed during the period of Spanish rule. Their name is from Queen Isabella the Catholic, who brought her daughter here for the sake of these baths. The spring that supplies them has a temperature at its source of about 112° F., and contains about 1 per cent. of sodium and magnesium chlorids.

HAMMAM MESKOUTIN, in the Algerian province of Constantine, with a station on the railway between Bone and Constantine, has very hot springs,—up to 203° F.,—which can be used in similar cases to those treated by the baths of Hammam R'Irha. The thermal establishment, with moderate accommodation for visitors, is situated in a picturesque mountainous region, covered with heather, ever-green shrubs, and low trees. The French have a military thermal hospital here.

BISKRA is a collection of villages in an oasis bordering the Sahara

desert, to the south of the Lesser Atlas range, at an elevation of about 360 feet above sea-level. It is nearly due south of Marseilles at $34^{\circ} 55'$ latitude north, corresponding to the latitude of the southern part of the island of Cyprus. The climate approaches that of the desert, and is drier and sunnier, but doubtless less equable, than that of Algiers. The annual rainfall—about $6\frac{1}{2}$ inches—is much less than at Algiers, but more than at Cairo ($1\frac{1}{4}$ inches). Though rain and the sirocco are rare during winter, there are sometimes terrible wind storms, which raise clouds of dust. The water is so charged with salts that it alters the taste of tea and of coffee. Though the accommodation at Biskra is fairly good, the railway journey to get there is, or at least quite recently was, excessively slow and fatiguing (about one day from Constantine and two days from Algiers), and the place cannot be recommended to very delicate or fastidious invalids. About four miles from Biskra are the hot baths of 'Fontaine chaude' (HAMMAM SALAHIN, or 'Bath of the Saints'), supplied by a spring having a temperature of 112° F. at the source. They are frequented by Arabs.

THE COAST OF MOROCCO

TANGIER, the nearest to England of African health resorts, lies at the western entrance of the STRAITS OF GIBRALTAR ($35^{\circ} 42'$ latitude north, $5^{\circ} 55'$ longitude west), thirty-five miles (three hours by steamer) from GIBRALTAR. Its climate is probably more under the influence of the Atlantic than of the Mediterranean; it is warm, moist, and equable, the moisture being derived both from the Mediterranean and the Atlantic. The mean annual temperature is 67° F.; and Tangier is said to be somewhat warmer in winter and cooler in summer than ALGIERS, owing to the greater humidity of the air. The daily range, however, is considerably larger than that of Madeira. The annual rainfall is 30 to 32 inches, though there are apparently not more than about 35 really rainy days in the year. The old town, built on the rocky slope rising from the shore, has the picturesque and antiquarian attraction of preserving its original Moorish characteristics, and has, likewise, the oriental disadvantages of densely packed houses, dirty narrow alleys, and crowds of importu-

nate beggars. There is fair accommodation for visitors within and without the town walls.

MOGADOR, on the northwest coast of Africa, lies at a slightly more southern latitude ($31^{\circ} 30'$ north) than that of Madeira. The prevalent winds are from the northeast, and desert winds are almost completely shut off by the High Atlas range. It is to the influences of the Atlantic and of prevalent winds that Mogador owes its extremely equable climate. The mean annual temperature (67° F.) is just above that of Funchal, in Madeira (65° F.), but the mean winter temperatures of the two places have been found the same— 61° F. The mean relative humidity has been given as 78 per cent., the number of rainy days as only 44, and the ordinary daily range of temperature as about 5° F., which is even less than that of Funchal. The sky is usually clear. Mogador is apparently more sanitary than one would expect a town in Morocco to be, but the accommodation is, of course, limited. On the hills, about one and one-half hours' ride from the town, is the Palm Tree House Hotel, recently enlarged.

CHAPTER III

ISLAND RESORTS IN THE ATLANTIC OCEAN

Islands in the North Atlantic Ocean—Warm Group—Madeira: The Canary Islands: The Azores. Cold Group—Iceland: The Hebrides: The Orkney Islands: The Shetland Islands: The Farøe Islands. Islands in the South Atlantic Ocean—Ascension Island: St. Helena: Tristan d'Acunha: The Falkland Islands.

WARM ISLANDS OF THE NORTH ATLANTIC OCEAN

MADEIRA

Madeira, between 32° and 34° north latitude, and between 16° and 17° west longitude, lies in the Atlantic Ocean, under the full influence of the recurved branch of the Gulf Stream, about 500 English miles from the west coast of Africa. The climate of its chief town, FUNCHAL, is generally regarded as the standard of warm, moist, marine health resorts. Many authors have written on this very equable climate (Mittermaier, Goldschmidt, Grabham, and others). The mean annual temperature is 65° F.; the mean winter temperature, from December to February, almost 61° F.; the mean January temperature, 60.3° F.; the mean summer temperature, about 69° F.; the mean daily range, about 9.5° F. The mean relative humidity is about from 70 to 74 per cent. of saturation. Samler Brown gives the average annual rainfall of seventeen years as 26.7 inches. There are about 85 rainy days in the year: 50 or more of them in winter. Clouds are tolerably frequent, but fogs and mists are hardly known except in the mountains. The temperature of the sea is said to vary between 63° and 75° F. (Brown). Funchal is situated in a kind of amphitheater on the south coast. The mountains, which rise to about 6000 feet on the north, shelter it from the prevailing northeast winds. From 7 to 9 o'clock in the morning there is generally no wind; from 9 to 4 the sea-breeze blows, and later in the evening the land-breeze descends the ravines. The dis-

agreeable dry east or southeast wind from the Sahara, termed the 'leste,' may blow in March and April, but is rare in the true winter. The steepness of the slope on which Funchal lies is a disadvantage for some persons, but conveyance in sleighs drawn by oxen or in hammocks is easy. The place has so long been used as a health resort that the wants of invalids are tolerably well supplied, and good medical advice can always be had. From New York the voyage may be accomplished in from seven to ten days; from Southampton in three days; and from Lisbon in two days.

The climate is sedative, and the air is pure and free from dust. The effect is beneficial to weak patients with **pulmonary emphysema** and **catarrhal affections of the larynx and bronchi**, when there is little expectoration and the cough is troublesome. The tendency to cough is certainly diminished. The climate is also useful in certain cases of **irritable dyspepsia** and '**irritable weakness.**' In some persons, however, a relaxing (depressing) effect is produced, with loss of appetite and tendency to diarrhea.

In former days, when a warm, equable climate was considered the most suitable one for all cases of **pulmonary consumption**, Funchal had a much greater climatotherapeutic reputation. Most phthisical patients need a more bracing place, and the results obtained in ordinary cases have not been particularly encouraging; but there are patients of naturally **weak constitution** and of **erethistic type**, with tendency to irritable cough, for whom the climate may still be considered suitable. The same applies to **old and emphysematous consumptives**, with low resisting powers, and to **feeble patients** in whom a great amount of lung substance has already been destroyed. It is possible that if the sanatorium treatment were introduced, better results would be obtained in carefully selected patients. For many the beauty of Funchal and the subtropical vegetation have great charms and exercise a beneficial mental effect. For residence during summer, there are, on the island, places cooler than Funchal, situated amidst pine forests at moderate elevations.

THE CANARY ISLANDS

The Canary Islands lie between $27^{\circ} 49'$ and $29^{\circ} 46'$ north latitude, and between $13^{\circ} 2'$ and $18^{\circ} 13'$ west longitude, about a day's

voyage south of Madeira and nearer to the African coast. On the whole, they are less humid and warmer than Madeira, but there are considerable differences between the various local climates.

TENERIFFE, the largest and most important of the Canaries, has likewise the highest mountains, the famous peak rising to 12,200 feet above sea-level. OROTAVA lies in a valley on the north of the island, facing the open Atlantic, and sheltered behind and on two sides by the mountains; its mountains and coast scenery and its vegetation justify Humboldt's opinion that it is "one of the most charming spots of the world." The mean monthly temperatures,¹ beginning with January, are: 61.2°; 61.6°; 62.6°; 64.0°; 68.3°; 69.8°; 72.5°; 73.3°; 72.7°; 71.2°; 67.1°; 63.7° F.

Dr. F. Lishman, to whose article in the "Edinburgh Medical Journal," September, 1898, we are much indebted, points out that the annual variation between the mean temperatures of August, the hottest month, and of January, the coldest, is 12.1° F. The diurnal variation averages 13.8° F., and is practically the same in summer and winter. The temperature of the sea is 65.7° F. in January, and 73.5° F. in August. Fogs are practically unknown at Orotava, and dew is rarely deposited. The mean annual rainfall is about sixteen inches. During bad weather short and heavy showers are the rule, and occur mostly at night. Rainy days average 59; on only 30, however, is the rainfall during daytime. The wettest months are usually December and January; practically no rain falls from the end of April to October. The heaviest rains soon disappear, owing to the porous volcanic soil and inclination toward the coast. The prevailing wind is the sea-breeze from the north in winter, extremely moderate in force, usually beginning some hours after sunrise, and dying down toward sunset, to be replaced by the gentle land-breeze during the night. High winds are uncommon, and, when they occur, are brief. In summer the cool northeast trade-wind blows with great regularity, and when it prevails, the weather is never oppressive. The hot dry south wind, when it occurs, does not usually last more than three days at a time. The

¹ See the table calculated from eight years' observations by Perry and Lishman, in Samler Brown's "Madeira and the Canary Islands," fifth edition, 1898.

so-called 'parasol of clouds' that surrounds the mountain ridge provides a welcome shade during the summer months ; it sometimes extends for a distance out to sea, but frequently leaves the coast-line in bright sunshine. Samler Brown's table, based on eight years' observation, gives the total amount of actual sunshine in the three winter months, December to February, as 459 hours, and in the whole year, as 2024 hours. Patients on their way back from South Africa, etc., to pass the summer in England, may often with advantage spend part of the spring in Teneriffe or Grand Canary.

The accommodation at Orotava is comfortable, the food good, and the water-supply excellent. There is always English society. Lishman says the best level for ordinary residence between November and June is from 100 to 400 feet above the sea. Cooler and more bracing climates are always within easy reach. Camping out among the pines and heather in the higher parts above the cloud level (about 4500 feet) is most pleasant and healthful during the rainless summer months.

SANTA CRUZ, on the east coast of Teneriffe, is the chief port and capital of the Canary Islands. Its mean daily winter temperature is slightly higher than that of Orotava, and the total annual rainfall is less.

LAGUNA is situated about five and one-half miles from Santa Cruz, at an elevation of 1840 feet above sea-level. It has a cooler, more bracing climate, and is therefore frequented during summer. The mean daily range of temperature for the eight months from October to May is 16.6° F. Other localities in Teneriffe at moderate elevations are GUIMAR (1200 feet) and TACORONTE (1700 feet).

VILAFLORE is still higher up (4335 feet above sea-level), and therefore is cooler and has a somewhat greater daily range of temperature (18.8° F.); it gets more actual sunshine than Orotava.

The island of GRAND CANARY is nearer the African coast than Teneriffe, and the climate is somewhat less moist. At LAS PALMAS, the well-known health resort on the northeast corner of the island, the mean annual rainfall is only 9 inches, whereas at Orotava, in Teneriffe, it is about 16 inches, and on the coast of Palma, nearly the most western of the Canary Islands, under the full influence of the recurved branch of the Gulf Stream, it reaches about 25 inches.

Dr. Brian Melland, to whose paper in the "Medical Chronicle," 1897, we are much indebted, says the mean relative humidity at Las Palmas during winter may be put down at about 67 per cent. A disagreeable dry east or southeast wind from the African desert occasionally blows during summer. The relatively dry northerly trade-wind is the prevailing wind throughout the year. An unusually strong north wind may sometimes be disagreeably cold for invalids, even though the shade temperature be 63° or 65° F. The mean daily temperature (shade temperature, of course) for the months from October to May inclusive is about 65.4° F. A 'parasol of clouds' girds the central mountains (6400 feet) of Grand Canary, but Las Palmas is many miles away and has a clear sky and abundance of sunlight. According to Samler Brown's table, Las Palmas gets 512 hours of sunshine during the three winter months, December to February. The hotel accommodation is satisfactory, and there are golf-links and a cricket ground. During the rainless summer months it is possible to camp out at higher elevations—above the cloud level. Dr. Melland says the invalid may remain for months in the dry genial climate above the clouds, under a rainless blue sky, with a view that extends to the limit of the horizon. The summer resort of the MONTE has an altitude of 1300 feet.

There is a chalybeate mineral spring in the island and an alkaline earthy table water.

PALMA, one of the western islands of the Canary group, has a moister climate, more nearly approaching that of Madeira. Its rainfall is slightly greater than that of Funchal. The highest points in the island reach 7700 feet. The scenery of the wooded mountains is very beautiful. There is hotel accommodation at Santa Cruz, on the eastern coast—not to be confused with Santa Cruz in Teneriffe.

THE AZORES

These small volcanic islands are situated between 36.59 and 40° latitude north, and between 25° and 31° longitude west, far out in the Atlantic Ocean, more than 800 miles from the coast of Portugal, to which country they belong. Nine islands (Flores, Fayal, Pico, St. George, Terceira, St. Michaels, Graciosa, Santa Maria, and

Corvo) form the archipelago, somewhat irregularly situated, running from west and northwest to east and southeast over a linear distance of some 300 miles. They have a typically equable and insular climate, and, with their more northerly position, have a somewhat lower mean annual temperature (62° F.) than that of Madeira (Funchal). The daily range of temperature is ordinarily not more than 4° F. The mean annual relative humidity is 76 per cent.; the mean annual rainfall, 38½ inches. The winds may be very forcible, and there are frequent storms.¹ The Azores, like Madeira and the Canaries, rise to a considerable height in the interior, the peak of the island of PICO rising to 7600 feet above sea-level. ST. MICHAELS, or SAN MIGUEL, the largest island of the group, possesses thermal springs in the LAS FURNAS valley, which are employed with considerable success in **chronic rheumatic affections, syphilis, and diseases of the skin.** The accommodation for invalids in these islands is very limited. Dr. H. Canfield, who, from his own experience, declares that Valle das Furnas is "a perfect heaven for a **neurasthenic,**" says that a patient should not be sent there alone for a lengthy stay, "unless he is full of resources for his own enjoyment and pleasure. There are never-failing delights for a lover of nature, but little to interest one who is not; and one dependent upon luxuries would fare badly." The Prince Line steamers land passengers at PONTA DELGADA, the capital of St. Michaels, a seven days' voyage from New York. The steamers of the Insular Navigation Co. stop at the Azores on their regular trips between New York and Lisbon, and there are monthly sailings to and from Madeira, the Canaries, and the Cape Verde Islands. Barks sail to the Azores irregularly from Boston and Philadelphia.

THE COLDER ISLAND CLIMATES

Among the **colder islands** that may be visited by persons of strong constitution who need rest and recreation after overwork, etc., are the HEBRIDES, the ORKNEY ISLANDS, the SHETLAND ISLANDS, the FARÖE ISLANDS, and ICELAND. Parties are even made up for

¹ See the account of these islands given in Solly's "Medical Climatology," 1897, p. 441.

the voyage to Spitzbergen. We shall here content ourselves with giving a short note on the climate of Iceland.

ICELAND can hardly be classed among health resorts, but the voyage there and back and an excursion in the island may be of use during summer to many persons who like sea-voyages and who, although of strong constitution, are suffering from the effects of mental overwork and prolonged town life. The interest and mental recreation afforded by such a trip have much to recommend it.¹

Iceland lies between 63.5° and 66.5° latitude north, and to the west side of the warm Gulf Stream. The ocean influence and the prevalence of the relatively warm easterly winds explain the fact that, though the northern coast of Iceland touches the arctic circle, the mean annual temperatures of the different parts of the island are included between 32° and 40° F. (Julius Hann). The climate is therefore equable, and the winters are relatively mild. In July the mean temperature of the southwest coast reaches 51.8° F. The greatest difference between the mean temperatures for the different months is about 14.5° F. on the north, the east, and the south coasts, and reaches 27° F. quite in the interior of the island. Rain and storms are most frequent during autumn and winter; nearly half the storms of the whole year occur during December and January. The proportion of cloudy weather is great. The annual fall of snow and rain (least amount in spring) is over 39 inches in the south of the island, $23\frac{1}{2}$ to $31\frac{1}{2}$ inches in the west, and apparently hardly $15\frac{3}{4}$ inches in the north (Hann).

ISLAND RESORTS OF THE SOUTH ATLANTIC OCEAN

Some small islands in the South Atlantic Ocean may, for convenience, be mentioned here.

ASCENSION ISLAND ($7^{\circ} 57'$ latitude south) is a small volcanic island belonging to Great Britain, about 800 miles to the northwest of St. Helena. A peak in the interior reaches to 2800 feet above

¹ The attractions of modern Iceland from the health-giving point of view formed the subject of some entertaining lectures delivered by Dr. W. Lauzun-Brown before the Royal Institution of Great Britain in May, 1899, and printed in the "Physician and Surgeon," London, March to May, 1900.

sea-level. In the Green Hills the mean annual temperature is said to be 73° F. The island is regarded as healthful, though, of course, it would be relaxing for most persons.

ST. HELENA, at $15^{\circ} 55'$ latitude south, is a rugged island, most of which is considerably elevated above sea-level. Its central peak has an altitude of about 2700 feet. The climate is equable and healthful, with a mean annual temperature of about 65° F., similar to that of Funchal, in Madeira. The annual rainfall of JAMESTOWN, on the northwestern side of the island, is said to be about 30 inches, and that in the higher regions about 50 inches.

TRISTAN D'ACUNHA is the largest of a group of three volcanic islands in the middle of the South Atlantic Ocean, at about the thirty-seventh degree latitude south, and 1500 miles from the nearest land. It has a moist, equable climate, naturally less hot and relaxing than that of the numerous small islands within the tropics. A peak in its interior reaches several thousand feet above sea-level.

THE FALKLAND ISLANDS (latitude 51° to 52° south), another British possession in the South Atlantic Ocean, to the east of the lower extremity of South America, with a mean annual temperature of about 45.3° F., are said to be extremely rainy and windy, and to share in the storms for which Cape Horn is noted. Moist, westerly winds prevail. The difference between the mean summer and mean winter temperatures is only about 13° F.

CHAPTER IV

EUROPEAN COAST RESORTS

The Coast of Spain and Portugal. The West Coast of France. The Northwestern Coast of Europe. The Channel Islands. The German North Sea Resorts. The Baltic Health Resorts of Germany. Russian Baltic Resorts. Scandinavian Seaside Resorts.

THE COAST OF SPAIN AND PORTUGAL

In proceeding around the coast of Spain from the northeastern frontier, the first place demanding our attention is Barcelona.

BARCELONA, formerly the chief town of the old principality of Catalonia, lies at nearly the same latitude ($41^{\circ} 22'$ north) as Rome and the southern extremity of Corsica. Its mean winter temperature is about the same as that of the Western Riviera, and the average number of rainy days is 69, distributed chiefly over spring and autumn. Although the position is beautiful, the accommodation good, and the walks in the neighborhood are attractive, the place can hardly be regarded as a winter resort for real invalids. The frequent changes between the cold northeast wind and the hot south wind are very trying to delicate persons.

VALENCIA ($39^{\circ} 26'$ latitude north) has a mild and equable climate. The mean annual temperature is 62.6° F.; the mean winter temperature, 52.5° F.; the mean spring temperature, 57.4° F.; the mean relative humidity, 66 per cent.; the annual rainfall, about $18\frac{7}{10}$ inches. The number of rainy days is about 47, distributed as at Barcelona, chiefly over autumn and winter. In spring and autumn the irrigation of the rice-fields in the neighborhood has an injurious effect on many persons.

ALICANTE, about 1° latitude south of Valencia, is slightly warmer, and, like the whole of Murcia, has a somewhat drier climate. The mean annual temperature is 64.4° F. The mean winter temperature is 53.5° F. The annual rainfall is $16\frac{9}{10}$ inches.

CARTHAGENA ($37^{\circ} 35'$ latitude north), the well-known Spanish Mediterranean seaport, has probably a similar climate to that of Alicante, but during winter is often visited by the severe north-west wind. Sudden changes of weather are complained of.

MALAGA ($36^{\circ} 44'$ latitude north, about the same as Algiers), on the south coast of Spain, has a beautiful position on dry, sandy soil, facing southeast, and shut in by a semicircle of hills on the north. The mean winter temperature is about 54.5° F.;¹ the mean spring temperature, about 64° F.; the mean summer temperature, 77.5° F.; the mean autumn temperature, about 71° F. The number of rainy days is 40. Though the climate is described as decidedly dry, the mean daily range of temperature, according to Francis, does not reach 5° F., and this author has spoken of Malaga as the mildest place in Europe. Owing, however, to a defect in the protecting semicircle of hills, the 'terral,' a dry, biting cold northwest wind, something like the 'mistral' of the Riviera, which prevents delicate persons from going out-of-doors, is often felt during winter. The 'solano' is a south wind from Africa, corresponding to the sirocco in Sicily, but is rare during the winter. The beauty of the surroundings attracts some chronic invalids.

GIBRALTAR (latitude $36^{\circ} 7'$ north) has a moist, equable, sunny winter climate. The mean temperature for the three winter months was formerly given as 54.5° F., the same as that of Malaga, but it is now stated to be somewhat higher. The number of rainy days is greater than at Malaga. The annual rainfall is about 32 inches. Though Gibraltar cannot, strictly speaking, be called a health resort, it is frequently visited by persons merely requiring rest and a change of climate; by invalids on their way to and from other health resorts; and by persons returning for their health from India and other eastern regions. The accommodation has improved, the hygienic arrangements are, on the whole, satisfactory, and the so-called 'rock fever' is said to be very rare among winter visitors.

CADIZ, in the isle of LEON ($36^{\circ} 32'$ latitude north), considered a very beautiful town, is situated on a low, chalky tongue of land. It has a moist, equable climate. The mean winter temperature is

¹ According to Hann's table, it is rather higher.

59° F.; the average daily range, about 10.5° F. The mean relative humidity is 76 per cent. The number of rainy days in the year is about 100. The accommodation is scarcely suitable for invalids, though the climate should be beneficial in **early phthisical cases** in those of weak constitution and with a tendency to irritable cough.

SAN LUCAR, at the mouth of the Guadalquivir, eighteen miles north of Cadiz, has perhaps a rather drier climate, but the town and surrounding country are not attractive.

HUELVA, on the coast a few miles north of San Lucar, has a moist, warm, and equable winter climate, with a daily range of about 10° F. Huelva is about twenty miles from the famous Rio Tinto mines.

LISBON (latitude 38° 42' north), the capital of Portugal, has an old reputation, like Constantinople and Naples, of being one of the most beautiful towns of Europe. It is situated on the right bank of the Tagus, about eighteen miles from its mouth. The mean annual temperature is 60° F.; the mean winter temperature, 51° F. The mean relative humidity is 71 per cent.; the annual rainfall, about $29\frac{3}{10}$ inches; the number of rainy days, about 112. Owing, doubtless, to the winds and the sudden changes in the weather, and to the uncertain hygienic conditions of the city, invalids are now sent to Lisbon from foreign countries much less frequently than in former years. CINTRA, most beautifully situated at an elevation of about 700 feet above sea-level, at the foot of the Serra da Cintra, is better suited for a stay than Lisbon, from which it is seventeen miles distant.

OPORTO (41° 9' latitude north), the second largest city of Portugal, picturesquely situated on the Douro, two miles from its mouth, is likewise used as a winter resort. The mean temperature for January is 49° F. The annual rainfall is about 60 inches, with 115 rainy days. It is now hardly likely to be chosen as a climatic health resort by foreigners, unless under exceptional circumstances.

Further northward, on the western and northern coasts of Spain, are VIGO, CORUNNA, SANTANDER, PORTUGALETE, and SAN SEBASTIAN, all under the climatic influence of the Atlantic Ocean; they attract visitors from the neighboring parts during the summer season, on

account of their sea-bathing facilities and beautiful and relatively cooler surroundings.

THE WEST COAST OF FRANCE

BIARRITZ (latitude $43^{\circ} 29'$ north), in the southwest of France, close to Bayonne, is situated on a picturesque, rocky portion of the coast of the Bay of Biscay, not far from Spain. The mean winter temperature (December, January, and February) is 45.6° F.; the mean summer temperature, about 64° F. or higher; the mean spring temperature, about 53° F. The mean relative humidity is said to be about 80 per cent., and the annual rainfall, $49\frac{1}{4}$ inches. Owing to the porous nature of the soil, the ground dries quickly. Biarritz has a rather moist climate, but the prevailing Atlantic winds, to which it is fully exposed, prevent a relaxing effect. The climate resembles that of places on the English Channel, but during winter it is warmer and rather sunnier, so that more time can be spent in the open air.

Biarritz is well suited for patients requiring a moderately bracing and cheerful place, less exciting than the drier resorts on the Riviera; it is too windy for those with **pulmonary tuberculosis** and others seriously ill. Persons who have a certain degree of **cachexia** after residence in India and tropical climates can often be advised to spend some of the colder months of the year at Biarritz, which likewise affords a pleasant change in spring for those who have spent the winter at Arcachon or Pau, from the latter of which it is some three or four hours distant by rail.

The accommodation is excellent. During the winter season the place is much frequented by the English; during the summer months, when it is unpleasantly hot for most inhabitants of northern Europe, it is thronged with visitors from Spain and the south of Europe. The sea-bathing is very fine.

About ten minutes' walk from Biarritz, on the steam tram-car line between Biarritz and Bayonne, a large bath establishment has been erected, where brine baths (Soolbäder) of any strength can be obtained, strong muriated waters derived from Briscous being employed for the purpose.

ST. JEAN-DE-LUZ, a little to the south of Biarritz, has a similar

climate, but is closer to the Pyrenees. It is smaller and less fashionable, and therefore, for some persons, more agreeable. Still nearer to the Spanish frontier is the village of HENDAYE, where there is a seaside **sanatorium for weakly children**. On the neighboring portion of the Spanish coast the seaport of SAN SEBASTIAN, already mentioned, has a fine beach and beautiful scenery; it attracts many visitors from other parts of Spain and from France during the bathing season.

ARCACHON (latitude $44^{\circ} 7'$ north) is situated in a sandy district, a good deal north of Biarritz, almost half-way between Bayonne and La Rochelle, and about thirty-four miles to the southwest of Bordeaux. The vast extent of low-lying country around Arcachon is almost entirely planted with pines, which serve to fix the sand dunes and prevent the encroachment of the sea. It is mainly on account of the pines that Arcachon has been so often compared to Bournemouth. Arcachon is about nine miles from the actual coast, and lies at the south of a large basin of salt water that is connected only by a narrow channel with the sea. The mean annual temperature (Hameau) is 58° F.; the mean winter temperature, 44.5° F.; the mean summer temperature, 68° F. The mean relative humidity is said to be 85 per cent., and the rainfall about 35 inches, with 103 rainy days. The winter climate is, on the whole, a mild and sedative one, likely to be suitable, as Burney Yeo has pointed out, in **irritable pulmonary cases**, etc. The villas of the 'winter town' lie amidst the pine trees on the sandy slopes, and are fairly well protected from the strong Atlantic winds. The 'summer town,' which is situated along the waterside, is much frequented during the bathing season by the inhabitants of Bordeaux and the neighborhood.

On the west coast of France, between Arcachon and Brest, are several places used by the French as summer resorts on account of the sea-bathing. We need mention only ROYAN, LA TREMBLADE, LES SABLES D'OLONNE, PORNIC, and LE CROISIC. Near Le Croisic, at PEN-BRON, there is a **charitable establishment for weakly children**, and at LA BAULE, on the railway between Paris and Le Croisic, there is a **seacoast sanatorium** (Institut Verneuil) for paying patients, specially designed for **debilitated persons and delicate**

children. Facilities are afforded for the education of the children, as well as for the improvement of their physical condition. At SAINT-TROJAN, in the island of Oléron, the 'Oeuvre des Hôpitaux Marins' have one of their excellent **establishments for poor children.**

THE NORTHWESTERN COAST OF EUROPE

THE COASTS OF FRANCE

THE NORTHWEST COAST OF FRANCE, especially FINISTÈRE, somewhat resembles in its climate the southwest coast of England. The naval port of BREST (latitude $48^{\circ} 23'$ north) may fairly be regarded as a climatic representative of the region. Its mean annual temperature is 53° F.; the mean winter temperature, 44.2° F.; the mean spring temperature, 51.2° F.; the mean summer temperature, 62.8° F.; the mean autumn temperature, 53.8° F. The mean annual relative humidity is about 79 per cent. The mean annual rainfall is nearly 30 inches, and the number of rainy days about 175. The southwest and western winds from the Atlantic are the most frequent.

THE NORTHERN COAST OF FRANCE (NORMANDY, etc.) has a drier climate than that of Brest. On it are situated many popular summer resorts, some of which are very fashionable during the height of the season (June to August). On the north coast of BRITTANY, proceeding from west to east, are situated ROSCOFF, TRÉGUIER, PAIMPOL, DINARD, and ST. MALO. DINARD is popular with English and American families, as is also the neighboring interesting old town of DINAN, which lies about fourteen miles inland, amidst beautiful scenery; St. Malo, a fortified town, lies on a little peninsula on the opposite side of the mouth of the Rance, and is connected with Dinard by steam ferry. The neighboring portion of Normandy, with the picturesque old fortified rock of MONT ST. MICHEL, is much visited by French and English tourists during summer. AVRANCHES, near the coast, opposite to Mont St. Michel, has a healthful position on a hill, whence one obtains beautiful views toward Mont St. Michel and the surrounding country. It is considered a pleasant place of residence by many, notably for

English families of limited means. From the bay of Mont St. Michel the coast-line turns northward to the Cap de la Hague, and about fourteen miles north of Mont St. Michel is situated GRANVILLE, a picturesque place with good sea-bathing.

THE CHANNEL ISLANDS

Opposite the portion of the French coast just referred to (Department of Manche) are the British possessions of Jersey, Guernsey, and the other Channel Islands, which may be described in this connection. JERSEY is sixteen miles from the French coast, and GUERNSEY is eighteen miles to the northwest of Jersey. The Channel Islands, which have belonged to England since the time of William the Conqueror, lie between latitudes $49^{\circ} 10'$ and $49^{\circ} 42'$ north and between longitudes $2^{\circ} 2'$ and $2^{\circ} 40'$ west. They have a moist marine climate and are much exposed to winds. In Jersey the mean temperature for spring is 48.7° F.; for summer, 60° F.; for autumn, 53° F.; for winter, 43° F. Guernsey has a slightly colder spring than Jersey, but both islands, as compared with the average of the British Isles, have a more equable temperature, with a warmer winter and a slightly cooler summer. The Channel Islands are apparently somewhat sunnier than the sunniest places in Great Britain proper. Thus, according to tables published in 1897 by the English Meteorological Office, Hastings gets 40 per cent. of the possible sunshine, while Guernsey gets 42 per cent., and Jersey, 44 per cent. Jersey has 1930.5 hours of bright sunshine in the year, which is 169.4 hours more than the record of Hastings. The mean relative humidity at Guernsey, taken at 9 A.M., for the various months, appears to range from 82 to 89 per cent. The average annual rainfall for Jersey and Guernsey is about from 32 to 34 inches, distributed over from 170 to 180 rainy days. The prevailing winds are westerly and southwesterly, excepting during the spring, when the east and northeast winds may be troublesome to persons with a tendency to respiratory affections. Old age appears to be exceptionally frequent in these islands, and the general development of the children unusually good. Drs. Symes Thompson and Lazarus-Barlowe¹ write :

¹ "The Climates and Baths of Great Britain," report published by the Royal Medical and Chirurgical Society of London, 1895, p. 104.

"There are many cases in which the voyage to Madeira or the Canaries seems too great or costly an undertaking, in which the short trip [from Great Britain] to the 'Norman Archipelago' will suffice; nevertheless, it must be remembered that the passage to the Channel Islands is often very rough, and hence inadvisable for old and debilitated persons, while the straining of sea-sickness during the voyage has, in our own knowledge, been the exciting cause of cerebral apoplexy in subjects of chronic granular kidney. The fact remains, however, that within seven or eight hours¹ of London a winter haven is to be reached where camellias and rhododendrons flower in the open in February, where frost is rare, and lasting snow unknown." The chief resorts in the Channel Islands are ST. HELIERS, on the south coast of Jersey, and ST. PETER'S PORT, situated on the side of a hill on the east coast of Guernsey. The interior of Jersey is more wooded and picturesque than is that of Guernsey.

THE FRENCH COAST (CONTINUED)

Further along the French coast, eighteen miles to the east of the Cap de la Hague, and nearly due south of the western extremity of the Isle of Wight, is CHERBOURG, the great naval port of France, which is likewise visited for its sea-bathing during the summer months. The mean temperature for July is 62.8° F.

Near the estuary of the Seine is a group of seaside summer resorts consisting of CABOURG-DIVES, HOULGATE-BEUZEVAL, VILLERS-SUR-MER, and the fashionable TROUVILLE and DEAUVILLE. Trouville, at the mouth of the Touques, formerly a small fishing village, was first brought into notice by the elder Dumas, and is now one of the most visited of French summer resorts. It has fine sands for bathing, a large casino, and facilities for hydrotherapeutic treatment. The life during the season is typical of fashionable French seaside places.

On the eastern side of the estuary of the Seine, between Havre and the mouth of the Somme, are ÉTRÉTAT, FÉCAMP, ST. VALÉRY-EN-CAUX, DIEPPE, and LE TRÉPORT-MERS. Étrétat, distinguished

¹ Ordinary journeys from London to Guernsey take nine hours; to Jersey, eleven hours.

for its picturesque scenery, has in quite recent times been converted, owing to the patronage of French artists, from a small fishing village into a much visited seaside resort. The chalk cliffs on each side of Étretat reach a height of 270 feet. The seaport of Fécamp lies in a valley between high cliffs; the mean temperature for August, the hottest month, is 63.6° F. Dieppe and Tréport are the nearest seaside resorts to Paris, and therefore both receive many Saturday to Monday visitors from the capital, besides those who come to stay for longer periods. Both resorts have shingly beaches and precipitous chalk cliffs, somewhat like those of Dover, in England. There are several interesting objects for walks and excursions in the neighborhood.

Between the mouth of the Somme and Boulogne is **BERCK-SUR-MER**, with several **sanatoriums for scrofulous children**. It lies on sand dunes, like some of the resorts on the Belgian coast, and so fine is the sand that a moderate wind can blow it up in clouds. At the south end of the 'Plage' is the enormous, barrack-like sanatorium of the 'Assistance publique de Paris,' which was inaugurated in 1869, and is probably the largest seaside sanatorium for children in the world, having a population of from 700 to 800 little ones. Berck is not picturesque nor beautiful, and is rather a place for real invalids than a mere seaside holiday resort.

BOULOGNE and **CALAIS** are, naturally, much visited by the English, since they are the nearest French towns to England. Boulogne is generally preferred for a holiday, and its gay casino and the shore to the north of the harbor present a lively scene during the season. There are facilities for warm sea-baths, etc. The 'Old Town,' or 'Haute Ville,' on an eminence surrounded by its well-preserved ancient ramparts, is a noteworthy historic curiosity, and rivals anything of the kind to be seen in England. **DUNKIRK** (Dunkerque), likewise of great historic interest to the English, has a much frequented seaside bathing place (**MALO-LES-BAINS**), with an extensive sandy beach, about half a mile from the old town.

THE FLEMISH COAST

OSTEND (latitude 51° 14' north), in Belgium, is one of the most visited seaside resorts in the world. It has an excellent sandy beach

for bathing, and the 'digue,' constructed on the sand dunes, forms a beautiful promenade in front of the large hotels and villas facing the beach. The attractions of the large casino (Cursaal) and the gay life of the place bring crowds of pleasure-seeking tourists to Ostend and considerably increase the expense of accommodation. The mean temperature for July is 64.8° F.

In the neighborhood, between Ostend and Dunkirk, are the smaller, less developed, and cheaper Belgian seaside resorts of MARIAKERKE, MIDDELKERKE, and NIEUPOORT-BAINS; these places are situated on dunes and have sandy beaches, like that of Ostend. BLANKENBERGHE, about eleven miles to the east of Ostend, has handsome villas and hotels on its digue, and a beach resembling that of Ostend, which place it almost rivals in popularity and gaiety. HEYST, five miles further east, and KNOCKE, two miles beyond Heyst, have similar situations, but are much less pretentious; Knocke is, in fact, only just commencing to be developed as a health resort. All these Belgian coast places have a decidedly refreshing climate, with a fair amount of wind.

HOLLAND

SHEVENINGEN (latitude 52° 7' north), the well-known seaside health resort of Holland, is mostly built along the dunes, like Ostend and the seaside resorts of Belgium. It has not the imposing digue, leveled and paved with tiles, as Ostend has, but there is a fine, long, undulating promenade on the dunes in front of the villas and hotels that face the sea. Scheveningen is only about two miles from The Hague, with which it is closely connected by tram lines. Warm sea-water baths and hydrotherapeutic treatment may be obtained at the thermal establishment close to the Cursaal. Scheveningen rivals Ostend and Blankenberghe in popularity, and enjoys the advantage of having two beautiful parks,—those of Scheveningen and The Hague,—with shady promenades where persons may walk or rest during hot weather or when tired of the seashore and the dunes. According to Dr. W. Francken,¹ during the season of 1898 the mean midday temperatures of the sea and

¹ Francken, "Scheveningen, sa Plage, ses Bains," published at The Hague, 1899.

air were found to be respectively 61.7° and 63.5° F. for June, 63.5° and 61.7° F. for July, 67.1° and 69.8° F. for August, 66.2° and 67.1° F. for September. There is a good deal of wind.

ZANDVOORT, further north of Scheveningen, is a similar seaside resort, but smaller and more recently developed. It is reached by train from Haarlem in twenty minutes. HAARLEM itself, about four miles from the coast, has a beautiful park and muriated chalybeate waters. About three miles northwest of Haarlem are the beautiful woods and country villas of BLOEMENDAAL, separated by high sand-hills (dunes) from the shore. The neighboring estate of DUIN-EN-DAL (dune and dale) now offers good hotel accommodation.

THE GERMAN NORTH SEA RESORTS

Germany possesses many bracing seaside resorts on the North Sea, among which should first be mentioned the small **East Frisian** islands of BORKUM, NORDERNEY, BALTRUM, and WANGEROOG. The most popular and best developed of these is probably Norderney, which can be reached by steamers in a little more than half an hour from the railway station of Norddeich.

The island lies in latitude $53^{\circ} 44'$ north, and is about eight and a half miles long and a mile and a half wide. It has, on the whole, a breezy, refreshing climate, though during the height of summer, excepting along the shore, the heat may sometimes seem oppressive. The mean temperature for the three summer months is said to be only 54.6° F. The annual rainfall is about $36\frac{1}{2}$ inches. The village, with its bright-looking modern villas and hotels, is at the west end of the island, and affords excellent sea-bathing. It has, likewise, an establishment where warm sea-water baths, etc., may be obtained. The sand dunes, which constitute the surface of the island, have a very bare appearance, but a small plantation and avenue on the south of the village offer a certain amount of shade, and may, for a change, be preferred to the seashore promenades. The custom at Norderney and German seaside resorts, unlike that at French places, is for the sexes to bathe apart at separate portions of the shore specially reserved for this purpose. At Norderney there is an excellent **sanatorium** (Seehospiz Kaiserin

Friedrich) for **scrofulous and weakly children** of the poorer classes; it is the largest of the marine sanatoriums belonging to the Society for Children's Sanatoria at German Seaside Places.

The island of HELIGOLAND (Helgoland), belonging since 1890 to Germany, lies in latitude $54^{\circ} 12'$ north, about forty-six miles from the mouth of the river Elbe. It has a thoroughly marine climate and excellent bathing. The mean temperature for June is 56.5° F.; for July, 60.6° F.; for August, 61.5° F.; for September, 58.2° F. The daily range is said to be not more than 6° F. This little island, which is only about one-fifth of a square mile in area, consists of a sharply elevated triangular plateau (Oberland) rising to 180 feet above sea-level, and a smaller, low-lying portion (Unterland). Heligoland is thronged with visitors during summer, especially from north Germany. Steamers reach it in about three hours from Cuxhaven or Bremerhaven.

Further north are the SCHLESWIG ISLANDS (**North Frisian group**), of which FOEHR and SYLT are popular summer resorts for north Germany. Sylt is the largest of the Schleswig Islands, and WESTERLAND (latitude $54^{\circ} 54'$ north), in the middle of its west coast, is its chief bathing place. The climate is thoroughly bracing. The mean temperature of the air during the summer months is about 58.8° F.; the mean temperature of the water is about 70° F. WYK, on the island of Foehr, is somewhat less bracing, and has more foliage than most German North Sea resorts.

Among North Sea resorts on the mainland of Germany we may mention the great naval port of WILHELMSHAVEN, for persons who like to see the shipping; DANGAST, in Oldenburg, not far from Wilhelmshaven; CUXHAVEN, at the mouth of the Elbe, the port of Hamburg; and BÜSUM, in Holstein.

THE BALTIC HEALTH RESORTS OF GERMANY

In this group we shall mention Düsternbrook, a suburb of Kiel; Travemünde, near Lübeck; Heiligen-Damm, close to Doberan, and Warnemünde, both near Rostock; Sassnitz, including Crampas, Binz, Lauterbach, near Putbus, and some other places on the island of Ruegen; Heringsdorf with the adjoining Ahlbeck, Swinemünde,

Misdroy, and Dievenow, all to the north of Stettin, at the mouths of the Oder; Kolberg (or Colberg); Ruegenwalde; Zoppot and Westerplatte, near Danzig; and Cranz, near Königsberg.

DÜSTERNBROOK, the northern suburb of the great naval port of Kiel, lies on the western bank of the inner portion of the bay (harbor) of Kiel. There are a few bathing establishments, but no regular beach, as on the open sea. The walks in the wood of Düsternbrook are very beautiful. At ALTHEIKENDORF, on the opposite (eastern) bank, half an hour by steamer from Kiel, there are likewise arrangements for bathing.

TRAVEMÜNDE was the port of Lübeck before the river was deepened. It lies on the left bank of the mouth of the Trave. There are beautiful trees and shady walks close to the shore. About two and a half miles to the northwest of Travemünde is the new and less developed summer resort of NIENDORF, and still further off is WILHELMINENBAD.

DOBERAN is a rather quiet place in Mecklenburg-Schwerin, and is much valued as a summer resort by Mecklenburg families. Beautiful walks through a beech wood lead to HEILIGEN-DAMM, which is the actual bathing place of Doberan, and about three and one-half miles distant.

WARNEMÜNDE, on the left (western) bank of the mouth of the Warnow, is the port of Rostock, from which it can be reached in about half an hour by train. At Warnemünde there are not to be had the shady walks in the woods that can be enjoyed during the hot summer days at most of the other Baltic resorts. The beach is of fine white sand, so that in July the heat and glare may sometimes be intense. To many children, however, and to grown persons also, the ships entering and leaving the river are a source of great interest.

SASSNITZ, including the adjoining village of CRAMPAS, one of the most beautiful places of the Baltic, is situated on hilly ground on the east of the ISLAND OF RUEGEN. The beach is of rather coarse shingle, and the waves may be forcible during an east wind. To the north of Sassnitz is the beautiful forest of Stubbenitz, which consists almost entirely of beech trees and covers the whole of the eastern portion of the peninsula of Jasmund. At a spot called

the Stubbenkammer, seven miles to the north of Sassnitz, the chalk cliffs attain the height of 435 feet, rising almost perpendicularly from the sea, like the famous Shakespeare Cliff (350 feet), near Dover; the walk in the forest of Stubbenitz, close to the edge of the cliffs from Sassnitz to the Stubbenkammer, is one of the most beautiful that can be enjoyed at any seaside resort in Europe. BINZ, on the bay, to the south of Sassnitz, is likewise prettily situated and much frequented, and close to it is the beautiful deer-park called the Granitz. PUTBUS, in the south of the island, has its sea-bathing place at LAUTERBACH, one and one-half miles distant.

HERINGSORF, AHLBECK, and SWINEMÜNDE lie close together on the northern coast of the island of USEDOM, one of the two islands at the mouth of the Oder, to the north of Stettin. These places have a broad level beach of fine white sand, constituting a natural promenade that connects them. Heringsdorf is considered the most fashionable seaside resort on the Baltic, and has therefore sometimes been called the 'Ostend of the Baltic.' It has fine villas and hotels well suited to such a place, but, unlike Ostend, it can boast of shady woodland (beech, oak, pine) close to the sea. Swinemünde consists of two portions—a harbor portion along the Swine, and a coast portion facing the Baltic; between the two is a beautiful forest of beech. In 1896 muriated mineral springs were discovered in this wood, and a fine bathing establishment has been erected close to the harbor portion of the town, with arrangements for brine baths (Soolbäder), moor baths, and a swimming bath of sea-water, etc.

Further to the east, on the north coast of WOLLIN, one of the two islands at the mouth of the Oder, is MISDROY, with pleasant villas and hotels facing the sea, and a sandy beach similar to that of Heringsdorf and Swinemünde. There are beautiful beech woods on the neighboring slopes.

DIEVENOW is a secluded, rather homely, summer resort, divided into three portions, the chief of which is BERG-DIEVENOW. It is reached by steam ferry from CAMMIN, a picturesque, ancient looking little town that is connected by railway with Stettin. Both Dievenow and Cammin possess brine springs.

Further along the coast, eastward of Stettin, are KOLBERG and RUEGENWALDE, both of which have arrangements for brine baths as well as sea-bathing.

ZOPPOT, about a quarter of an hour by train from Danzig, has a beach of fine white sand immediately adjoining shady plantations. Behind these are the villas and hotels of the health resort, and inland of these is a range of wooded hills running nearly parallel to the shore. The Carlsberg, at OLIVA, a village a few miles from Zoppot, attains a height of 350 feet, and commands a magnificent view of the whole surrounding district. Zoppot is much resorted to during summer by families from Danzig, Stettin, Berlin, etc., as well as by some from Poland and Russia. WESTERPLATTE, at the mouth of the Weichsel (Vistula), has pleasant shady woods adjoining a beach of fine sand, as at Zoppot. It can be reached by steamer from Danzig in a few minutes, and is therefore often thronged with excursionists from Danzig who come to spend the afternoon and evening there.

KRANZ, the most easterly Baltic health resort of Germany, somewhat resembles Zoppot, and is about one hour by railway from Königsberg.

All these Baltic resorts, called Ostseebäder by the Germans, lie between $53^{\circ} 50'$ and 55° latitude north, and between the July isothermal lines for 60° F. and 70° F. The average summer temperature of the whole coast-line is probably about 62° F. to 63° F., and there is a good deal of bright clear weather. In summer the climate is somewhat less windy and less bracing than that of the North Sea coast. The mean relative humidity for summer appears to be slightly over 72 per cent. (Heringsdorf and Misdroy). The winter climate of the coast, especially of the more eastern portion, is a cold one; at Memel, the most easterly town of the German Baltic coast, there is a difference of nearly 37° F. between the mean monthly temperatures for July and January. "The curving round of the January isothermals of 30° , 20° , and 10° upon the regions surrounding the Baltic is to some extent due to the freezing of the shallow, brackish waters of that sea during winter. Had the Baltic been deeper and saltier, and not subject to freezing, the winter climate of places round its coasts would have

been much less severe."¹ The following figures, quoted from Hann, may be given as specimens of the temperatures of this region :

	<i>Mean annual temperature.</i>	<i>January.</i>	<i>July.</i>
Swinemünde, 45.7° F.	30.2° F.	63.3° F.
Putbus (Island of Ruegen), 45.5° F.	30.8° F.	62.6° F.
Memel, 43.9° F.	26° F.	62.8° F.

The climate of the Baltic coast is less distinctly marine than that of the North Sea, and in some respects it resembles that of large inland lakes. In regard to the sea, it must be observed that there is no tidal ebb and flow; the water is less salt, and the wave movement usually slighter, than on the North Sea and Atlantic coasts. While the Mediterranean has from thirty to forty parts of salt in 1000 parts of water, and the North Sea and Atlantic Ocean about thirty parts, the Baltic water has only from four to twenty parts; the saltiest portion of the Baltic is that nearest to the North Sea; at Heringsdorf the sea-water contains about ten parts of salt in the thousand. The mean temperature of the sea-water at the Baltic resorts during the summer months is from about 61° F. to 62° F.—slightly less than that at the German North Sea resorts, and several degrees lower than that at the resorts on the English Channel. At the Baltic resorts the sea attains its highest and pleasantest temperature for bathing (about 66° F. or higher) in August.

At all the German Baltic spas sea-bathing is permitted only at the regular establishments that have been erected for the purpose. These are large wooden structures projecting into the sea, and resembling the bathing establishments commonly employed for open-air bathing in inland lakes. Each health resort has at least two such establishments, one for men and one for women, some distance apart from each other. The times at which the establishments are open for use are fixed by the local authorities. No independent bathing is permitted, at least during the bathing season, on the coast or from boats.

The forests near the coast form a special feature of the Baltic

¹ A. Buchan, "Introductory Text-book of Meteorology," 1871, p. 72.

resorts, and not only afford protection from the sun during hot weather, but add considerably to the beauty of the scenery. At some places, such as Zoppot, shady plantations immediately adjoin the shore.

Several places along the coast possess brine springs that can be employed for baths before, or in some cases instead of, sea-bathing. Thus, Kolberg, Cammin, Dievenow, Swinemünde, and Greifswald possess brines (Soolen) of strengths varying from 2 to 5 per cent. The thermal establishment connected with the brine springs of Swinemünde is quite modern and complete in its arrangements.

At GROSS-MÜRITZ, in Mecklenburg-Schwerin, and at ZOPPOT there are charitable sanatoriums for scrofulous and weakly children of the poorer classes.

RUSSIAN BALTIC RESORTS

RIGA (latitude $56^{\circ} 57'$ north), the capital of Livonia, has a mean July temperature of 65.7° F. The mean temperature of the sea for the same month is about 66° F. KEMMERN, not far from Riga, is much visited for its cold sulphurous springs and peat baths. ARENSBURG, on the southeast coast of the island of Oesel, is much frequented and is chiefly known for its mud-baths. PERNAU, in Livonia, on the northeastern shore of the gulf of Riga, and HAPSAL, in Esthonia, are visited for their sea-baths and their mud-baths. At these places the kind of baths termed 'diluted mud-baths' are much employed. Their action doubtless more nearly approaches that of baths of water than that of the semisolid peat baths given at some health resorts. The mud at most of the Russian Baltic resorts comes from the sea, but at Pernau it is obtained from boggy ground.

REVEL, in Esthonia, and HELSINGFORS, the capital of Finland, opposite each other on the gulf of Finland, and the ALAND ISLANDS, at the mouth of the gulf of Bothnia, have good sea-bathing.

We may here likewise mention the sanatoriums for poor consumptives near the HALILA LAKE, in Finland, and the LINDHEIM SANATORIUM (300 feet), in Livonia, though the latter is far inland.

SCANDINAVIAN SEASIDE RESORTS

In Denmark, KLAMPENBORG and SKODSBORG, near Copenhagen, are popular resorts; on Sundays, however, during summer, Klampenborg and its beautiful Deer Park ('Dyrehave') are quite overrun by thousands of visitors, mostly of the poorer classes. MARIENLYST is a pretty suburb of Helsingör, from which it can be reached by a few minutes' walk. A little further along the coast, to the northeast of Marienlyst, is HELLEBEK. The VEJLEFJORD SANATORIUM for the treatment of **pulmonary tuberculosis**, situated on the Danish mainland, near Vejle and Fredericia, is one of the most modern establishments of its kind.

MARSTRAND, on a small island in the Kattegat, twenty-two miles northwest of Gothenburg, is a fashionable Swedish summer resort. On the Swedish coast, about twenty-six miles north of Marstrand, is LYSEKIL, another popular seaside place; further north, on the Skager-Rak, near the Norwegian frontier, is STRÖMSTAD, noted for its mud-baths. Still further north, in Norway, a few miles from Fredrikstad, is the HANKÖ '**Kyst Sanatorium.**' LAURVIK and SANDEFJORD, situated on 'fjords' of the opposite (Norwegian) coast, have mud-baths like those of Strömstad, and likewise sulphurous and chalybeate mineral waters. FREDRIKVAERN, near Laurvik, and HAGEVIK, near Bergen, may be mentioned as the sites of Norwegian seaside **sanatoriums for scrofulous children.**

RONNEBY, on the Baltic coast of Sweden, near Carlskrona, is a well-known health resort, with sea-baths, chalybeate waters, and mud-baths.

CHAPTER V

RESORTS OF INLAND EUROPE

High Altitude Winter Resorts of Switzerland. Swiss Summer Resorts of High Altitude. Swiss Resorts of Low and of Moderate Elevation.

Among the inland resorts of Europe, spas—that is, mineral water health resorts—occupy quite as important a position as climatic health resorts proper; but since the ordinary treatment at spas is chiefly by mineral waters and baths, we shall allude to them only briefly in this work, referring readers to the volume on “Hydrotherapy, Thermo-therapy, and Balneology” for an account of the action of the various classes of mineral waters and baths.

SWITZERLAND

HIGH ALTITUDE WINTER RESORTS ¹

Among Swiss health resorts we must first consider those of high altitude, especially the **winter resorts** of high altitude, some of which have attained a higher stage of development than mountain resorts in any other part of the world. In Part I of this work we have sufficiently described the general physiologic and therapeutic effects of climates of high altitude, and in Part III we shall further discuss the main indications for high altitude resorts in various diseases and morbid conditions. The use of high mountain valleys in Switzerland as winter resorts may be said to date from about 1865, a good many years after Archibald Smith ² had pointed out the value of the high mountain valleys of the Peruvian Andes in cases of pulmonary tuberculosis. About this time the subject was taken up by

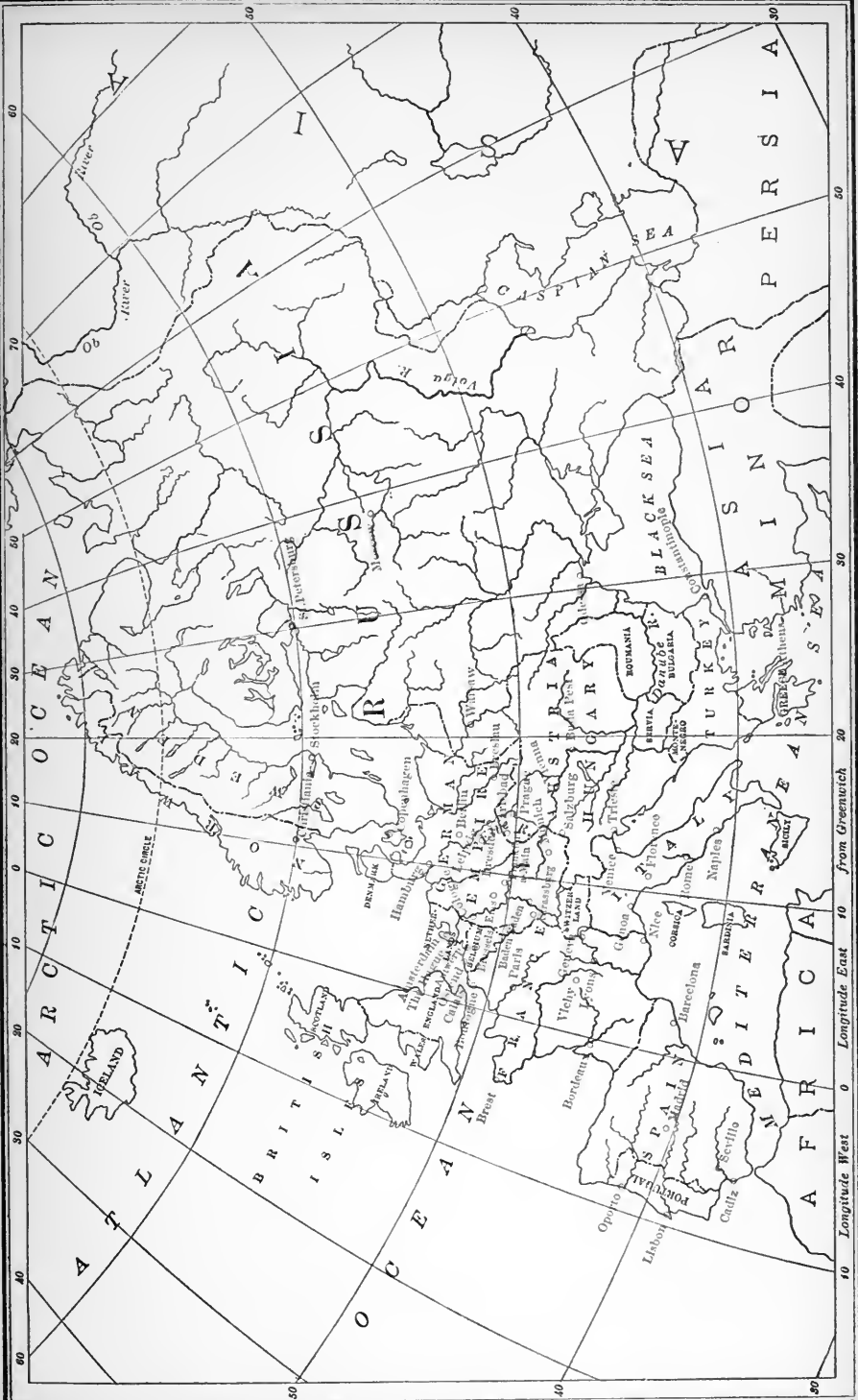
¹ As high altitude resorts in Switzerland we include those over 3500 feet above sea-level (*vide* Part I).

² See, especially, “The Edinburgh Medical and Surgical Journal,” 1840, vol. LIV, pp. 5-13.

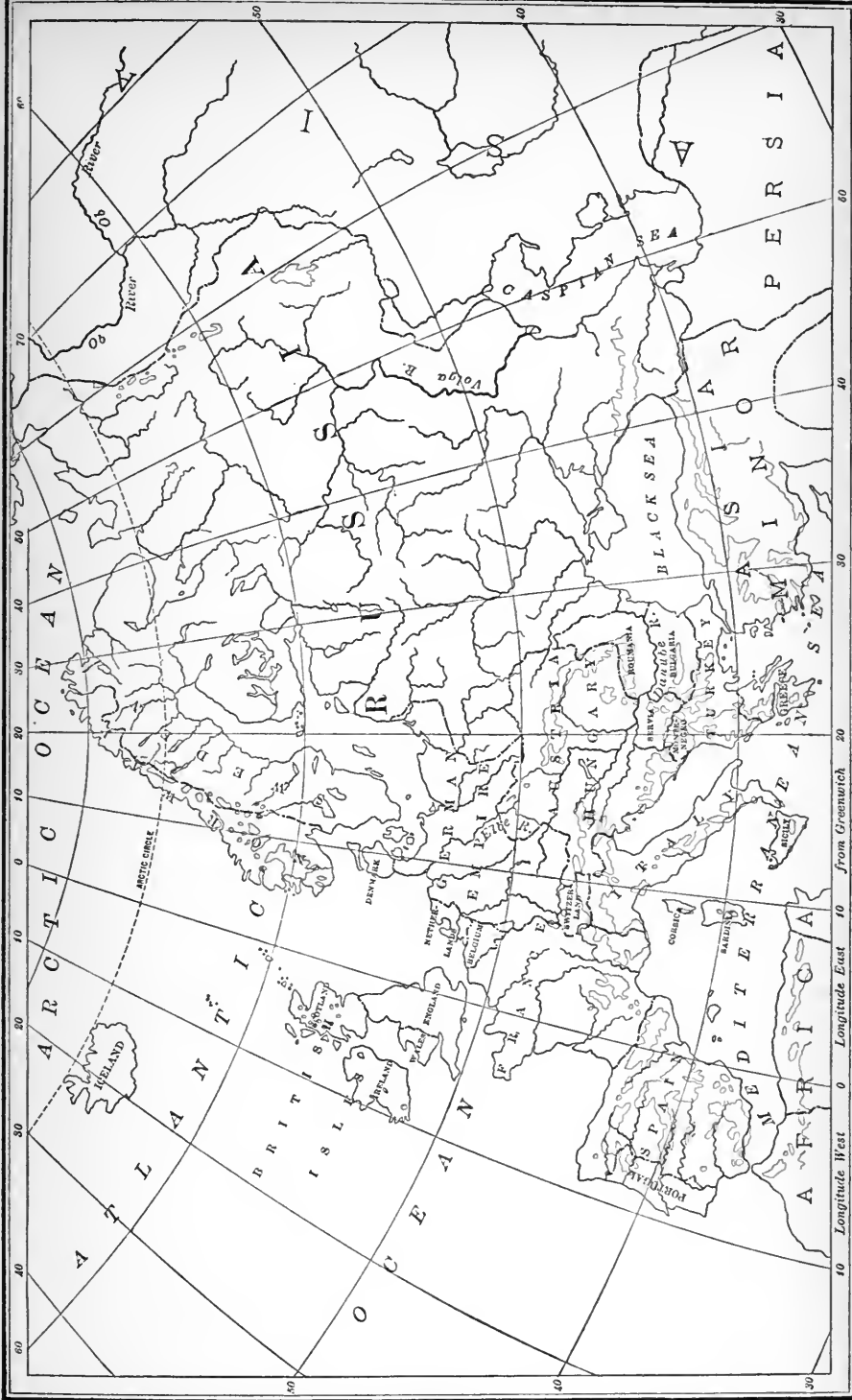
various medical writers, and not long afterward knowledge as to the winter climate in the Swiss mountains began to be disseminated in England by the writings of such laymen as John Addington Symonds and A. W. Waters. Before this the popular belief had been that during the winter months the high mountain valleys were sunless regions of ice and snow and fog and wind; but now there began to be talk of the bright winter days in the mountains, when the sun is so hot and the air so still that persons can sit out-of-doors during the greater part of the day and even require a protection from the great light and heat of the sun.

During the winter season, embracing five months, November to March inclusive, the mean temperature in these resorts is between 20° and 30° F.; the mean relative humidity, 60 to 80 per cent. of saturation; and the number of rainy or snowy days, about from 50 to 60. The amount of sunshine during the colder months, reckoned as the percentage of the possible sunshine (the observations at Davos including the seven months from October to April), is about 56 per cent.; but the possible sunshine in different places differs considerably. Davos-Platz and Davos-Dörfli are both on the sunny side of the valley, but a depression in the surrounding mountains allows the sun to shine slightly longer on Davos-Dörfli than on Davos-Platz. Places situated high up on the sunny sides of valleys or on elevations in valleys naturally have a longer duration of possible sunshine than those situated in the deeper parts; thus, the upper portion of Arosa gets more sunshine than the lower portion of Arosa, and Wiesen, St. Moritz-Dorf, and Leysin get more sunshine than the two Davoses, both of which are situated only slightly above the level of the valley. Leysin, which lies high up on a slope with an open outlook toward the south, has 7½ hours possible sunshine in December, while Davos has only about 5½. If we compare the amount of actual and possible sunshine at the Swiss mountain resorts with that at the sunniest winter resorts of Great Britain, we find that Davos-Platz has a monthly average of about 102½ hours (58.5 per cent. of the possible) for the three winter months, while Hastings has only about 67½ hours (26 per cent. of the possible), and Torquay about 61½ hours (24 per cent. of the possible).

The contrast between the cold in the shade and the warmth in

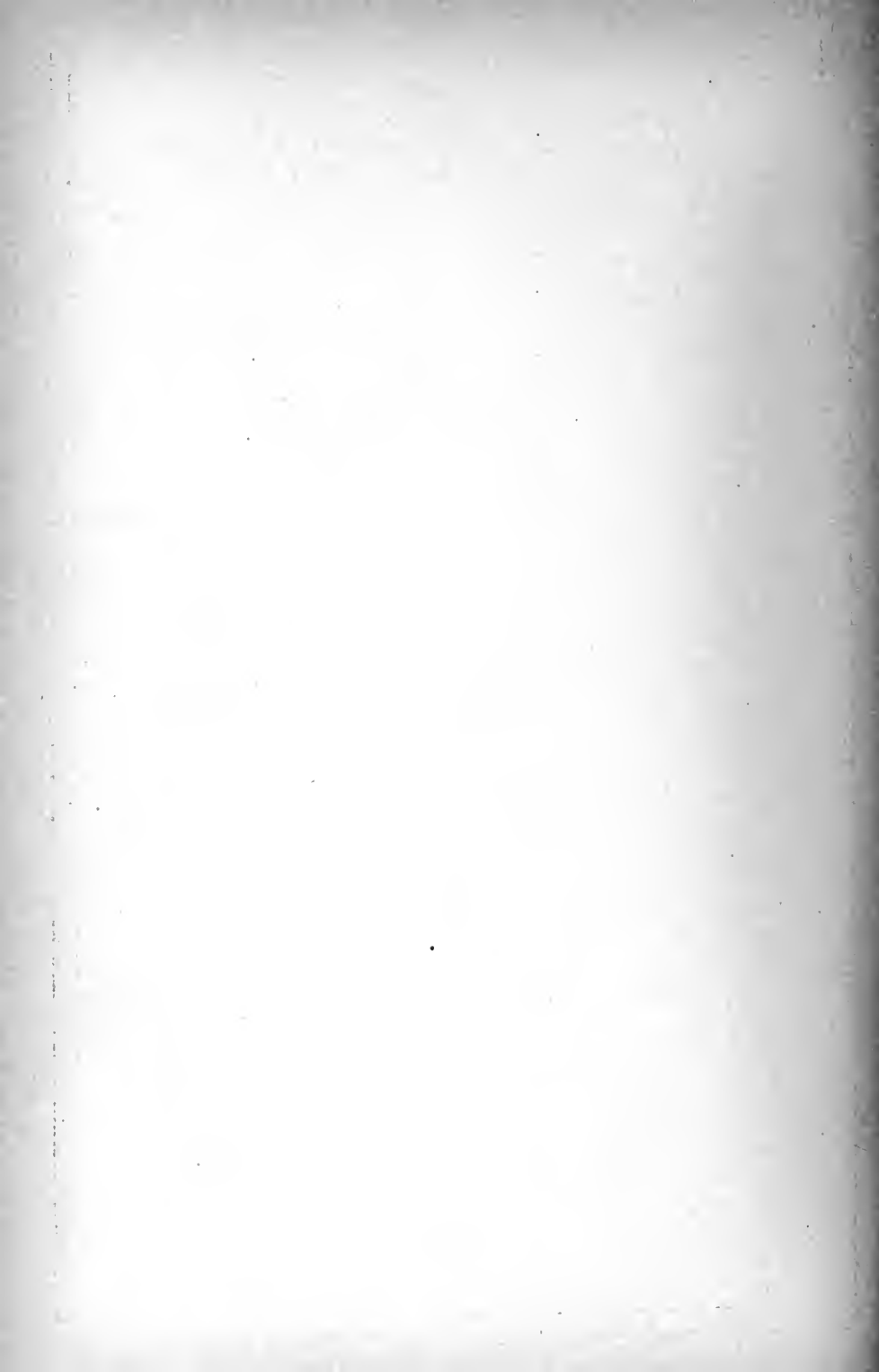






Areas enclosed in red, altitude of 3000 ft. or above.





places exposed to the sun is very great. Sir H. Weber gives a difference of 70° F. between the mean maximum temperature in the sun and the mean maximum temperature in the shade for December at Davos. Since the sun temperatures are so high, it is easy to understand how, with a mean monthly temperature of about 20° F., and a mean maximum temperature in the shade of about 36° F., persons can feel warm when sitting still in the open air watching the skating, and how a sunshade may often be agreeable. J. A. Lindsay says: "It may seem almost incredible that with the thermometer below freezing-point in the shade patients should sit for hours upon an exposed balcony with perfect impunity; that they should require sunshades although clothed in furs; and actually suffer from heat while the breath freezes upon the mustache—yet such are the seeming anomalies of Davos." Even in the shade and when the sun has set, the dryness and stillness of the air prevent the low temperature from being felt so much as it would be at low elevations. The stillness of the air enables the windows to be kept wide open during the night, and greatly facilitates the carrying out of the open-air treatment. The freedom from troublesome winds and dust in the high Alpine valleys is certainly a point in their favor when we compare them with other sunny winter resorts, such as those of the south of Europe and of Egypt.

During winter the ground is generally covered by from six to twenty-four inches of snow. This covering helps to keep the air free from dust, and, by reflecting the solar rays, increases the brightness and warmth in the sunshine. The time when the snow covering commences and the time when it begins to melt varies at different places, and also at the same place in different years. The seasons of different years differ from one another in the high mountains as everywhere else. At Davos the ground generally commences to receive its permanent winter covering of snow toward the end of November or beginning of December, but this may be delayed until January; the melting generally begins in the first half of March. At Les Avants, which is lower than Davos, the duration of the snow covering is shorter, and it has generally disappeared by the beginning of March. If the maximum winter stay is required, patients should arrive between the end of September and Novem-

ber in order to become acclimatized before the great winter snowfalls take place. The **snow-melting period** sometimes extends over several weeks, and is accompanied by much moisture, frequent changes of the temperature, and occasional violent winds. Coryza, coughs, and sore throats frequently occur at this time, and great caution must be observed by delicate patients. In many cases it is best for patients to remain where they are, because all climates at this season have their drawbacks, and a journey may be attended by greater risks than are incurred by remaining in the mountains. The individual case, however, must be considered, and sometimes there can be no grave objection to a change of climate, while occasionally the mental condition of the patient may render it even advisable. In the latter cases a change may be recommended to such places as Ragatz, Seewis, Thusis, the Hotel Dolder, near Zürich, Glion or Les Avants, above Montreux, Locarno, and other places on the Italian lakes.

Before describing the individual resorts we may consider briefly the main points in which, according to Ruedi and Solly, high mountain localities of Switzerland differ from those of the Rocky Mountains in North America. Most of the Swiss stations are more shut in and have a rather moister and colder climate, but less wind and dust than the stations in the Rocky Mountains. At Colorado Springs snow lies for only a few days during winter, and there is no troublesome snow-melting period as at the Swiss resorts. The limit of vegetable growth is much lower in Switzerland than in the Rocky Mountains, and apples or other fruits will not ripen at St. Moritz and Davos, as they will near Denver. Denver and Colorado Springs have a greater possible and a greater actual amount of sunshine than Davos-Platz. According to Solly,¹ for every 100 hours of actual sunshine during the three winter months at Davos-Platz there are 188 at Denver. At Colorado Springs, however, Solly states that severe and exceedingly disagreeable wind or dust

¹ "Medical Climatology," Philadelphia, 1897, p. 253. The period of observation on which these figures are based is, however, rather short. Moreover, in all such comparisons possible differences in standard have to be remembered. According to Swiss official observations (1886 to 1895), what Solly gives as 100 hours for Davos should be about 102½.

storms occur about six times a year, when the air is very dry and electric.

DAVOS-PLATZ (latitude $46^{\circ} 48'$ north), the best known winter mountain resort in Europe, lies in a valley of Canton Grisons, at an elevation of about 5120 feet above sea-level. In 1862 Dr. A. Spengler (died 1901) drew attention to the advantages of the Davos climate by his communications to Dr. C. Meyer-Ahrens, the author of the well-known work on Swiss health resorts. Dr. Unger, a German physician suffering himself from **pulmonary tuberculosis**, arrived early in 1865. During the winter of 1865-'66 there were only two invalids at Davos, but from that time, owing to the exertions of Dr. Spengler and Dr. Unger, the place gradually became more widely known. Twenty-two patients spent the winter of 1866-'67 there, and after some years the number of visitors became so great as to constitute a danger from overcrowding. The drainage, however, was then thoroughly improved, and the resort has maintained its reputation. The valley of Davos is about half a mile wide, and is watered by the Landwasser stream, which joins the Albula stream near Alveneu; the general direction of the Davos valley is from northeast to southwest, the health resort being situated on the northwest, the sunnier, side of the valley, partly on the slope. The shelter from cold winds is very good. Dr. R. Billwiller, the director of the Central Meteorological Institution of Switzerland, has kindly furnished us with the mean temperatures for the different months, derived from thirty years' observation (1864 to 1893). The mean monthly temperatures converted into degrees Fahrenheit, beginning at January, are the following: 18.8° , 22.8° , 26.4° , 35.8° , 44.2° , 50.2° , 53.8° , 52.4° , 47° , 37.6° , 29° , 21° . The mean annual temperature is 36.7° F. Dr. Billwiller gives the mean annual relative humidity as 79.7 per cent.; and the mean relative humidities for the different months, beginning with January, as follow: 83.4, 80, 78, 78.1, 75.4, 77.8, 79.6, 80.7, 80.6, 78.9, 79.6, 83.9 per cent. The average amounts, in hours, of actual sunshine (1886-'95) for the different months beginning with January are the following: 102.4, 115.8, 163.8, 173.7, 179, 171.9, 211, 209.9, 171.6, 131.1, 94.3, 89; for the year the total is $1813\frac{1}{2}$ hours, a rather higher figure than that of Hastings and the sunniest resorts of England.

The climate of Davos is best during winter, when the air is purer, the number of clear days greater, and the atmosphere stiller than during summer. In summer the heat during the day is often great and the dust is sometimes troublesome, while the mountain and valley winds may likewise be felt disagreeably. Davos is now connected by railway with the station of Landquart, on the line between Zürich and Chur (Coire). The 'open-air treatment' is carried out thoroughly at various **sanatoriums** both for paying patients and for poor **consumptives**. Dr. Turban's sanatorium, on the slope, about forty feet above the valley level, was built in 1887 and enlarged in 1894, being the earliest establishment of its kind in the Swiss mountains. On the **SCHATZALP**, 6120 feet above the sea-level and about a thousand feet above the valley, a sanatorium, under the direction of Dr. L. Spengler, has quite recently been instituted in a situation that gets about one hour more possible sunshine than Davos during the shortest days of winter. A funicular railway connects the Schatzalp with Davos.

DAVOS-DÖRFLI, one and a half miles higher up the valley, has a climate similar to that of Davos-Platz; as it is situated opposite to the entrance of the Dischma valley, it is not quite so well sheltered from winds, but, on the other hand, it receives slightly more sunshine.

FRAUENKIRCH, in the same valley, two and a half miles below Davos, has a somewhat lower situation and does not offer much accommodation for invalids. Opposite to it, in the Sertig valley, is **CLAVADEL**. It lies on the sunny slope of the valley, at an elevation of 5460 feet, and has greater advantages than Frauenkirch.

WIESEN is situated in the same valley (Landwasser), about eleven miles below Davos-Platz, at an altitude of about 4760 feet above sea-level, on a terrace nearly 1000 feet above the stream. The place is quieter and more picturesque than Davos, and obtains rather more sunshine; owing to its position being fairly open toward the south, it can get five hours of sunshine even on the shortest winter days (10 A.M. to 3 P.M.). The ground is covered with snow somewhat later, and the snow melts somewhat earlier, than at Davos. Wiesen is sometimes utilized by patients for a stay before or after a season at Davos.

The neighboring KURHAUS MONSTEIN (5250 feet), in the short branch valley of Monstein, opening higher up on the opposite side, may be mentioned as a summer resort. The little SPINABAD (4820 feet), with a cold sulphur spring, is situated in the main valley, about half-way between Davos and Wiesen.

AROSA, in a branch of the Schanfiggthal, is a more elevated winter and summer resort than Davos, from which it is separated by high mountains; good walkers can cover the distance between the two places by the Strela Pass in about four and one-half hours. It consists of a number of hotels and villas, all enjoying considerable shelter from wind, the altitude of different portions varying from 5700 to 6090 feet above sea-level. The buildings of the higher portion, where there is a sanatorium (6090 feet) for consumptive patients, are best adapted for winter residence, because the sunshine lasts longer than in the lower portion. The latter, near which is a little lake, is well suited for the summer months. Dr. Billwiller kindly tells us that the mean temperatures (Fahrenheit), computed from ten years' observation (1890 to 1899), are the following for the different months, commencing with January: 22.4°, 24.1°, 27.7°, 34.2°, 41°, 47.8°, 51.4°, 51.4°, 46.8°, 39.6°, 33.1°, 25°. The mean annual temperature is 37° F. The mean relative humidities for the different months, beginning with January, are as follow: 60.3, 59.4, 62.8, 65.5, 67.8, 67.8, 68.4, 65.3, 66.5, 64.8, 59.9, 57.9 per cent. The mean annual relative humidity is 64 per cent. Dr. Billwiller also gives us the mean number of hours of actual sunshine for the years 1890 to 1899, for the different months, beginning with January, as follow: 108.5, 127.7, 160.8, 159.2, 160.8, 163.8, 196.9, 214.1, 172.5, 142.4, 120.2, 99.4; total sunshine for the year, 1826.2 hours. During the three winter months Arosa gets about 28½ hours of actual sunshine more than Davos-Platz. Arosa has therefore a somewhat higher winter temperature, rather more sunshine, and a lower relative humidity than Davos. It is a quieter place than Davos or St. Moritz. It can be reached by diligence in about five hours from the railway station of Chur.

ST. MORITZ-DORF, in the valley of the Upper Engadine (Canton Grisons), lies at an elevation of 6100 feet above sea-level, and about 300 feet above the level of the valley. It is rather

windier and colder than Davos, the ground becomes covered with snow somewhat earlier, and the snow begins to melt later. Dr. Billwiller has kindly furnished us with the following data, which, though referring to the neighboring village of Sils, may to some extent be accepted as illustrating the climate of St. Moritz. The mean monthly temperatures, converted into degrees Fahrenheit, and beginning with January, are : 17.4°, 20.6°, 24.6°, 32.9°, 41.2°, 48.2°, 52.2°, 50.7°, 45.3°, 36°, 27.1°, 19.6°. The mean annual temperature is 34.7° F. The mean relative humidities for the different months, commencing with January, are : 77.7, 76.4, 76, 73.9, 73.3, 71.8, 72.5, 75, 78.4, 78.4, 78.2, 77.7 per cent. The mean annual relative humidity is 75.8 per cent. The winter climate of St. Moritz is suited for a somewhat more robust class of patients than that of Davos. It is especially suitable for the large class of persons free from tuberculosis and grave organic disease, who, owing to overwork or other causes, require a holiday during winter in a sunny, very bracing resort, where there are good opportunities for skating, tobogganing, and the open-air sports of the season. These sports have been for many years successfully cultivated by English visitors to the Alps, especially at St. Moritz.

ST. MORITZ-BAD (latitude 46° 30' north) is situated at the ordinary level of the valley, about 300 feet lower than the Kulm (upper part of the village) of St. Moritz, from which it is about one and one-fourth miles distant. On one side of the spa is the lake of St. Moritz, and on the other side, the lake of Campfer. The chalybeate springs, for which St. Moritz-Bad has long been known, are used in the same class of cases as those of Spa, Schwalbach, Pyrmont, etc., but are rather weaker in the proportion of iron bicarbonate that they contain. Visitors taking the waters have the alternative of residing at St. Moritz-Dorf, which is, on the whole, more bracing than the spa itself, and is connected with it by an electric tramway; or they may, if so preferring, stay at the neighboring village of Campfer. The springs are not kept open during winter; the spa season is from the middle of June to the middle of September. In the case of feeble patients and those with excitable vasomotor system, it is advisable to rest for some time preliminarily at an intermediate station of somewhat lower altitude, such as Churwalden,

Parpan, Savognin (German, Schweiningen), or Bergün. In the course of a few years St. Moritz will probably be connected with Thusis and Chur (Coire) by a railway *via* the Julier Pass, Tiefenkasten, and the magnificent scenery of the so-called Schyn Pass.

LEYSIN, 4760 feet above sea-level, the recently established summer and winter resort near Aigle, in Canton Vaud, is situated about 600 feet above the village of Leysin, on the southwestern slope of the Tour d'Aï mountain chain. Its position, open toward the south, gives Leysin an abundance of sunshine and a beautiful view across Aigle and the Rhone valley, toward the peak of the Dent-du-Midi. It is sheltered from northerly and northeasterly winds by the Tour d'Aï behind it, and has good paths and pine woods in the neighborhood, where exercise can be taken. According to de la Harpe, for 100 hours of actual sunshine at Davos during the winter months there are 108 at Leysin village. The maximum possible daily sunshine for December is seven and one-half hours, and for January, twenty minutes more. The mean temperature for February, the coldest month, is 27.8° F. The modern **sanatorium** and **open-air treatment** are extensively carried out at Leysin.

MONTANA, in the Canton Valais, is a summer and winter station situated on the heights to the north of the Rhone valley, above the village of Montana, at an altitude of about 5010 feet above sea-level. It lies in a kind of natural park, with beautiful pines and lawn-like grassy slopes, about two hours distant from the railway station of Sierre, with which it is connected by a good carriage road, completed in 1898. There is rather too much water, in the form of small lakes, in the neighborhood.

LES AVANTS, in the Canton Vaud, above Montreux, stands at an elevation of 3500 feet, in a kind of broad amphitheater, sheltered on all sides except the south by the surrounding heights. Its position, free toward the south, is very sunny, and the time during which the ground is covered with snow is shorter than at Davos; the snow has usually disappeared in the beginning of March. Les Avants is kept open all the year round, and is suitable in cases needing a milder climate and somewhat lower elevation than Arosa, St. Moritz, Davos, etc.

There are a few other resorts in the mountains of Switzerland,

such as SAMADEN in the Engadine, and ANDERMATT near the St. Gothard tunnel, that are used to some extent during winter as well as during summer ; but these will be referred to among the stations in the Swiss mountains used chiefly or merely as **summer resorts**, to the consideration of which we shall now proceed.

SWISS SUMMER RESORTS OF HIGH ALTITUDE

The **summer season** in the high mountain resorts is a short one, varying at the different localities from three to five months. Some of the hotels, as many of those in the Upper Engadine, are open only from the middle of June to the middle of September, while others, as the Belalp Hotel above the Rhone valley, receive visitors during the five months from June to October ; most of them are open for about four months.

Some of the **general features of the summer climate** of Swiss mountain resorts, such as those of the Upper Engadine, Davos, and Arosa, are worthy of brief mention.

Though the temperature during the summer months may reach 70° to 80° F. in the shade, the highest mean monthly temperature is only about 54° F., and the temperature sometimes falls from thirty-five to forty degrees Fahrenheit within a day. During winter it may fall to from 5° F. below zero to 15° F. below zero. Although the absolute annual range of temperature is about from 80° F. to 95° F., the difference between the mean temperatures for the hottest and the coldest month of the year is only about from 25° to 35° F. The mean daily range of temperature at all seasons of the year can be put down at about from 12° to 15° F. The mean temperature for the three summer months is about from 50° to 53° F., and the number of rainy days (Davos) during the same period is about 35. There is more wind and more dust in summer than in winter. In taking up individual resorts, we shall first consider those of the Engadine.

The localities in the **Upper Engadine** are the most popular summer resorts of high altitude in Europe, and probably in the world. In addition to excellent hotels, beautiful scenery, and, in some cases, as at Pontresina, the proximity of glaciers, they

have likewise the advantage of good carriage roads that allow of drives in several directions. In this last respect they can scarcely be rivaled by other mountain resorts. The Engadine valley, or Swiss portion of the valley of the Inn, stretches from the Maloja Pass at the southwest to the Austrian frontier at the northeast. The portion of the valley above Punt-Ota, between Zuz and Zernez, is called the Upper Engadine, to distinguish it from the Lower Engadine, which has a somewhat lower elevation and a rather less bracing climate.

The MALOJA (5960 feet) is the lowest pass between Switzerland and Italy. At the summit of the pass, just above the southern extremity of the lake of Sils, stands the fine Hotel Kursaal, which at first was kept open during the winter as well as during the summer, but is now used merely as a summer resort, from the middle of June to the end of September. The views from the Maloja in both directions are very fine. The descent from the Val Bregaglia side of the pass, toward Chiavenna, is precipitous and forms a contrast to the Engadine side.

SILS MARIA (5895 feet) stands at the northeastern end of the lake of Sils, at the entrance of the Fex valley. The accommodation is comfortable, and there are shady walks in the neighborhood. Sils Maria has an advantage of being half a mile distant from the dusty road between Maloja and St. Moritz, which passes by SILS BREGAGLIA. We have given some meteorologic data concerning Sils in speaking of St. Moritz.

SILVAPLANA (5958 feet) is a quiet, and, in summer, rather dusty, place, between the lakes of Silvaplana and Campfer. CAMPFER (6000 feet), near the northern end of the small lake of that name, is only about one and one-half miles distant from St. Moritz-Bad, and persons drinking the waters of St. Moritz can reside at Campfer if they prefer a quieter place.

The village of St. MORITZ has already been considered under winter resorts, and for convenience the baths of St. Moritz were described in the same place.

CELERINA (5650 feet), between St. Moritz and Samaden, has accommodation for the less fastidious.

SAMADEN (5670 feet), three miles from the village of St. Moritz,

is both a summer and a winter resort, and has a winter climate very similar to that of St. Moritz. It is the chief village of the Engadine, and the accommodation is satisfactory.

Six miles below Samaden is ZUZ (5548 feet), a pleasant village with good accommodation. The mean temperature for July reaches 57.4° F. at this place. The shady walks are rather too distant, none being less than twenty minutes away.

PONTRESINA (5915 feet), about three and a half miles to the south-east of Samaden, lies in a branch valley leading from the Upper Engadine over the Bernina Pass toward Italy. The village, with its numerous hotels, extends for half a mile or more along the right, which is the sunny side of the valley, opposite the opening of another valley leading to the Roseg glacier. The mean July temperature is 51.6° F. The proximity of large glaciers, the shady walks in the neighborhood, and the excellent accommodation are great advantages for persons needing **rest from mental work** in a bracing sunny climate, with facilities for walking and climbing exercise. Pontresina is, however, the most fashionable summer resort of the Engadine, and is much more visited by healthy persons, for the great beauty of the scenery, the mountaineering, and the like, than by invalids.

In the **Lower Engadine** are the well-known springs of TARASP, with the neighboring health resorts of SCHULS and VULPERA. The Kurhaus of Tarasp (3890 feet) is situated in a deep part of the valley, on the northern bank of the Inn, and although more sheltered from winds, gets less sun than the more elevated and open villages of Schuls (3970 feet) and Vulpera (4180 feet). The spa is best known for its sulphated alkaline mineral waters, but some of the springs may be classed in the gaseous chalybeate group. The VAL SINISTRA water, in the neighborhood, contains a certain amount of arsenic in addition to iron bicarbonate. In Part III of this work we shall have occasion to point out many conditions in which mineral water treatment at Tarasp is suitable. The climate of this neighborhood is milder than that of the Upper Engadine, as is shown by fruit ripening at Schuls. The mean temperature for the three summer months at Schuls is 59° F., and the number of rainy days is 25. The mean summer temperature at Tarasp is apparently

about 1° F. lower than at Schuls. The good accommodation, the fine walks, and the beauty of the scenery render the neighborhood very attractive for **summer residence**. Persons taking the waters at Tarasp may reside at any of the three localities.

FETTAN, on the north side of the valley, one and a half hours by carriage from Schuls, has a considerably more elevated position (5405 feet) and beautiful views toward the south. The accommodation, however, is as yet only moderate. The mean temperature for July is 54.5° F.

Leaving the Engadine, we shall first mention **other summer resorts of high altitude** in the Canton of Grisons, and then proceed to those in other parts of Switzerland.

KLOSTERS, in the broad Praetigau valley, is on the line of railway to Davos. It consists of different portions, the highest of which is KLOSTERS-DÖRFLI, 4190 feet above sea-level. The mean temperature for the three summer months is about 53° F.

BAD FIDERIS (3580 feet), lower down the Praetigau valley, has weak gaseous chalybeate waters.

The village of LANGWIES (4285 feet), the chief place of the Schanfiggthal, is used as a summer resort; it stands on the road from Chur to Arosa, and at the foot of the Strela Pass to Davos.

On the Bernina Pass, between Le Prese and Pontresina, is the BERNINA HOSPICE HOTEL (7575 feet), one of the highest hotels in Switzerland, but only rarely used for a prolonged stay as a health resort.

The following places are on the Julier route, between the Upper Engadine and Chur: MOLINS (German, Mühlen), altitude 4790 feet; SAVOGNIN (German, Schweiningen), altitude 4060 feet; KURHAUS LENZER-HEIDE, altitude 4775 feet; PARPAN, altitude 4940 feet; CHURWALDEN, altitude 4120 feet.

BERGÜN (4475 feet) is situated in the Albula valley, close above the romantic gorge termed the Bergüner Stein.

SOGLIO (3570 feet), in the Val Bregaglia, near the Italian frontier, can be used as a quiet summer resort.

SPLÜGEN (4760 feet) lies in an open valley at the northern foot of the Splügen Pass.

SAN BERNADINO (5320 feet), on the south side of the pass of that name, between Splügen and Bellinzona, has gaseous chalybeate waters and satisfactory accommodation.

We shall now mention the summer resorts that one would pass were he to travel from Chur up the Vorder-Rhein valley, and then, crossing the Oberalp and Furka Passes, proceed down the Rhone valley to the lake of Geneva.

The FLIMSER WALDHÄUSER (3700 feet), near the little town of Flims, on the northern slope of the Vorder-Rhein valley, are celebrated for their beautiful beech and pine woods. They lie on the main road between Chur and Ilanz. On hot days the more robust visitors may bathe in the little lake when the water has a temperature of about 70° F.

VALS-AM-PLATZ (4090 feet), in the Valser Thal, fourteen miles to the south of Ilanz, has subthermal (77° F.) calcium sulphate waters and fair accommodation.

DISENTIS has excellent accommodation and a rather mild climate considering its altitude (3770 feet).

ANDERMATT (4738 feet), on the western side of the Oberalp Pass, four miles from the station of Göschenen, on the St. Gothard railway, is a summer and winter resort. The mean winter temperature for the five months from November to March is 21.7° F.; therefore lower than that of Arosa and Davos, although both the latter places are more elevated.

HOSPENTHAL (4800 feet), one and a half miles southwest of Andermatt, has good summer accommodation.

The HOTEL PIORA (6100 feet), in the Val Piora, sheltered from north winds, may here be mentioned. The mean July temperature, according to de la Harpe, is about 56.3° F. It can be reached from the railway station of Airolo in about two and a half hours.

On the western side of the Furka Pass is the Rhone valley, in which and its branches a number of high altitude resorts are situated. The RHONE GLACIER HOTEL (5770 feet) is placed at the junction of the Furka and Grimsel Passes, at the base of the Rhone glacier.

ZERMATT (5315 feet) lies in a valley amidst high glacier-covered mountains, commanding magnificent views of the Matterhorn and

other peaks. The mean temperature for June, the hottest month, is 52° F., and for the three summer months, 51.2° F. It is a great mountaineering center, and hence rather noisy for persons needing quiet. The railway journey from Visp (Viège), in the Rhone valley, takes about two and three-quarter hours. Above Zermatt are the still higher hotels—the RIFFELALP (7305 feet), the RIFFELHAUS (8430 feet), the SCHWARZSEE (LAC NOIR) HOTEL (8490 feet), and the GORNERGRAT HOTEL (10,260 feet); the last three are quite unsuitable for delicate invalids.

The HÔTEL BELALP (7155 feet), near the Aletsch glacier, is a favorite summer resort of the English.

Other resorts of high altitude in the Rhone valley and its branches, between Visp and the Furka Pass, are the RIEDER-FURKA (6820 feet), the RIEDER ALP (6315 feet), the EGGISHORN HOTEL (7190 feet), BINN (4720 feet), BERISAL (5000 feet), and SAAS-FÉE (5900 feet).

To the south of the Rhone valley, between Visp and Martigny, are MAYENS DE SION; EVOLENA, in the Val d'Hérens, six hours distant from the railway station of Sion; AROLLA (6570 feet), a very bracing resort in a branch of the Val d'Hérens, three and a half hours from Evolena; the HOTEL BELLA TOLA and HOTEL MONT-CERVIN, near St. Luc; CHANDOLIN (6340 feet), above St. Luc; the HÔTEL WEISSHORN (7690 feet), with too little shade, above Vissoye; ZINAL (5500 feet), near the southern end of the Val d'Anniviers; and the LAC DE CHAMPEX (4810 feet), near Orsières. Nearer to the lake of Geneva, at an altitude of 4300 feet, in the Val de Morgins, a branch of the Val d'Illiez, is MORGINS-LES-BAINS, with chalybeate waters.

In the valleys and on the heights to the north of the Rhone valley, between Visp and the lake of Geneva, are Loèche-les-Bains and several places to be reached from Bex and Aigle, that we must now consider. Montana, above Sierre, and Leysin, above Aigle, have already been mentioned among winter resorts. Above Bex we may mention GRYON, a village situated on a slope, at an altitude of 3632 feet, commanding a magnificent view of Bex in the valley below it, and of the Dent-du-Midi on the opposite side of the Rhone; it has perhaps too little shade. LES PLANS-DE-FRENIÈRE

is a neighboring village at a slightly lower elevation, close to shady woods. VILLARS-SUR-OLLON and CHESIÈRES are situated close together on sunny open slopes, about four and a half hours by diligence from the railway station of Aigle; Villars (4170 feet) is about 200 feet more elevated than Chesières, from which it is about twenty minutes distant. Other summer resorts to be reached from Aigle are the HÔTEL DES DIABLERETS, in ORMONT-DESSUS, LA COMBALLAZ, and CHÂTEAU D'OEX. The last-mentioned place, much resorted to by the English, is situated in the middle of the valley of the Sarine, at an elevation of less than 3500 feet. It is likewise used to some extent as a winter resort, in spite of its comparatively low situation. The mean temperature for the three summer months, June to August, is 56.3° F.; for the five winter months, November to March, 34° F. The mean annual rainfall is 46 ½ inches.

LOÈCHE-LES-BAINS (LEUKERBAD) is situated in Canton Valais, at an altitude of 4600 feet, on the southern side of the Gemmi Pass, about three and a half hours by carriage from the railway station of Loèche-Souste, in the Rhone valley. The expanded valley-head in which the baths of Loèche lie is surrounded by precipitous mountains, except on the south and northeast. Although not so regular in shape as that vast amphitheater, it is to some extent—more so, at least, than most Alpine valley-heads—analogue to the famous Cirque de Gavarnie, in the Pyrenees. The shelter from cold winds is fairly good. The midday in summer may be very hot, the heat being increased by reflection from the rocks, but, owing to the surrounding heights, the sun rises late and sets early, and on the longest days of the year can shine only between 7 A.M. and 5 P.M. The season lasts from June to September, and for these months Dr. de Werra calculates the mean temperature at 1 P.M. as about 60° F., while the mean temperature at 7 A.M. and at 9 P.M. is about 50° F. The mean relative humidity for the season is about 68 per cent. The rainfall for the season is about 16 ½ inches, and for the whole year, about 30 inches. Loèche-les-Bains has thermal waters containing a moderate amount of calcium sulphate, somewhat resembling those of Bath, in England; they are chiefly employed for prolonged tepid baths in **chronic cutaneous affections**. The local effect of these prolonged baths on the skin is, as Dr. de la

Harpe points out, an irritative or stimulant one; they are serviceable in very chronic cases of eczema and psoriasis, which are not spreading and not accompanied by much itching.

In the neighborhood of Loèche-les-Bains is the **TORRENTALP HOTEL**, in an open position, with fine views, at an elevation of 8000 feet above sea-level; at this elevation, of course, no shade trees can be expected.

We shall now describe some high altitude resorts in other parts of Switzerland, mentioning, first of all, those in the **Bernese Oberland** and other parts of the Canton of Bern.

GRINDELWALD (3460 feet) is beautifully situated to the north of the great Bernese Mountains, and is not far from two large glaciers—the upper and the lower Grindelwald glaciers; these are great attractions for tourists during the summer season. It is well sheltered from the north, but the south wind (foehn) is sometimes violent, especially during spring and autumn. Grindelwald is used as a winter resort as well as a summer resort. It is frequently visited during winter by healthy persons for the tobogganing, skating, etc. The mean temperature for the three summer months is about 64° F.; for the three winter months, about 31° F.

MUERREN (5350 feet), a much frequented summer resort, has a magnificent view toward the mountains of the Oberland.

WENGEN, the **HOTEL JUNGFRAU** on the **WENGERNALP**, the **HOTEL BELLEVUE** on the **LITTLE SCHEIDEGG**, **ISENFLUH** (3600 feet), above **Zweilütschinen**, **ROSENLAUI**, **ENGSTLENALP**, and the **AXALP**, above **Giessbach**, are other summer resorts of the Oberland.

ST. BEATENBERG (3770 feet) is a beautifully situated summer resort to the north of the lake of Thun, well sheltered on the north and northeast. The mean temperature for the three summer months is 56.5° F.; for the three winter months, 30.4° F. It is reached by a cable railway from a station on the lake.

GURNIGEL (3780 feet) has an open situation on the northern slope of the Gurnigelberg, adjoining an extensive pine forest with numerous sheltered paths. The sulphurous waters have a special reputation in disorders of the digestive organs. The mean temperature of the air for July, the hottest month of the year, is 60.6° F.; the

daily range is 13.3° F. The relative humidity is said to be rather high, on account of the forest.

The BATHS OF LENK (3630 feet), near the northern end of the upper Simmenthal, commanding a fine view of the rocky ridges and glaciers of the Wildstrubel Mountain, possess strong sulphur waters.

ADELBODEN has a sunny position on the side of the valley of that name, at an elevation of 4450 feet above sea-level.

Among high altitude summer resorts in other parts of Switzerland are the HOTEL ALPENCLUB (4790 feet), above Amsteg, in the picturesque MADERANER THAL (Canton Uri); the sulphur baths of SCHIMBERG (4670 feet), in Canton Lucern; and the well-known hotels on the RIGI and the PILATUS; the Rigi and Pilatus hotels, with the exception of the Rigi-Scheidegg (5460 feet), are too much frequented by tourists to be suitable for persons requiring rest and quiet. CHAUMONT (3845 feet), above Neuchâtel, and KURHAUS WEISSENSTEIN (4220 feet), above Solothurn (Soleure), in the Swiss Jura Mountains, owing to their open situations possess more bracing climates than would correspond to the same elevations in the Alpine ranges.

SWISS RESORTS OF LOW AND OF MODERATE ELEVATION—BELOW 3500 FEET

In Part I allusion has been made to the influence of large inland lakes upon the climate of stations in proximity thereto, and we shall now speak of localities in the neighborhood of the LAKE OF GENEVA. This great lake lies just south of latitude 46.5° north, at an elevation of 1230 feet above sea-level, and has a mean depth of 500 feet. The temperature of the surface water varies from about 45° F. in winter to 80° or even 85° F. in summer, and the lake is never entirely frozen over. The western part is bordered by a considerable stretch of nearly level ground, but the eastern part is surrounded by mountains that are closest to the shore on the southern, or French, side of the lake. The writings of J. J. Rousseau and of Byron have helped to make the district from Vevey to Chillon well known the world over.

MONTREUX (latitude $46^{\circ} 26'$ north), on the northeastern shore of the lake of Geneva, is the best-known health resort of the Swiss lakes. It may conveniently be taken to include the whole district from Clarens to the picturesque castle of Chillon (Clarens, Vernex, Montreux, Territet, and Veytaux), and is famous as a locality for the grape cure in the autumn, as well as for the mere climatic features of a health resort. The chief seasons are autumn and spring, but there are numerous visitors at all times of the year. Dr. Billwiller, Director of the Central Meteorological Office of Switzerland, has kindly furnished us with the following data concerning Montreux: The mean annual temperature is 50.2° F. The mean monthly temperatures, in degrees Fahrenheit, beginning with January, are: 34° , 36.9° , 40.6° , 50° , 58° , 63.9° , 66.8° , 65° , 59.6° , 50.4° , 42.1° , 35.4° . The mean relative humidities for the different months, commencing with January, are: 77.3, 73.4, 67.1, 65.7, 66.6, 66.8, 66.6, 67.9, 75.6, 76.9, 76.9, 77.8 per cent.—average for the year, 75.2 per cent. Mists are, on the whole, relatively rare. The mean annual rainfall is 46 inches, and there are about 140 rainy days. The climate is often compared to that of Meran, in Tirol, and the mean winter temperatures of the two places are nearly the same. The amount of actual sunshine at Montreux is not great in comparison with that at many health resorts. The mean duration in hours for the different months has been kindly furnished by Dr. Billwiller, from the official observations for the years 1893 to 1899. Beginning with January, the figures are the following: 66.9, 95.3, 136.4, 170.5, 174.8, 191.4, 222.4, 234.5, 163, 123.2, 72.5, 56.3. If we can trust to figures obtained from so limited a period of observation, the average yearly amount of sunshine at Montreux is only 1707 hours—that is, about 54 hours less than at Hastings, on the south coast of England; while during the three winter months Montreux has about $88\frac{1}{2}$ hours less sunshine than Davos-Platz, and about $176\frac{1}{2}$ less than Lugano. At Montreux there is not the marked diurnal variation of temperature that is so striking a characteristic of the Western Riviera climate, and **excitable patients** who suffer from sleeplessness, etc., on the Riviera, often do well at Montreux. The best season at Montreux is autumn, for, during spring, snowfalls on the neighboring slopes occasionally cause

sudden changes in the temperature of the air. The mountains to the north of Montreux afford great protection from cold winds. The 'bise,' or northeast wind, which is very troublesome on the shores of the lake from Geneva to Lausanne, is hardly felt at Montreux. In a general way the protection afforded by the mountain wall may be said to increase in a direction eastward along the coast from Vevey. TERRITET and VEYTAUX are the most protected spots, but as a consequence of their position get slightly less sunshine. Thus, during the shortest days of winter, while CLARENS can get six hours of sunshine, Veytaux can get only five (about 10.30 A.M. to 3.30 P.M.).

The grape cure in Montreux and the neighborhood begins about the end of September and lasts about a month. The grapes are smaller, have thinner skins, and contain more sugar than those of Meran. Montreux is likewise an excellent locality for courses of **milk and whey**.

Above Montreux are several localities situated on the slopes and mountains at various higher elevations. Among these are CHARNEX, or Chernex (1890 feet), one and one-half miles above Clarens; LES PLANCHES (1480 feet), above Montreux; MONT-FLEURI (1970 feet), above Territet; and, higher up still, Glion, Caux, and Les Avants. LES AVANTS has already been described among winter resorts. GLION (2250 feet) has a sunny situation on a terrace about 1000 feet above the lake; it commands beautiful views, and is reached by a funicular railway in about nine minutes. The GRAND HÔTEL DE CAUX (3610 feet), which, like Les Avants, is kept open all the year round, has a more open and slightly more elevated, but less sheltered, position than Les Avants. It is reached by the rack and pinion railway between Glion and the ROCHERS DE NAYE, where there is likewise a hotel, kept open during the summer months, at an elevation of about 6470 feet.

There is, therefore, a great choice of altitudes at which patients and visitors may reside in the neighborhood of Montreux. The hotel or dwelling must be selected according to the nature of the case and the season of the year. During hot weather the scarcity of shade may be felt, but there are some woods, as near Veytaux, and in the shady Gorge du Chaudron between Glion and the lake.

VEVEY, three and one-half miles westward of Clarens, has a beautiful position on the lake, but is less sheltered from the north and northeast than Montreux, and its temperature is more variable. The 'bise,' or northeast wind, is, however, not nearly so much felt at Vevey as at Lausanne and Geneva. Vevey is at its best in autumn, and is a good place for the **grape cure** and **milk cure**. Climates of higher altitude may be reached quickly by the recently opened funicular railway from Vevey to MONT-PÉLERIN (3550 feet). The whole shore from Vevey to the castle of Chillon is connected by an admirable electric tram service.

LAUSANNE has a hilly situation above the northern part of the curve of the northern shore of the lake of Geneva. The altitude of different portions varies from 1500 at the railway station, to 1735 feet at the commanding terrace on which the cathedral stands. The city is much exposed to winds from the southwest, north, and northeast, and has a somewhat colder and less equable climate than Montreux. The mean annual temperature (Hirzel, quoted by de la Harpe) is 49.3° F.; the mean January temperature, 32.5° F. The annual rainfall is nearly 41 inches, and there are 151 rainy days. There are good villas and houses in the newer quarters, and the facilities for the education of children and the moderate expense of living at Lausanne have attracted many English families as permanent residents.

OUCHY (1230 feet), the port of Lausanne, with which it is connected by a cable railway, is more sheltered from the north. The Beau Rivage and other hotels border the lake.

Mention may here be made of the French spa, EVIAN-LES-BAINS, situated opposite to Lausanne, on the southern shore of the lake of Geneva. Its weakly mineralized waters and baths are much resorted to by the French in **affections of the urinary system**. Owing to its position on the lake to the north of the mountains, the summer is less hot than at Lausanne and Montreux. The bathing season is from June to the commencement of October. THONON, with similar waters, is situated six miles to the west of Evian, on a cliff about 130 feet above the lake.

GENEVA (latitude 46° 12' north), though not strictly speaking a health resort, is much visited by invalids and others on their way to

and from various stations. It is situated on the Rhone, at the southwestern extremity of the lake of Geneva, at an altitude of 1240 feet, and within sight of the high mountains of the Mont Blanc group. Its beautiful position, excellent accommodation, and the museums and attractions of a large town serve to draw thither many visitors, while the facilities for education offered by its schools and university induce some families to choose Geneva as a place of permanent residence. The mean annual temperature (48.6° F.) is slightly lower than that of Lausanne. The mean relative humidity is 82 per cent. The annual rainfall is $33\frac{3}{10}$ inches. The cold north-east winds are often disagreeably felt.

CHAMPEL-LES-BAINS, on a hill (1360 feet above sea-level) in the southeastern suburb of Geneva, is an excellent place for hydrotherapeutic treatment; it derives its water from the river Arve, which flows past the establishment.

Another well-known hydrotherapeutic establishment easily reached from Geneva is that of DIVONNE-LES-BAINS (1540 feet), situated in French territory, at the foot of the Jura Mountains, a half-hour distant by carriage from the Swiss railway station of Coppet.

To the southeast and east of Geneva are some climatic resorts politically French, but geographically belonging to the Swiss group. Mention may be made of MORNEX (1630 feet) and MONNETIER (2330 feet), on the Salève, and the hotels on the Voirons range, all of them easily reached from Geneva. The resorts of the Voirons should strictly be classed with the group of high altitude resorts—that is, those above 3500 feet.

To the north of Geneva, ST. CERQUES (3420 feet) has a very bracing position in the Jura Mountains, high above the lake of Geneva, about six and one-fourth miles from the railway station of Nyon.

We shall now pass to some localities in the **Rhone valley** and its branches above the lake of Geneva.

AIGLE-LES-BAINS (1770 feet), at the entrance of the valley of Les Ormonts, has comfortable hotel accommodation and good arrangements for hydrotherapeutic treatment. From Aigle are reached the

higher resorts—Leysin, Chesières, and Villars, which have previously been mentioned.

CHAMPÉRY (3450 feet), in the center of the Val d'Illiez, is a popular summer resort, reached in three and one-fourth hours by carriage from the railway station of Monthey; there are many interesting mountain excursions to be made by the more robust visitors.

BEX (1430 feet) has a sheltered position on the right side of the valley, opposite the Dent-du-Midi. It is well provided with strong brine waters, used for baths and douches. The Hotel des Salines has a somewhat more elevated position (1520 feet), and is pleasantly situated in a park about a half mile to the northeast of the village. The best months for Bex are May and June, and from the end of August to the end of September. July is hot, the mean temperature being 67° F. During the shortest days of winter the sun shines only three hours: from 11 A.M. to 2 P.M. Bex is an excellent place for a **grape cure**.

LAVEY-LES-BAINS (1350 feet), with sulphur waters, is situated between the right bank of the Rhone and the Dent-de-Morcles, about one and one-quarter miles from the railway station of Saint-Maurice.

To the southwest of the Rhone valley, above Vernayaz, are the resorts of SALVAN (3030 feet) and FINHAUT (4060 feet), the latter of which might with propriety have been included among the places of high altitude previously mentioned.

SION (1710 feet), further up the valley, has the relatively high mean annual temperature of 51° F., and the summer is very hot (mean, 66.7° F.). In autumn (mean, 50.9° F.) Sion can be visited for a **grape cure**.

SIERRE, pleasantly situated in the valley (1765 feet above sea-level), has a warm, dry climate. The Hotel Bellevue is used as a winter resort by the English. MONTANA, above Sierre, has been mentioned among high altitude stations.

Still higher up in the Rhone valley VISP (French, Viège), where the railway to Zermatt branches off, and BRIEG (French, Brique), the present railway terminus, have rather higher elevations—about 2150 and 2250 feet—than Sierre and Sion. Accommodation is fair.

ACQUAROSSA (1150 feet), in Canton Ticino, is situated amidst high mountains in the Val Blenio, about eight and a half miles to the north of the St. Gothard railway station Biasca; the mineral waters are subthermal chalybeate, containing small quantities of arsenic.

In the different parts of Canton Grisons, besides the high altitude resorts that have been mentioned in preceding pages, there are a number of places at various elevations below 3500 feet, some of which are well suited as intermediate stations on the way to and from high altitude resorts, and for a stay during autumn and spring. Among them may be mentioned: The baths of LE PRESE (3160 feet), in the Val di Poschiavo; PROMONTOGNO (2685 feet), in the Val Bregaglia; ILANZ (2350 feet), in the Vorder-Rheinthal; the baths of PEIDEN (2700 feet), in the Lugnetz valley, three and a half miles to the south of Ilanz; TIEFENKASTEN, or TIEFENKASTELL (2790 feet), and the neighboring baths of ALVANEU, or ALVENEU (3150 feet), on the Albula route; THUSIS (2450 feet), near the famous scenery of the Via Mala and the Schyn Pass; ANDEER (3200 feet), in the Schamser Thal, about three hours by carriage from the railway station of Thusis, with the neighboring baths of PIGNIEU; ROTHENBRUNNEN, with weak iodine and chalybeate waters and a bath establishment, in the valley of the Hinter-Rhein, about half-way on the railway between Thusis and Reichenau (the waters have an old reputation in Switzerland for the treatment of **scrofulous and backward children**); the baths of PASSUGG in the Rabiusa valley, one hour distant from Chur; and SEEWIS. The last-named place is pleasantly situated on a terrace of the northern slope of the Praettigau valley, at an elevation of about 3000 feet above sea-level. It is open from the commencement of April to the end of September, and is a useful spring and autumn resort and a good place for **milk and whey** cures.

Here must be mentioned RAGATZ (1700 feet), in Canton St. Gall, as it is quite close to Canton Grisons. This well-known health resort is situated on the southwestern side of the Rhine valley, at the entrance of the Tamina gorge, three miles from the baths of Pfaefers, from which it receives its thermal waters. Ragatz is an excellent climatic station from the middle of May to the end of June, and from the second week in August to the middle of Sep-

tember. The mean temperature for May is 53.8° F.; for July, 64.2° F.; for September, 56.7° F. In addition to its climatic features, Ragatz offers simple thermal baths (89° to 93° F.), in conjunction with Swedish gymnastics, massage, electricity, or ordinary hydrotherapeutic treatment, when deemed advisable. PFAEFERS itself, shut up in the deep Tamina gorge, has naturally a cooler and moister climate, with less sunshine, so that the establishment is kept open for a much shorter period. Ragatz has a station on the railway between Chur and Sargans. About 1000 feet higher, and connected with it by a funicular railway, is the WARTENSTEIN HOTEL. Accommodation at a higher elevation is likewise to be had at the village of VALENS (3020 feet), not far from Ragatz.

In CANTON BERN there are several places to be mentioned. BERN itself (1765 feet), the seat of the Swiss Government, has a changeable climate. The mean annual temperature is 46.4° F.; the mean January temperature, 27.9° F. The annual rainfall is 39 $\frac{3}{8}$ inches. The quaintness of the old portion of the city and the beautiful views from Bern and its neighborhood toward the Oberland cause the town to be frequently visited by persons on their way to and from health resorts in Switzerland.

Around the LAKE OF THUN (about 1840 feet above sea-level) and the neighboring LAKE OF BRIENZ (about 1860 feet) a number of health resorts are grouped. INTERLAKEN, in the valley between the two lakes, and THUN, at the other, northwestern, extremity of the lake of Thun, have mild climates and rather high mean summer temperatures. Interlaken may be used for **milk** and **why cures** and for the **grape cure** in autumn. On the heights to the east of Thun, the **sanatorium** of HEILIGENSCHWENDI (3800 feet) for poor **consumptives** has recently been erected. Close to the lake of Thun are BAD-HEUSTRICH (2300 feet), with well-known sulphur waters, and FAULENSEEBAD (2600 feet). BAD WEISSENBURG (2820 feet) can be reached in about three and one-half hours by carriage from Thun. It lies in a deep, densely wooded defile to the north of the lower Simmenthal, and possesses weak calcium sulphate waters, chiefly used for drinking. The mean temperature of the atmosphere for July is about 61.4° F. The place is much resorted to

during summer for **chronic pulmonary and bronchial affections**. ZWEISIMMEN (3215 feet), further up in the Simmenthal, and SAANEN, or Gessenay (3380 feet), near the boundary of the Canton Vaud, on the high road to Château d'Oex, should likewise be mentioned here.

LAUTERBRUNNEN (2620 feet), three-quarters of an hour by railway from Interlaken, lies very much in a hollow, and can hardly be called a health resort, although it is much visited by tourists for the sake of the waterfalls, etc. GRINDELWALD has already been referred to. BRIENZ is beautifully situated at the eastern end of the lake of that name, and although rather hot in summer, is a pleasant resort during spring and autumn. Baths in this part of the lake have a particularly tonic action, owing to the relative coldness of the water, which, even in the height of summer, is not warmer than 68° F. The GIESSBACH HOTEL (2360 feet), near Brienz, is a very popular summer resort.

KURHAUS BRÜNIG (3300 feet), in Canton Unterwalden, close to the railway station of Brünig, and near the old mountain pass of that name, is a pleasant summer resort in the neighborhood of forests.

The LAKE OF LUCERN and its neighborhood offer a number of climatic resorts at various elevations up to four or five thousand feet or even more above the level of the lake (1435 feet). Some of the hotels, however, especially those on the Rigi and Pilatus Mountains, are, as we have already observed, too much frequented by passing tourists to be suitable places for invalids requiring rest and quiet. On the northern shore of the lake, GERSAU, VITZNAU, WEGGIS, and HERTENSTEIN, sheltered toward the north by the Rigi, have a specially mild climate. Gersau has been termed the 'Montreux of the Lake of Lucern,' although it certainly has a somewhat colder and less mild winter than Montreux has. It is rather too hot in the height of summer (mean summer temperature, about 64° F.), but is better suited for spring and autumn residence. It is, however, more exposed to the southeast wind (foehn) than Weggis and Hertenstein. BRUNNEN, situated about four miles to the east of Gersau, where the shore curves round toward the south, is one of the most beautiful spots on the lake, but is exposed

to the northeast wind as well as to the foehn. BECKENRIED, on the southern shore, is, owing to its position, somewhat cooler than Gersau, on the opposite side of the lake. LUCERN itself (latitude $47^{\circ} 3'$ north) has a picturesque position on a western bay of the lake, facing the Rigi and Pilatus Mountains. The mean temperature for the year is 49.1° F.; for May, 53.1° F.; for July, 64.4° F. The annual rainfall is about 48 inches. Lucern has some of the features of a large and ancient town, as well as its beautiful scenery and facilities for excursions, to attract visitors. It is at its best during spring and autumn, but is likewise much frequented, especially by Americans, during summer. To the west, above the town, are the hotels on the GÜTSCH (1720 feet) and on the SONNENBERG (2350 feet). Not far from FLUELEN, at the southeastern terminus of the lake (Bay of Uri), is ALTORF, or ALTDORF, celebrated in the legend of William Tell.

Among resorts of somewhat higher elevation near the lakes of Lucern and Zug we may speak of: The four hydrotherapeutic establishments, SCHÖNBRUNN (2215 feet), SCHÖNFELS (3070 feet), FELSENEGG (3125 feet), and SCHÖNECK (2500 feet); the HOTEL BÜRGENSTOCK (2855 feet), reached by a funicular railway from the lake of Lucern; and the much frequented summer resorts, Axenstein, Axenfels, Seelisberg, and Engelberg. The hotels of AXENFELS (2065 feet) and AXENSTEIN (2460 feet) are situated on a terrace immediately above the eastern shore of the lake of Lucern, commanding magnificent views over the lake toward the west. Above the opposite shore is the well-known summer resort of SEELISBERG (2630 feet), with the KURHAUS SONNENBERG; Seelisberg has a fairly sheltered position, and is the type of a good Swiss mountain resort of medium elevation. ENGELBERG (3315 feet), in Canton Unterwalden, lies in a pleasant, well-sheltered valley to the north of the Titlis Mountain. The mean July temperature is 57.6° F. The mean relative humidity for July is 79 per cent. Clouds and rain are frequent during the month of June.

The baths of STACHELBERG (2050 feet), in Canton Glarus, may be mentioned partly on account of their beautiful position near the Toedi Mountain. Not far off, but at a higher elevation (3800 feet), is the BRAUNWALD SANATORIUM for poor consumptives.

ZÜRICH (1345 feet) is famous for its beautiful situation at the northwestern end of the lake of Zürich, toward which the view is magnificent. The mean temperature for the year is 47.6° F.; for December, 30° F.; for July, 66.2° F. The mean annual relative humidity is 80.8 per cent. The annual rainfall is $43\frac{3}{10}$ inches. The climate is rather changeable and windy, but the attractions of an important and historic town, the beauty of the site, and its charming surroundings will always induce many, including some invalids, to stay a while at Zürich on their way to and from other places. About twenty-five minutes' distance from the town is the HOTEL DOLDER, which has the advantage of being situated in a fine forest of beech and pine, about 600 feet above the level of the lake. There is satisfactory accommodation for hot weather to be had on the UETLIBERG (2830 feet), which can be reached in half an hour by railway from the city. Along the shores of the lake of Zürich are many beautifully situated localities more or less used as summer resorts.

The narrow LAKE OF WALLENSTADT (1395 feet above sea-level), inclosed by steep mountains on each side, has a picturesque situation, well known to most railway travelers to the Engadine, and affords good bathing. Visitors may stay for the bathing and other outdoor diversions of a mountain lake region at WALLENSTADT or at WEESEN.

In the CANTON OF APPENZEL, in the northeast of Switzerland, are many health resorts specially noted for their good milk and whey, where milk cures, etc., can be easily carried out. Among such places we may mention APPENZEL, WEISSBAD, GONTEN, GAIS, and HEIDEN, the last of which has a beautiful situation, with splendid views toward the lake on one side, and the green mountains of the Canton of Appenzel on the other.

The LAKE OF CONSTANCE (1310 feet above sea-level) may be mentioned here, although its shores are divided between Switzerland, Austria, Bavaria, Würtemberg, and Baden. Several localities on the lake are used as summer bathing resorts. The old-fashioned and historically interesting town of CONSTANCE, belonging to Baden, is beautifully situated on the Rhine, between the Obersee and the Untersee. The mean temperature of the air for summer

is about 63.4° F., and the temperature of the water is seldom higher than 71.5° F. BREGENZ, on the Austrian (eastern) end of the lake, is an ancient town surrounded by fine forests of pine and beech. To the east of Bregenz is the PFAENDER (3490 feet), with beautiful views and with hotel accommodation near its summit. On the northern shore, LINDAU, in Bavaria, FRIEDRICHSHAFEN, in Württemberg, and UEBERLINGEN, in Baden, afford good bathing; and this may likewise be obtained on the Swiss (south) shore at ROMANSHORN and RORSCHACH (mean July temperature, about 70° F.). MAMMERN, in Canton Thurgau, on the southern shore of the Untersee, is a well-known hydrotherapeutic establishment.

BASEL, or BÂLE, or BASLE (870 feet), owing to its position near the northwest frontier, its old cathedral, and magnificent situation on the Rhine, attracts many visitors, but cannot be termed a health resort. It is exposed to winds and is very hot in summer. The mean temperature for the year is 48.7° F.; for January, 30.6° F.; for July, 66.2° F. The annual rainfall is 33 inches. On the south bank of the Rhine, nine miles above Basel, are the very strong brine wells of RHEINFELDEN (885 feet), with excellent modern bathing and hotel accommodation.

In the Jura Mountains, between Basel (latitude $47^{\circ} 33'$ north) and Geneva (latitude $46^{\circ} 12'$ north), are some pleasant mountain resorts of medium elevation that should be mentioned here: LANGENBRUCK (2355 feet), near Basel; MACOLIN, or MAGGLINGEN (2960 feet), above the lake of Biemme; KURHAUS TWANNBERG (2870 feet), in the same neighborhood; and BALLAIGUES (2815 feet), in Canton Vaud, above Vallorbe. ST. CERQUES, further south, has already been mentioned in connection with Geneva. YVERDON (1430 feet), at the southern extremity of the lake of Neuchâtel, has subthermal sulphur waters.

BRESTENBERG (1575 feet), in Canton Aargau, pleasantly situated at the northern end of the Hallwyler See, is a well-known hydrotherapeutic establishment.

BADEN IN SWITZERLAND (1230 feet), has a beautiful position in the Limmat valley, in Canton Aargau, and its thermal sulphur baths have a very old reputation in cases of **rheumatoid arthritis, chronic affections of the joints, muscular rheumatism, sciatica,**

etc. It is only half an hour distant by railway from Zürich. The sulphur springs of SCHINZNACH (1140 feet), in the Aar valley, are much frequented for **cutaneous affections**, etc., and the accommodation is satisfactory. The neighboring village of WILDEGG possesses a muriated spring containing small quantities of iodids and bromids. This water is employed internally and is sometimes prescribed for patients while undergoing a course of baths at Schinznach. Baden and Schinznach are both rather hot places in summer. Baden is decidedly pleasanter during spring and autumn, although the constant current of air produced by the swift river renders the summer heat endurable.

CHAPTER VI

RESORTS OF INLAND EUROPE (Continued)

Italy—The North Italian Lakes. Italian Inland Resorts. Spain and Portugal. France—The French Alps. The French Pyrenees. The Auvergne Mountains, the Cevennes, and Central France. The French Jura. The French Vosges. The North of France. Belgium and Luxembourg. Norway and Sweden.

ITALY

THE NORTH ITALIAN LAKES

Although some of the localities on the North Italian lakes are situated in Switzerland and Austria (Tirol), it is convenient to consider them all together under Italy. All these places are more or less sheltered by the Alps on the north, and their climates are, of course, influenced by the proximity of mountains and of sheets of water. (See Part I, p. 66.) The differences that exist are due to altitude, degree of shelter, etc. On the whole, the winter climate of the North Italian lakes is warmer, moister, and more equable than that of Meran; less warm, less sunny, less stimulating, and more humid, with more rain and wind, than that of the Western Riviera; and less sedative than that of Pau. Very high winds are rare, and there is generally less dust than on the Riviera. There are more clear days than at health resorts in England, and snow generally falls on about seven or eight days only in the year. To illustrate the sunny quality of the climate of the health resorts on the North Italian lakes we give some figures derived from the Swiss official observations (1886–1895), kindly furnished by Dr. Billwiller. They show that the duration, in hours, of sunshine at Lugano for the different months, beginning with January, is as follow: 125.3, 147.9, 189.8, 181.6, 203.6, 253.2, 285, 283.4, 210.5, 147.5, 99.7, 121.9; total sunshine for the year, 2249.5 hours.

On the LAGO MAGGIORE (635 feet above sea-level), the principal resorts are LOCARNO, in Switzerland, and PALLANZA, BAVENO, and STRESA in Italy. The last two places are situated on the south shore of the bay containing the Borromean Islands, and are not so well sheltered as is Pallanza, on the north shore opposite. The LAGO D'ORTA (950 feet), with the little town of ORTA, and the LAGO DI VARESE (785 feet), are situated respectively on the west and east of the southern portion of the Lago Maggiore, the town of VARESE (1250 feet) lying about two and one-half miles from its lake, and considerably above the level of the latter. LUGANO, in Switzerland, is the chief resort on the LAGO DI LUGANO, which is the highest (890 feet) of these lakes excepting Orta. On the LAGO DI COMO (700 feet above sea-level), which belongs entirely to Italy, are the VILLA D'ESTE, MENAGGIO, CADENABBIA (in the district called the 'Tremezzina,' or garden¹ of Lombardy), and BELLAGIO. Bellagio is wonderfully beautiful and attractive, but there is less shelter from winds, and the sunshine is of somewhat shorter duration, than at Cadenabbia, on the opposite shore. COMO itself, at the southwestern extremity of the lake of that name, although much visited by tourists for the sake of the fine cathedral, the beautiful excursions, etc., is a large industrial city that cannot be regarded as a health resort. The LAGO D'ISEO (605 feet) has abrupt and picturesque shores, on which, however, there are no health resorts. The LAGO DI GARDA (225 feet), the largest and least elevated of the North Italian lakes, has on its western shore a peculiarly sheltered and sunny strip of land, termed the 'Riviera of the Lago di Garda,' including the well-known health resorts of GARDONE-RIVIERA and FASANO. At the northern extremity of the lake, in Austrian territory,—Tirol,—is RIVA; and in the Sarca valley, three miles to the northeast of Riva, is ARCO (305 feet), in a sheltered position, although not quite so well screened as Gardone-Riviera. These last health resorts we must now consider in further detail.

The Riviera of the Garda Lake, or, as it is also called, the 'Riviera of Salo,' is the narrow strip of land between the mountains

¹ The garden of the celebrated 'Villa Carlotta,' on the shore of the lake near Cadenabbia, well exemplifies the luxuriant vegetation of the Tremezzina district.

and the lake, extending from SALO, on the western, or more correctly the northwestern, side of the lake, in a northeasterly direction as far as GARGNANO, a distance of about eleven English miles; beyond this the cliffs descend more or less abruptly to the water edge. This strip of shore, owing to its southeasterly frontage, gets a great amount of possible sunshine; it has been compared to the strip of land on the northern side of the lake of Geneva, included under the general name of Montreux,¹ but is warmer and sunnier. From Salo to Maderno—that is, to about half-way between Salo and Gargnano—the shore is sprinkled with villas and hotels, and other villas are situated on the slopes at moderate elevations above the shore. Gardone, termed GARDONE-RIVIERA (latitude $45^{\circ} 37'$ north) to distinguish it from other Gardones, lies at about equal distances from Salo and Maderno, and it is here and at the neighboring FASANO, which may almost be included under the name Gardone-Riviera, that the chief accommodation for winter guests is to be obtained. Following are meteorologic data for Gardone² from observations made between 1885 and 1900: The mean monthly temperature for October is 56.7° F.; November, 47.8° F.; December, 39.7° F.; January, 38.3° F.; February, 40.6° F.; March, 47.3° F.; April, 55.2° F. During these seven months, which include the season in the widest sense of the term, the mean daily range of temperature is 11.5° F., and there are only about three days on which snow falls, and thirty and a half days on which the nocturnal temperature falls below freezing-point; during the same period the total rainfall is $25\frac{1}{2}$ inches; the mean relative humidity is 76 per cent.; and there are 1128 hours (435 during the three winter months) of sunshine and 133 days without wind. Lemons are much cultivated here, but require a certain amount of artificial shelter from the occasional great variations of temperature. The visitors at Gardone, who are mostly German-speaking, include convalescents

¹ Which might, indeed, for comparison with the 'Liburnian Riviera' about Abbazia, and the 'Riviera of the Garda Lake,' be termed the 'Riviera of the lake of Geneva,' just as the Undercliff about Ventnor might, by a similar stretch, be termed the 'Riviera of the Isle of Wight.'

² See "Gardone-Riviera am Garda See als Winterkurort," by K. Koeniger, fourth edition, Berlin, 1901.

from acute diseases, various **pulmonary cases**, and many **over-worked persons** and others who merely require a winter holiday in a pleasant, healthful, sheltered, and fairly warm locality. The communications are by steamboats that call on their way between Desenzano at the southern, and Riva at the northern, end of the lake. Moreover, Salo is connected by steam tramway with Brescia, and can also be reached from the railway station of Desenzano in somewhat less than two hours by carriage.

RIVA, a thoroughly Italian town, though belonging to Austria, is beautifully situated at the northern extremity of the lake of Garda. It is a pleasant place for a visit in spring or autumn, has facilities for bathing in the lake, and now possesses a first-class hotel (Hotel Lido); but it is not sufficiently sheltered from the north and northeast to be considered a winter health resort for delicate invalids. The mean temperature for the three winter months is 38.8° F.

ARCO, in the Sarca valley, three miles to the northeast of Riva, is a bright, modern-looking Austrian health resort, with an old town and the picturesquely situated ruins of an ancient castle. It has about the same mean winter temperature as Riva, but is better sheltered from winds. On the west rise the heights of the Brenta, etc., and on the east is the lofty Monte Baldo; on the north, especially the northeast, and on the south it is less protected, though immediately to the north rises the castle hill, and to the south, toward Riva, the valley is partially closed by the isolated Monte Brione, which helps to shut off the southerly valley winds from the Lago di Garda. Arco is a genuine winter health resort. It has a fairly sheltered and sunny winter climate of medium humidity, and may be visited by patients who do not require or 'cannot' visit one of the warmer, more southern, winter resorts. It possesses facilities for hydrotherapy and for inhalation treatment. Dr. M. Kuntze points out that the season can last longer at Arco than at Gardone-Riviera, because at the latter place, owing to its peculiar situation, hot summer weather is earlier felt than at the former.

The health resorts on the North Italian lakes are too hot for most invalids during the hottest months of the year, the mean July temperatures reaching 70° to over 74° F.; but they are good spring and autumn resorts, and in many cases may be used as intermediate

stations in passing from a summer to a winter resort, and conversely. Pallanza, Locarno, Lugano, Gardone-Riviera, and Arco are all open for invalids during the winter; their mean temperatures for the three winter months, December to February, are respectively as follow: Pallanza, 37.4° F. (Scharrenbroich); Locarno, 37.2° F. (calculated from E. de la Harpe); Lugano, 36.7° F. (from de la Harpe); Gardone-Riviera, 39.6° F. (K. Koeniger); Arco, 38.7° F. (Reimer). These figures may be compared with those for Meran (35.2° F.) and Montreux (35.4° F.). During the three winter months Lugano gets apparently 395 hours of actual sunshine—about 176½ more than Montreux, and about 88 more than Davos-Platz. Gardone-Riviera is a still sunnier place; yet the 435 hours of actual sunshine that, according to Koeniger, Gardone-Riviera can claim during winter (December to February), amount to only 53 per cent. of the possible duration, while the 307 hours that Davos-Platz gets during the same period equal 58.5 per cent. of the possible. For comparison it may be repeated that Torquay and Hastings, in England, get only 24 to 26 per cent. of the possible. The mean winter relative humidity at Lugano is about the same as at Gardone-Riviera (76 or 77 per cent.).

ITALIAN INLAND RESORTS

Italy contains many **mineral water health resorts** and some **mountain stations** at various elevations above sea-level.

The baths of BORMIO lie at the head of the Valtellina, on the southern side of the Stelvio route, near the frontiers of Switzerland and Tirol. The new baths (4380 feet) and the old baths (4750 feet) are both frequented during July and August for their simple thermal waters. The chalybeate waters of SANTA CATARINA (5600 feet) are only three miles distant.

MONTE GENEROSO, between the lakes of Lugano and Como, has been termed the 'Rigi of the south of the Alps'; the hotel (3970 feet) is reached by a rack and pinion railway from Capolago, a station on the St. Gothard line.

In the southern Monte Rosa valleys we must mention MACUGNAGA (4125 feet), ALAGNA (3955 feet), GRESSONEY-LA-TRINITE (5370 feet), and GRESSONEY-ST. JEAN (4495 feet).

ANDORNO (1800 feet), in the Val d'Andorno, is a popular summer resort, pleasantly situated three miles north of Biella. VARALLO (1480 feet), the chief place of the Val Sesia, is likewise visited during summer.

COURMAYEUR (4015 feet), to the south of Mont Blanc, is much frequented by Italians as a summer resort; not far off are the simple thermal baths of PRÉ-SAINT-DIDIER (3280 feet). Further south, near the Gran Paradiso Mountain, are the chalybeate springs of CERESOLE REALE (5290 feet above sea-level).

RECOARO (1400 feet), a summer resort with chalybeate springs and a good center for excursions, lies in a picturesque neighborhood, at the head of the Val d'Agno, to the south of the Tirolese Alps, and is connected with Vicenza by a steam tramway.

Among the various simple thermal, sulphur, and muriated springs of northern Italy we may note the following: ABANO and BATTAGLIA, a few miles from each other, at the eastern foot of the isolated Euganean hills, near Padua; the baths of VALDIERI (4425 feet), situated in the Maritime Alps close to the French frontier; the baths of VINADIO (4360 feet) in the same district; and the well-known baths of ACQUI (450 feet, province of Alessandria). All these spas, especially Battaglia, are noted for the local application of a hot mud ('fango'), obtained from the thermal springs, and employed in **chronic articular affections**, etc.

ORMEA, a picturesque summer resort pleasantly situated in the Ligurian portion of the Maritime Alps, at an elevation of 2400 feet above sea-level, is connected by railway with Turin on the north, and is only thirty-one miles from the station of Oneglia on the Riviera coast. CERTOSA-DI-PESIO (2825 feet), a summer resort and hydrotherapeutic establishment, stands amidst fine chestnut trees, in the picturesque Val Pesio, to the northwest of Ormea. Further south, in a valley of the southern declivity of the mountains, is the summer resort and hydrotherapeutic establishment of SAN DALMAZZO-DI-TENDA (2250 feet), near the French frontier.

We now come to two of the best-known spas in Italy—namely, Salsomaggiore and Bagni di Lucca. SALSOMAGGIORE (520 feet) is pleasantly situated in the province of Parma, at the foot of the Apennines, about thirty-six minutes by steam tramway from the rail-

way station of Borgo-San-Donnino. It is much frequented for its baths (muriated waters), and the accommodation is now excellent. Three miles distant are the cold sulphur waters of TABIANO.

BAGNI DI LUCCA (400 to 1000 feet) is situated in the beautiful valley of the Lima, fifteen miles north of the town of Lucca, from which it may be reached in about an hour by the new railway. The thermal calcium sulphate baths are suitable for cases likely to be benefited by simple thermal treatment, douches, etc. Many of the visitors come merely for amusement and change of air. Of the three villages that help to make up the spa, BAGNI CALDI (1000 feet) and VILLA are the most frequented by English visitors; PONTE A SER-RAGLIO may, however, be regarded as the central one of the three. There is an English medical man resident during the season. LUCCA itself is an ancient but clean city, the ramparts of which have been converted into a broad encircling promenade commanding beautiful views of the plain and neighboring wooded hills.

In the Val di Nievole (province of Lucca) are likewise the tepid muriated springs of MONTECATINI (920 feet), the waters of which are employed internally and externally for **dyspeptic conditions**, etc., and the natural hot vapor bath of MONSUMMANO, to which Garibaldi and Louis Kossuth came for treatment. The GROTTA OF MONSUMMANO was accidentally discovered in 1849 by the father of the poet Giuseppe Giusti. The spacious interior, lined by stalactites and stalagmites, is carefully kept clean and is illuminated by electric lights. It is fancifully divided into a 'Paradiso,' a 'Purgatorio,' and an 'Inferno.' The temperature of the last named, the hottest portion of the cavern, is about 95° F.; that of the natural thermal lakes, which heat the air and produce the vapor bath, is about from 92° to 95° F. The patients, men and women, clad in a comfortable kind of dressing gown, walk about or rest in the grotto, and mostly perspire freely in spite of the temperature being relatively low for a vapor bath. After remaining there for a prescribed time,—generally about an hour,—they rest on couches as after ordinary forms of sweating baths. A tepidarium has been added to the natural cavern, and there is a large tepid piscina for a plunge. Arrangements have likewise been made for hydrotherapeutic treatment. The season is from April to September. Patients can lodge at either the modern

hotel adjoining the grotto, or at Montecatini, which is only about two miles distant. The treatment is often useful in chronic cases of painful disorders, such as **lumbago**, **sciatica**, etc. On the railway between Pistoja and Bologna are the thermal sulphur waters of **PORRETTA** (province of Bologna), situated in a valley of the Apennines, at an elevation of 1150 feet. At some distance to the west of the railway, and reached by a drive of several hours from Pracchia (2025 feet, the highest station of the railway), are two summer resorts in the Apennines, the **ALBERGO DELL' ABETONE**, beautifully situated in a forest, at an elevation of 4520 feet above sea-level, and **CUTIGLIANO** (2215 feet), somewhat nearer to the railway.

CASTRO-CARO, to the east of the Apennines, near the station of Forli, has muriated waters containing iodids and bromids.

In the Apennines, to the east of Florence, we may mention **CAMALDOLI** (2720 feet) and **VALLOMBROSA** (3140 feet), both formerly famous for their monasteries.

CHIANCIANO (1800 feet), in the valley of Chiana, not far from Montepulciano, in Central Italy, has thermal earthy waters chiefly used for bathing.

ALBANO (1250 feet) and **FRASCATI** (980 feet), on the Alban Mountains to the southeast of Rome, with their fine positions and beautiful villas, have always been favorite resorts of the Romans.

Among larger Italian towns, the interesting ancient cities of **PERUGIA** (1700 feet above sea-level) and **SIENA** (1000 to 1150 feet), although not exactly health resorts, may be mentioned as suitable localities at which to make a halt in spring or autumn, owing to their good accommodation and moderate elevation above sea-level. Venice and Naples have already been mentioned among marine climates; and Rome, Florence, and Milan will be referred to further on among the Large Towns of Europe.

SPAIN AND PORTUGAL

One might suppose that the Spanish, or southern, valleys of the Pyrenees would afford more suitable sites for climatic resorts of high altitudes than the French side. Yet at present the choice of such localities is extremely limited. **PANTICOSA**, situated close to

the French frontier, in Huesca, at an elevation of about 5600 feet above sea-level, is sometimes visited by foreign as well as Spanish invalids, including some suffering with **chronic pulmonary tuberculosis**, for the sake of its mountain climate and its weakly mineralized subthermal waters. The season, however, lasts only from the middle of June to the middle of September, and there is no attempt to keep this or other Spanish mountain hospices open during winter, as at Davos and St. Moritz in Switzerland.

The number of **mineral water health resorts** in the Iberian Peninsula is very great. We may mention FITERO (Navarra), CALDAS-DE-OVIEDO (Oviedo), and SACEDON (Guadalajara) in Spain, and CALDAS-DE-GEREZ (Minho) in Portugal, among the simple thermal waters. CALDAS-DE-MONTBUY (Barcelona), CALDAS-DE-MALAVELLA (Girone) and CESTONA-GUESALAGA (Guipuzcoa), all in the north of Spain, have thermal muriated waters. TRILLO (Guadalajara) has subthermal muriated and chalybeate waters containing a little sulphureted hydrogen. CARRATRACA (Malaga) and SANTA AGUEDA (Guipuzcoa) possess cold sulphur springs. The following spas possess thermal sulphur waters: LEDESMA (Salamanca), MONTEMAYOR (Caceres), CORTEGADA (Orense), CARBALLINO (Orense), Carballo (Coruna), ONTANEDA (Santander), ARCHENA (Murcia), and CALDAS-DE-RAINHA, CALDAS-DE-VIZELLA, and SAN PEDRO-DO-SUL, the last-named three in Portugal.

VIDAGO, in the north of Portugal, has alkaline waters that may be used in the same class of cases as those of Vichy. URBEROAGA-DE-ALZOLA, near San Sebastian, in Spain, with weak alkaline earthy waters, has somewhat misleadingly been termed the 'Spanish Vichy.' The Spanish sulphated purgative waters, CONDAL, RUBINAT, CARABANA, and VILLACABRAS, are largely exported.

SEVILLE will be mentioned under the head of Large Towns of Europe.

FRANCE

THE FRENCH ALPS

We shall, for convenience, arrange the French health resorts into geographic groups, beginning with the Alps.

The French shore of the lake of Geneva and the resorts of the

Voirons and Salève Mountains have already been referred to under Switzerland. CHAMONIX (3450 feet), the well-known mountaineering resort to the northwest of the Mont Blanc chain, lies in a valley, through which flows the picturesque Arve stream; it offers good accommodation, but is obviously more suitable for tourists than for invalids. Its climate is much milder than that of the HOTEL MONTANVERT, the most tonic place in the Mont Blanc district, situated above the Mer-de-Glace, at an elevation of 6300 feet above sea-level. ARGENTIÈRE, further up the Chamonix valley, five miles to the northeast of Chamonix, has a somewhat higher elevation (3960 feet) than the latter place, and is close to the large glacier of Argentière. Chamonix is visited as a holiday resort by healthy persons during winter as well as during summer. Especially is it thronged in December and January, for the tobogganing, sleighing, and other winter sports.

SAINT-GERVAIS-LES-BAINS (Haute Savoie) lies to the south of the Arve valley, to the west of the Chamonix valley. The baths (2075 feet) are situated in a wooded gorge, while the village (2680 feet) is situated in a more open and sunny position higher up the mountain side. The thermal springs contain small quantities of sodium sulphate, calcium sulphate, and sodium chlorid; and one of them contains sulphureted hydrogen. They are employed internally and externally in cutaneous affections, chronic gout, chronic rheumatism, etc. The season is from the beginning of June to the end of September.

AIX-LES-BAINS, the celebrated Savoy health resort (860 feet), lies about one and one-fourth miles to the east of the beautiful and picturesque Lac du Bourget (745 feet above sea-level), and at the foot of Mont-Revard (5360 feet). The thermal sulphur waters are chiefly employed for douches and baths of various kinds, and especially for the 'Aix douche' or 'douche-massage' treatment. The conditions treated include chronic disorders of the joints, sciatica, neuralgias, muscular rheumatism, and a great variety of gouty and rheumatic manifestations. The gay life and aristocratic society during the season attract many visitors. The climate of Aix is mild, and the establishment is open throughout the year; but the season includes spring, summer, and winter. At MARLIOZ, about ten

minutes' walk to the south of Aix, is a cold sulphur spring with excellent inhalation and spray rooms. The hotel on the summit of MONT-REVARD may be reached by a rack and pinion railway from Aix, so that persons for whom the summer heat of Aix is too trying may be transferred to a high altitude resort of over 5000 feet above sea-level. Owing, however, to its position on the mountain top, the hotel is too much exposed to winds for delicate invalids. In colder weather the less elevated situation of LES CORBIÈRES (2200 feet), with a station on the Mont-Revard railway, is preferable. The COL-DU-CHAT (2090 feet), above the opposite shore of the lake of Bourget, likewise affords some accommodation.

ANNECY and some other places afford accommodation near the beautiful LAKE OF ANNECY. The lake is situated at an elevation of 1470 feet above sea-level, amidst meadows, vineyards, and mountains, and this neighborhood might well be selected in many cases for a stay in spring or autumn. ALBERTVILLE (1180 feet), on the railway from Chambéry to Moutiers, may likewise be chosen for a stay by those who are able to make excursions in the neighborhood, but neither the climate nor the present accommodation entitles it to be regarded as a health resort.

BRIDES-LES-BAINS (1860 feet) is pleasantly situated in the Tarentaise (southern part of Savoy), in the deep valley of the Doron de Bozel, three and a half miles from the railway station of Moutiers (Moutiers-en-Tarentaise). The waters contain small quantities of sodium, magnesium, and calcium sulphates, with some common salt, and though not quite similar to the waters of Carlsbad, may often be employed successfully in the same kinds of cases. SALINS-MOUTIERS (1610 feet) lies lower down the valley, between Brides and the railway station. It possesses gaseous thermal muriated waters that may be used in cases similar to those treated at Nauheim in Germany. PRALOGNAN (4670 feet), a well-sheltered mountain climatic resort, open only in the summer, can be reached by a drive of three and a half hours from Brides.

LA BAUCHE (1640 feet), which has a charming position in a broad fertile valley, with the rocky cliffs of the L'Épine Mountains on the east, with a view of the Grande Chartreux range on the south, may be used as a quiet summer resort.

CHALLES (880 feet), about three miles by steam tramway from Chambéry, possesses cold sulphur springs much used for sprays, etc., in **chronic catarrhal conditions** of the upper respiratory passages.

ALLEVARD (1400 feet), in a pleasant mountain valley to the east of the railway between Chambéry and Grenoble, has cold muriated sulphur waters and an excellent thermal establishment, with inhalation rooms, etc.

GRENOBLE (700 feet), though not itself a health resort, is a tourists' center, and is visited by many persons on their way to places in the French Alps, partly for the sake of the mountain excursions to be made in the neighborhood.

URIAGE-LES-BAINS (1350 feet) lies amid woods, in a beautiful valley about eight miles from Grenoble, with which it is connected by steam tramway. Its thermal muriated sulphur waters may roughly be likened to those of Aachen, in Germany. Many **skin affections** connected with disorders of the general nutrition are especially likely to be benefited, and the treatment of **syphilis** is carried out on similar lines to that at Aachen.

At present there is no mountain resort near Grenoble available for invalids, though accommodations can be obtained at various elevations in the Grande Chartreuse range—for instance, near ST. PIERRE-DE-CHARTREUSE (2785 feet) and LE SAPPEY (3280 feet). Further away to the east from Grenoble there are LE MONËTIER-DE-BRIANÇON (4890 feet) and BRIANÇON (4330 feet), near the Italian frontier.

LAMOTTE-LES-BAINS, with thermal muriated waters, is situated in a pleasant Dauphiné valley, near the railway, about twenty-three miles to the south of Grenoble. An old château 2130 feet above sea-level has been converted into the thermal establishment.

AIX (Bouches-du-Rhône), the 'Aquæ Sextiæ' of the Romans, and the old capital of Provence (590 feet), has simple thermal waters, but is of historic, rather than of medical, interest. It has a station on the railway between Grenoble and Marseilles.

GRÉOULX (Basses Alpes), with thermal muriated sulphur waters, lies at an elevation of 1140 feet, about one and one-half hours from Mirabeau, a station on the line from Grenoble to Marseilles. Fur-

ther to the northeast is DIGNE (1960 feet), with similar waters and a thermal establishment not far off, in the valley of Eaux Chaudes.

THORENC (Alpes Maritimes) is a new summer mountain resort situated at an altitude of nearly 4200 feet, near a forest of firs, in the Thorenc valley. It is kept open from the middle of May to the end of October, and can readily be reached by those who have wintered on the Riviera—in four and one-half hours by carriage from Grasse, in five and one-half hours from Cannes, and in six and one-half hours from Nice. The mean temperature for July is about 62° F.; for September, about 52.3° F. The valley is imperfectly sheltered from the 'mistral,' but well protected from other winds.¹ ST. MARTIN-VÉSUBIE, or ST. MARTIN-LANTOSQUE (3120 feet), is a summer resort of somewhat lower altitude, thirty-six and one-half miles to the north of Nice, close to the Italian frontier.

THE FRENCH PYRENEES

The Pyrenees differ considerably from the Swiss Alps, partly owing to their more southern latitude and lower average height. The Pyrenees lie between latitudes 42° and $43^{\circ} 30'$ north, while the loftiest summits of the Alps—Mont Blanc, Monte Rosa, etc.—lie in latitude $45^{\circ} 50'$ or further north. The average height of the Pyrenean chain is only 6000 feet, while the average height of the Swiss Alps is 11,000 feet. The snow level on the southern slopes of the Pyrenees is about 10,000 feet, and on the northern slopes about 9000 feet, while in the Swiss Alps it is from 100 to 2000 feet lower. Glaciers are fewer and smaller in the Pyrenees, and trees and vegetation flourish at a considerably higher level than in Switzerland, trees being found as high as 6000 feet on the northern slopes and 7500 feet on the southern slopes. The zones of vegetation and the snow-line rise somewhat from west to east. There are far fewer high altitude health resorts in the Pyrenees than in Switzerland, and no winter resorts of high altitude comparable to Davos, St. Moritz, and Arosa. In the Pyrenean district there are no large inland lakes, like the famous Swiss and Italian lakes, with their much frequented health resorts. The thermal sodium sulphid springs are the most important **mineral springs** of this region; some

¹ See A. Philip and M. Esmonet, "La Haute Vallée de Thorenc," 1898.

of them, especially those of the eastern Pyrenees, are more or less 'degenerate' sulphur waters, giving an alkaline reaction and containing a little sodium sulphate and sodium carbonate; they are less rich in sodium sulphid than the typical Pyrenean waters.

In considering health resorts of the Pyrenees we shall commence from the eastern end (Department of Pyrénées Orientales).

AMÉLIE-LES-BAINS (920 feet), in the 'Vallespir,' as the portion of the Tech valley above Céret is called, has a mild winter climate. The summer is very hot. The place is visited especially during the winter season by patients with **chronic catarrhal affections** of the respiratory organs, etc. In connection with the thermal sulphur springs there is a large military hospital. The Tech valley has a general downward direction of southwest to northeast, and at Amélie it is in great part sheltered from the cold and biting northwest wind that blows with great violence over the plain of Rousillon. On the other hand, the northeast wind blowing up the valley from the sea may sometimes be too strong for invalids, as may likewise be the south wind, especially during summer. H. Lamarque points out that the portion of the valley at the foot of the Montbolo hill, near the railway station, is especially protected from the north, northwest, and northeast; this locality, which forms the favorite promenade during winter, receives the maximum amount of sun, and has been called the 'Petite Provence.'

PRATS-DE-MOLLO (2620 feet), on the mountain slope, higher up the valley, about fourteen miles from Amélie, has a position that Dr. Lamarque considers admirably adapted for **winter residence**.

LA PRESTE-LES-BAINS (3700 feet), further from Amélie (twenty miles), has pleasant shady walks and alkaline thermal sulphur waters with a reputation in **chronic urinary affections**.

LE BOULOU (275 feet), in the Tech valley below Céret, has sub-thermal simple alkaline waters, and has been termed by Garrigou the 'Vichy of the Pyrenees.'

VERNET-LES-BAINS, or LE VERNET (2060 feet), is pleasantly situated in a southern branch of the Tet valley, at the northern foot of the Canigou Mountain, which here separates the Tet valley from the Tech valley ('Vallespir'). The thermal sulphur springs and bath arrangements are well managed, and though the chief

season is in summer, one of the thermal establishments is kept open throughout the year. There are shady promenades in the neighborhood. A little above Le Vernet, at an altitude of 2100 to 2300 feet, facing southwest, are the **sanatorium galleries** for consumptive patients founded by Dr. Ch. Sabourin in 1890. This was the earliest of the modern sanatoriums for **pulmonary tuberculosis** in France.

The thermal sulphur baths of MOLITG (1475 feet), about five miles from the railway station of Prades, are situated in the narrow valley of the Castellane, close to its junction with the Tet. They have a reputation in **cutaneous affections**.

OLLETTE (2010 feet), in the valley of the Tet, above Prades, likewise has thermal sulphur waters. LES ESCALDES (4430 feet), in the Department of Pyrénées Orientales, close to the Spanish frontier, and a place of the same name in the neighboring small independent State of Andorra, both have thermal sulphur springs.

RENNES-LES-BAINS (1040 feet), in the Department of Aude, possesses muriated as well as thermal weakly mineralized waters.

AX-LES-THERMES (2340 feet), in the upper part of the Ariège valley, has very hot springs—up to 171.5° F.—and excellent thermal sulphur baths. It is a quiet spa. USSAT (1590 feet), lower down the Ariège valley, fourteen miles by railway from Ax, has simple thermal baths used for **gynecologic affections**, etc.

BAGNÈRES-DE-LUCHON, one of the most fashionable and most frequented of French summer resorts, has a picturesque situation (2050 feet) on the western side of a broad level valley, surrounded by mountains in almost every direction; the spa is in the Department of Haute Garonne, close to the Spanish frontier. The thermal sulphur waters are used for baths, douches, and inhalations in **cutaneous affections, syphilis, chronic rheumatic disorders**, etc. The climate is subject to rather sudden changes. BAGNÈRES-DE-BIGORRE (1805 feet) is pleasantly situated in the valley of the Adour, in the Department of Hautes Pyrénées. Its mineral springs may be divided into three groups: (1) Simple thermal and thermal earthy, somewhat analogous to those of Bath in England; (2) nongaseous chalybeate waters; (3) the cold sulphur waters conveyed from LABASSÈRE, seven and one-half miles

distant. Bagnères-de-Bigorre has a mild climate and is likewise used as a simple climatic station. It is open all the year round, but the chief season is during the summer. The spa is often visited by tourists in connection with the ascents of the 'Pic du Midi di Bigorre' (9440 feet), high up on which there is now a certain amount of accommodation to be had.

CAUTERETS (3200 feet), situated in the typical Pyrenean valley of the Gave de Cauterets, rivals Luchon in the number of invalids and visitors who flock there during the season, which lasts from the end of May to the beginning of October. There are several thermal sulphur springs and a number of thermal establishments. The spring of La Raillère, most frequently employed for internal use, is nearly a mile higher up the valley, to the south of Cauterets, and forms a center of spa life from seven to ten o'clock in the morning. Cauterets has a special reputation in **chronic catarrhal affections of the respiratory passages**. The excursion to the Pont d'Espagne (4880 feet) and the Lac de Gaube (5710 feet) is one of the attractions for more robust visitors.

In the valley of the Gave de Gavarnie, which joins the Gave de Cauterets at Pierrefitte, is situated ST. SAUVEUR (2500 feet), with well-known thermal sulphur baths that have a special reputation in **gynecologic cases**.

The thermal sulphur baths of BARÈGES (4200 feet), in the valley of the Gave de Bastan, are much resorted to for the treatment of **old gunshot and other wounds, painful cicatrices, and chronic joint affections**. The waters of BARZUN, below Barèges, which are similar in character to those of the latter spa, are conducted to Luz, where the valley in which Barèges lies joins the valley in which St. Sauveur lies. GAVARNIE (5085 feet), a small village near the entrance to the famous CIRQUE DE GAVARNIE, twelve miles up the valley from St. Sauveur, should be mentioned here, as it affords tolerable accommodation to persons needing a higher altitude than that afforded by St. Sauveur, Cauterets, and similar stations.

EAUX BONNES (2460 feet) and EAUX CHAUDES (2050 feet) are situated five miles apart from each other, in two prolongations of the Ossau valley, about twenty-six miles to the south of Pau. These spas both possess thermal sulphur waters, those of Eaux Bonnes

being employed chiefly internally, in **chronic affections of the respiratory organs**, and those of Eaux Chaudes chiefly in the form of baths and douches for **gynecologic affections**, etc.

ST. CHRISTAU (985 feet), with weakly mineralized waters, is prettily situated in the Vallée d'Aspe, to the south of Oloron.

SALIES-DE-BÉARN (100 feet), in the Department of Basses Pyrénées, has possibly the best known brine baths in France. The waters resemble those of Nantwich, in England. The climate is mild and very hot in summer.

SALIES-DU-SALAT (960 feet), in the Department of Haute Garonne, has much weaker muriated waters (3 per cent.).

We have still to speak of Pau, Argelés, Dax, and Cambo.

PAU (620 feet), the old capital of Béarn, lies on the Gave de Pau, in latitude $43^{\circ} 20'$ north, and is the chief town of the Department of Basses Pyrénées. Its position to the north of the Pyrenees, not far from the Atlantic, and the hills on its north give it a mild and rather sedative winter climate. The mean temperature¹ for November is 46.8° F.; for December, 43.2° F.; for January, 41° F.; for February, 43.3° F.; for March, 48.2° F.; for April, 54° F. Rain or snow falls on about from seventy to ninety days during these months, and the mean relative humidity is about 82 per cent. The winter climate of Pau is not so warm as that of the Western Riviera, but is more equable; there is less sunshine, as well as more rain, at Pau, but cold winds are more frequently felt on the Riviera; and there is altogether less wind at Pau than at the majority of health resorts. On the other hand, the winter at Pau is warmer than that at Montreux or Meran. The climate is suitable for **erethistic constitutions** and for **catarrhal conditions of the respiratory passages** with dry, irritable cough. On a hill, half an hour by carriage from Pau, is the TRESPOEY SANATORIUM for **consumptive patients** (695 feet), a small establishment that is open from the middle of October to the middle of May.

ARGELÉS (1520 feet), in the Department of Hautes Pyrénées, lies in a broad part of the valley of the Gave de Pau, nine and a half miles to the south of Lourdes. There is a bath establishment, supplied

¹ Hann gives slightly different figures.

with sulphur waters from GAZOST, ten miles distant. The situation is most beautiful and the accommodation is good. During the summer season Argelès is very hot, but it is a pleasant intermediate climatic station during spring and autumn.

DAX (130 feet), well known for its mud-baths and simple thermal springs, is situated in the Department of Landes, considerably nearer to the coast than Pau. Its climate is therefore more under the Atlantic influence, but it has little shelter from winds. Dax is open all the year round. Its mean winter temperature is said to be slightly higher than that of Pau.

CAMBO (200 feet), on the Nive, twelve miles by railway southeast of Bayonne, lies partly in the valley and partly on an eminence above the right bank of the river. The sulphur and chalybeate springs are three-fourths of a mile distant. The summer is very hot, and the spring and autumn are much pleasanter. Cambo has been chosen by some persons for winter residence.

THE AUVERGNE MOUNTAINS, THE CEVENNES, AND CENTRAL FRANCE

The volcanic mountains of Auvergne, situated almost in the center of France, between the forty-fifth and forty-sixth degrees of latitude north, are rich in **mineral waters**. The Mont-Dore group, amidst which lie the spas of Mont-Dore and La Bourboule, possesses the highest summit—Puy-de-Sancy (6185 feet). To the north of this group, on the lower slopes of the Puy-de-Dôme (4800 feet), is the much frequented spa of Royat.

ROYAT (1480 feet), beautifully situated at the entrance of the Tiretaine valley, is one and one-fourth miles to the west of Clermont-Ferrand, with which it is connected by train and electric tramway. The view from Royat over the fertile plain of the Limagne, toward the Forez hills on the east, is magnificent. The thermal muriated alkaline springs, on whose account Royat has sometimes been called the 'French Ems,' have a great reputation in **chronic gout, rheumatoid arthritis, chronic catarrhal conditions of the respiratory organs**, etc. The springs of Royat contain more or less iron bicarbonate, as well as sodium chlorid and sodium bicarbonate. Royat is a fashionable spa, very much frequented during the sea-

son, especially from the middle of June to the middle of August, and the hotel accommodation is first class.

At DURTOL, not far from Royat and Clermont-Ferrand, is a **sanatorium for consumptives**, opened in 1898 under the direction of Dr. Charles Sabourin. It has a sheltered position near pine woods, at an elevation of 1705 feet above sea-level.

MONT-DORE (3440 feet) lies in the deep valley of the commencement of the Dordogne, well sheltered by the surrounding heights. Its springs may be classed in the simple thermal group, though they contain a minute quantity of arsenic; they are used chiefly for inhalation, pulverization, foot-baths, douches, and ordinary baths, in **chronic catarrhal affections** of the respiratory organs, etc. The climate undoubtedly aids the treatment in many cases, especially perhaps in certain cases of **asthma**. The new thermal establishment is one of the finest in Europe. The season lasts from the middle of June to the middle of September.

LA BOURBOULE (2780 feet), four miles lower down the stream from Mont-Dore, possesses thermal muriated alkaline waters, distinguished from other waters of the same class by the amount of arsenic they contain, equivalent to 0.028 gram of sodium arsenate in a liter of the Source Perrière Choussy. La Bourboule is of use in **chronic catarrhal conditions** of the respiratory organs, **gout and rheumatism** in feeble patients, **chronic malarial troubles**, etc. The season at La Bourboule is about a month longer than at Mont-Dore.

SAINT-NECTAIRE (2500 feet), in another Auvergne valley, has thermal muriated alkaline waters somewhat analogous to those of Royat, but the life is simpler and less fashionable than that at the latter spa.

CHATEL-GUYON (1300 feet), an Auvergne spa (Puy-de-Dôme) much frequented by the French, has thermal waters containing magnesium and sodium chlorids and calcium, sodium, iron, and lithium bicarbonates. The climate during the height of the season may be very hot.

The waters of RENLAIGUE and CHÂTEAUNEUF, likewise in the Department of Puy-de-Dôme, may be classed as gaseous chalybeate and alkaline chalybeate.

CLERMONT-FERRAND (1300 feet), formerly the capital of Auvergne, is closely connected by train and electric tramway with Royat, and is often visited by persons undergoing treatment at the various Auvergne spas. The summer is very hot, the mean July temperature being 66.6° F.; but toward the end of the spa season it becomes cooler. Living is, of course, less expensive than at Royat, and many interesting excursions can be made in the neighborhood.

There are a number of resorts worthy of notice in **the southern part of the Cevennes**. Mention will be made of the more important of them.

LAMALOU-LES-BAINS (620 feet), a summer resort in the southern valley of the Cevennes, in the Department of Hérault, has thermal chalybeate waters, much used for baths in cases of **tabes dorsalis, chronic affections of the nervous system, neuralgias, etc.**

BAGNOLS-LES-BAINS (2600 feet), in the valley of the Lot, in the Department of Lozère, possesses thermal sulphur waters. These, it is interesting to note, were employed about 1859 or earlier by a local physician (Dufresse de Chassaigne) in **chronic affections of the cardiac valves**.

CHAUDES AIGUES (2050 feet), in the Department of Cantal, possesses exceedingly hot simple thermal waters—up to 180° F.

Further to the south, on the mountains of AUBRAC, at an elevation of 4590 feet above sea-level, there is **sanatorium accommodation**.

VALS-LES-BAINS (790 feet) lies in a picturesque valley of the **northern Cevennes**, on the banks of the Volane stream, near its junction with the Ardèche. It is famous for its cold simple alkaline springs, and has been termed the 'cold Vichy.'

LE PUY, the old capital of Velay, can hardly be termed a health resort. It is picturesquely situated on the slopes of Mt. Anis, at an elevation of 2340 feet above sea-level. The mean temperature for the year is 49.1° F.; for January, 32.5° F.; for July, 66.6° F.

On MONT-PILAT (Loire), one of the chief mountains of the northern Cevennes, there is accommodation at an altitude of about 3940 feet above sea-level.

VICHY (740 feet), possibly the best known health resort of France, is situated on the right bank of the Allier, in a rather flat and uniform country. It is famous for its simple alkaline springs, chiefly thermal, and is resorted to by the various classes of invalids that can derive benefit from alkaline waters. Its climate and amusements are not very unlike those of Paris. CUSSET, two miles from Vichy, is in a somewhat more picturesque country, and has cold alkaline waters. HAUTERIVE and SAINT-YORRE, a few miles from Vichy, have likewise cold alkaline waters that are much exported.

In the district inclosed between the Loire and its tributary, the Allier, we may take note, likewise, of SAIL-LES-BAINS, with simple thermal waters containing a mentionable amount of alkaline silicates in solution; and of CHÂTELDON, RENAISON, SAINT-ALBAN, and SAIL-SOUS-COUZAN, all with gaseous waters containing calcium and sodium bicarbonates, and that can be used as table waters. The source of the better known table waters of SAINT-GALMIER is close to this district, but on the other (eastern) side of the Loire.

ST. HONORÉ-LES-BAINS (990 feet) is a pleasantly situated summer resort in a well-wooded, hilly country at the western foot of the Morvan Mountains, which shelter it on the east and northeast. It possesses tepid sulphur waters employed for inhalation treatment, douches, etc., in chronic catarrhal affections of the respiratory organs, etc.

POUGUES-LES-EAUX (650 feet), on the right bank of the Loire, about eight miles to the north of Nevers, has cold alkaline earthy waters, with a casino in a pleasant park. The waters have a reputation in various digestive and urinary disorders.

Somewhat southward of the two last-mentioned spas are BOURBON-LANCY (780 feet) and BOURBON-L'ARCHAMBAULT (870 feet), with weak thermal muriated waters. To the southwest of the latter place are the simple thermal baths of NÉRIS-LES-BAINS (1150 feet) and the more primitive ÉVAUX-LES-BAINS (1500 feet), with Gallo-Roman remains.

THE FRENCH JURA

SALINS (1200 feet) has a picturesque position in the narrow valley of the Furieuse stream, in the midst of the Jura Mountains. Its

brine baths (about 2 per cent.) are much employed for **weakly children**. LONS-LE-SAUNIER (840 feet), in a much broader valley on the outskirts of the Jura, has a 30 per cent. brine. LA MOUILLÈRE (830 feet), a suburb of BESANÇON, possesses a newly erected thermal establishment, supplied with very strong (29 per cent.) brine from MISEREY, three and a half miles distant. The view toward the old city and the heights above it is picturesque. The mean annual temperature of Besançon is 51.2° F.; for January, 35.1° F.; for July, 68.2° F.

DIVONNE has already been mentioned with resorts of Switzerland.

HAUTEVILLE (Department of Ain) is a picturesquely situated summer resort in the south of the Jura, eight and one-half miles from the station of Tenay, on the railway between Lyons and Geneva. A **sanatorium for poor consumptives** has been erected here by the people of Lyons, aided by the government, and was opened in 1900. It is situated on the eastern slope of the plateau of Hauteville en Bugey, above the village, not far from a pine forest, at an elevation of 2990 feet above sea-level.

THE FRENCH VOSGES

CONTREXÉVILLE (Department of Vosges) is situated at an elevation of about 1150 feet above sea-level, in a shallow valley, on a plateau connected with the Monts Faucilles, and during the main part of the season, from the middle of June to the middle of September, can be reached by special trains from Paris in six hours. The calcium sulphate waters have a great reputation, and are taken in rather large quantities internally in cases of **uric acid gravel, oxaluria, chronic gouty disorders, gouty diabetes**, etc.

VITTEL (1100 feet) and MARTIGNY-LES-BAINS (1200 feet), a few miles from Contrexéville, have somewhat similar waters.

BOURBONNE-LES-BAINS (900 feet), in the Department of Haute Marne, pleasantly situated in hilly ground belonging to the Monts Faucilles, has rather weak thermal muriated waters that are much used for douches and baths in **chronic rheumatoid arthritis, chronic sciatica**, the late effects of **injuries to joints**, etc. They are likewise employed internally. Treatment by hot, forcible douches is much employed in cases of **sciatica**, etc.

PLOMBIÈRES (1300 feet), situated in a narrow valley of the Vosges, has simple thermal waters that are employed for baths and douches in the various disorders ordinarily benefited by simple thermal waters. In certain cases of **chronic diarrhea** and in the chronic consequences of **localized peritonitis**, and notably of **appendicitis**, Plombières has acquired a special reputation.

LUXEUIL-LES-BAINS (1300 feet), on fairly level ground at the western foot of the Vosges Mountains, with simple thermal waters, is about twelve and one-half miles distant from Plombières. BAINS-LES-BAINS (980 feet), in a valley of the Vosges, likewise has simple thermal waters. BUSSANG (2200 feet), not far from the Alsatian frontier, has gaseous chalybeate waters containing a minute amount of arsenic.

GÉRARDMER (2200 feet), the most popular summer resort on the French side of the Vosges, is situated amidst wooded hills to the east of the lake of Gérardmer. Among the numerous excursions to be made from this center, one of the most popular is that to the SCHLUCHT, as the mountain pass from the French valley of Gérardmer to the Alsatian valley of Münster is called. At the summit of the pass (3775 feet) is a French hotel, and on the Alsatian side of the frontier the HOTEL ALTENBERG (3300 feet), on a plateau amidst pine trees, above the Münsterthal, affords first-class accommodation.

THE NORTH OF FRANCE

In the neighborhood of Paris, VERSAILLES (420 feet), with its park, the suburb of AUTEUIL, with its pleasant villas, ENGHYEN-LES-BAINS (160 feet) and PIERREFONDS (275 feet), with their sulphur waters, and SAINT-GERMAIN-EN-LAYE and FONTAINEBLEAU, with their grand forests, may be used for spring, early summer, or autumn residence. There are likewise many old places in Brittany and Normandy that can be chosen for their pure country air.

BAGNOLES-DE-L'ORNE (530 feet), situated in a deep valley in the picturesque district termed the 'Norman Switzerland,' has thermal weak sulphur baths, recommended for a tendency to **phlebitis**.

ST. AMAND-LES-BAINS (100 feet) is situated in the Department Nord, not far from the Belgian frontier. It adjoins a large forest and is noted for its mud-baths.

BELGIUM AND LUXEMBOURG

BELGIUM

There are several places in the Belgian ARDENNES that may be visited for their pure air. SPA (1000 feet) has a beautiful position in a sheltered valley, surrounded by wooded slopes affording shady promenades. Its gaseous chalybeate waters have an old-established reputation in **anemic conditions** and the like. During the season, from May to October, it is visited by invalids and their friends of every nationality. CHAUDEFONTAINE, not far distant, has simple thermal waters. The hilly neighborhood of Dinant and Namur is very pleasant, and may roughly be likened to the Peak district in England. At DINANT there is a hydrotherapeutic establishment under medical guidance. The hotel recently erected on the site of the ancient citadel of NAMUR, from 200 to 300 feet above the Meuse, must, owing to its open and airy position, be a refreshing resort in warm weather. It is connected with the town by a funicular railway. The CHÂTEAU D'ARDENNE, 790 feet above sea-level, in the fine park of the royal domain of Ardenne, between Dinant and Jemelle, has been converted into a hotel and is a good summer resort.

LUXEMBOURG

The GRAND DUCHY OF LUXEMBOURG has likewise some healthful localities for summer residence. A great portion of the north and west has an elevation of more than 1000 feet above sea-level. MONDORF (650 feet), near the southeastern frontier, has subthermal muriated waters.

NORWAY AND SWEDEN

ST. OLAFS-BAD, with mud-baths, etc., is one of the most popular health resorts of Norway. It is picturesquely situated at an elevation of 500 feet, not far from the cobalt mines of Modum, and two and one-half miles to the west of the railway station at Vikersund. HOLMEN-KOLLEN (about 1040 feet) is a summer and winter resort, only about five miles from Christiania; the sanatorium, suitable for cases re-

quiring a tonic climate of moderate elevation, is kept open throughout the year. EIDSVOLD (410 feet), with a chalybeate spring, has a railway station forty-two miles to the northeast of Christiania; the Eidsvoldsbad is open from the beginning of June to the end of August.

The TONSAASEN SANATORIUM, in the beautiful VALDERS district, is situated amidst pine forests on the slopes of the Tonsaas, at an altitude of 1980 feet above sea-level, an elevation that is climatically equivalent to a considerably higher one in Switzerland. This health resort is open in winter as well as in summer. The HOIFJELDS SANATORIUM (2370 feet) in the Gausdal, about ten miles from the railway station of Tretten, is open from the middle of June to the end of August. **Nervous disorders** and similar conditions are treated here.

The establishment of LOKA, near Filipstad, in Sweden, is situated in a picturesque region, and is well known for its mud-baths. A form of massage with cold mud is made use of.

CHAPTER VII

RESORTS OF INLAND EUROPE (Continued)

Germany—The Taunus Mountains. Rhenish Bavaria. Alsatian Resorts. The Odenwald. The Black Forest Region. The Harz Mountains. The Thuringian Forest. The Erzgebirge and Saxony. The Riesengebirge and Sudetic Range. Other Regions of Germany. The Bavarian Highlands. The Austro-Hungarian Empire—The Austrian Alps. Tirol. Salzburg. Upper and Lower Austria, Styria, Carinthia, and Carniola. Bohemia and Moravia. The Carpathian Mountains, Galicia, Hungary, Transylvania, Slavonia, Croatia, and Bosnia. The Caucasus and Inland Russia. Roumania.

In describing the inland health resorts of Germany and Austria, the districts bordering on the Rhine, commencing at the north and including the Eifel, the Taunus, the Harzt Mountains, the Alsatian Vosges, and the Black Forest, will first be considered. We shall then proceed in the following order: The Harz Mountains, the Thüringer Wald, the Erzgebirge and Riesengebirge, other regions of Germany (including Pyrmont, Oeynhausen, Wildungen, Kissingen, etc.), the Bavarian Highlands and Eastern Alps (Tirol, etc.), the Bohemian spas, and other health resorts of the Austro-Hungarian empire.

Various districts of Germany and Austria have a medical interest not only on account of the established health resorts that they include, but equally, or even in a greater degree, because of the peculiar facilities and inducements they offer for the kind of leisurely touring in a pure air, amidst picturesque scenery, which is one of the best remedies in many cases of **overwork, brain fag,** and the like. One can indulge in walking, cycling, driving, riding, or travel by railway, as may be advised by his physician or may suit the whim or exigencies of the moment.

Specially suitable for such **tours** of various lengths, both on account of scenery and on account of the great number of places

affording suitable accommodation, are the districts of the Rhine between Bonn and Bingen, the Eifel and Moselle valley, the Taunus, the Vosges, the Black Forest, the Harz Mountains, Thuringia, the Saxon Switzerland, the Erzgebirge, the Riesengebirge, the Bavarian Highlands, and various parts of Tirol.

GERMANY

CLEVE (180 feet), in Rhenish Prussia, close to the Dutch boundary, formerly capital of the Duchy of Cleve, has magnificent views and woodland walks, and is much visited as a summer resort by Dutch families. The moderate elevation of the hills of Cleve is of some importance, owing to the flatness of the surrounding country. Its chalybeate spring is not effervescent, like the well-known springs of Spa, Pyrmont, etc. On the wooded hills, about two miles to the south of the town, is the pleasant resort of BERG UND THAL. Here we may likewise mention the neighboring summer resort BERG-EN-DAL, on the Dutch side of the frontier, three miles to the east of the interesting old town of NIJMEGEN, with which it is connected by steam tramway. The hotel is situated on a ridge to the south of, and overlooking, the Rhine valley, at about 280 feet above the valley level.

AACHEN, or AIX-LA-CHAPELLE (530 feet), the Aquisgranum of the Romans, and the favorite residence of Charles the Great, lies near the Belgian frontier, in a broad depression, amidst gently sloping hills that afford a certain degree of protection from winds. The mean temperature for the three summer months is 61.9° F.; for the three winter months, 37° F. The beautiful Aachener Wald is connected with the town by electric tramway, and during hot weather shady walks may be enjoyed there. The Lousberg, a wooded hill to the north of the town, offers similar attraction. The size and industrial importance of the city somewhat modify its character as a general health resort, but the bath arrangements and accommodation for invalids are excellent, and adapted not only for the wealthy, but also for persons of more or less restricted means. The thermal muriated sulphurous waters are employed chiefly for baths and douches; massage and various forms of Swedish gymnastics are

made use of in suitable cases. The Aachen treatment of **syphilis** consists in the methodic employment of an antisyphilitic régime, chiefly mercurial inunction, simultaneously with balneotherapeutic measures; and the great reputation of the spa for the cure of syphilitic disorders of all periods doubtless depends largely on the great attention that has been paid to the subject by the local physicians. The baths are open all the year round. BURTSCHIED, a suburb of Aachen, has similar but hotter springs; the temperature of one of them reaching 167° F.

The banks of the Rhine between Bonn and Bingen offer many picturesque places suitable as summer and autumn resorts. We need mention only GODESBERG, ROLANDSECK, KÖNIGSWINTER, HONNEF, NEUWIED, BOPPARD, ST. GOAR, and ASSMANNSHAUSEN. There are some well-known hydrotherapeutic establishments in this region: GODESBERG, LAUBBACH, near COBLENZ, and MARIENBERG and MÜHLBAD, near BOPPARD.

Above HONNEF, on the southwestern slope of the Siebengebirge, is the sanatorium of HOHENHONNEF, under Dr. E. Meissen's direction, for the treatment of **pulmonary tuberculosis**. It faces southwest, and is about 520 feet above the level of the Rhine at Honnef—that is, about 770 feet above sea-level.

In the Siebengebirge hotel accommodation is now to be had at the top of the PETERSBERG (1095 feet), which can be reached by a rack and pinion railway from Königswinter.

ASSMANNSHAUSEN (260 feet), on the right bank of the Rhine, has tepid muriated alkaline waters containing lithium bicarbonate. On the wooded summit of the NIEDERWALD (1080 feet), connected with Assmannshausen by a rack and pinion railway, there is likewise some limited accommodation.

NEUENAHN (260 feet) has a fairly sheltered position in the Ahr valley, six and one-fourth miles from Remagen. It has sometimes been termed 'the German Vichy,' but its thermal alkaline waters are much more weakly mineralized than those of the French spa. Special attention has been paid to **glycosuric cases** at Neuenahr. Close to Neuenahr is the spring of the Apollinaris table water.

The mountainous district called the **Eifel**, with its rather bleak-looking plateaus, is an extensive area between the Rhine and its tributary, the Moselle, between the towns of Coblenz, Treves, and Aix-la-Chapelle. As summer resorts in the Eifel we may mention AHRWEILER (340 feet) and ALTENAHN (345 feet), in the Ahr valley above Neuenahr (the latter, nine miles from Neuenahr, is much more picturesquely situated), the LAACHER SEE (900 feet), GEROLSTEIN (1230 feet), and BAD BERTRICH (500 feet), the last place with mineral waters resembling those of Carlsbad, but only about one-third as strong. BAD TOENNISTEIN, in the Brohlthal, has gaseous muriated alkaline waters somewhat resembling those of Selters. The gaseous waters of GEROLSTEIN and NIEDERMENDIG and the more strongly alkaline waters of BIRRESBORN, near Gerolstein, which are all exported as table waters, bear witness likewise to the richness of this district in mineral springs.

KREUZNACH (340 feet) lies on the Nahe, about ten miles to the south of its junction with the Rhine at Bingen. The brine baths ('Soolbäder') of Kreuznach, often strengthened with 'Mutterlauge' (mother lye), are much used in **scrofulous affections** of children, in **chronic disorders of the pelvic organs** in women, and in **chronic cutaneous affections**. The cold Elisabethquelle, the spring chiefly used for drinking, contains in a thousand parts about ten parts of sodium chlorid and two parts of calcium chlorid. There are arrangements for inhalation of the water on the Wassmuth system, as well as by the older method of the 'Gradirhäuser.' Kreuznach is too hot for some persons during the height of summer, and there is scarcely sufficient shade in the neighborhood, except in the Kurgarten. The mean temperature for the year is 50.2° C.; for the three summer months, about 70° F. The mean annual relative humidity is 74.9 per cent. There are probably not more than 20 rainy days during the summer months.

About one and a half miles south of Kreuznach, in a narrower and rather more picturesque portion of the Nahe valley, is MÜNSTER-AM-STEIN (380 feet), with similar, but warmer, waters. The season at both places is from the beginning of May to the end of September.

Ems (260 feet) is beautifully situated in the narrow valley of the Lahn, seven and a half miles from its entry into the Rhine at Niederlahnstein. Its thermal muriated alkaline waters have obtained a great reputation in **chronic catarrhal affections** of the respiratory organs, and are employed for drinking, for inhalation treatment, and for baths and douches. When there is **emphysema**, Waldenburg's method for inspiration from air of increased density, and expiration into air of diminished density, is frequently employed. The thermal baths and vaginal douches are often made use of for chronic catarrhal affections of the **uterus**, etc. The mean summer temperature at Ems is 64.4° F., and the midday heat during summer may be oppressive, though a considerable fall of temperature takes place when the sun sets behind the sides of the valley. During hot weather the shady walks on the hills are pleasant for those who are able to take them, and by a funicular railway patients can quickly reach the wooded summit of the Malberg, about 1090 feet above sea-level.

At NASSAU (265 feet), on the Lahn, five miles to the east of Ems, is a much frequented establishment for hydrotherapeutic treatment. Between Nassau and Limburg-on-the-Lahn is FACHINGEN, the cold gaseous alkaline water of which is extensively used in Germany. The weakly mineralized gaseous 'Johannis' table water is obtained from near ZOLLHAUS, to the south of Limburg, and further to the east is NIEDERSELTERS, the source of the gaseous muriated alkaline water commonly known as 'natural Seltzer,' which up to the middle of the nineteenth century was almost the only gaseous table water in general use.

THE TAUNUS MOUNTAINS

The Taunus district, to the north of the Main, between Mainz and Frankfurt, is rich in health resorts and mineral waters.

WIESBADEN (380 feet, latitude $50^{\circ} 4'$ north), formerly the capital of the Duchy of Nassau, one of the most frequented health resorts of the world, is beautifully situated at the southern foot of the western part of the Taunus range, about two and one-half miles to the north of the Rhine. The valley in which Wiesbaden lies opens southward into the Rhine valley, and is sheltered from cold winds.

The mean temperature for summer is given as 65.4° F. ; for autumn, as 50° F. ; for winter, as 33.4° F. ; for spring, as 49.4° F. The mean relative humidity is about 78 per cent. The thermal muriated waters of Wiesbaden, especially the Kochbrunnen, are used for drinking in **gouty conditions** and the like, and notably in **chronic catarrhal affections** of the respiratory organs, for which the mild climate of the health resort is favorable. The baths and douches are largely prescribed for **chronic gout, chronic neuralgias, muscular rheumatism**, etc. **Syphilis** is treated by a combination of antisiphilitic and balneotherapeutic measures as at Aachen. The middle of summer is too hot for many persons, but spring and autumn are very agreeable seasons of the year at Wiesbaden. The beautiful walks in the neighboring woods afford grateful shade during hot weather. Wiesbaden is kept open the whole year round, but is rather cold as a winter resort. It is a suitable locality for **milk cures**, and in autumn for the **grape cure**. There are several good establishments in Wiesbaden and its neighborhood where ordinary hydrotherapeutic treatment can be carried out.

Not far distant, on the summit of the **NEROBERG** (800 feet), which can be reached by funicular railway, there is hotel accommodation that might be used for a change from Wiesbaden.

Also in the western portion of the Taunus range are the spas of Schlangenbad and Schwalbach. **SCHLANGENBAD** (900 feet) is situated in a deep, densely wooded valley, having a southerly direction toward the Rhine, which is about five miles distant. The mean summer temperature is 63.8° F. The simple thermal baths of Schlangenbad are among the best known in Germany, and have a special reputation in **insomnia** and **functional nervous disorders** associated with **weakness and irritability**. **SCHWALBACH**, or, more correctly, **LANGENSCHWALBACH** (950 feet), lies in a valley on the northern side of the Taunus range, about four and one-half miles to the north of Schlangenbad. The mean summer temperature is given as 61.4° F. The Schwalbach waters are gaseous chalybeate, and are used in the same class of cases as those of Spa, in Belgium, etc.

In the more eastern portion of the Taunus are Königstein, Cronberg, Soden, Homburg, and Nauheim. To the south of the Taunus,

between Wiesbaden and Frankfurt, lies BAD-WEILBACH (440 feet), with sulphurous and muriated alkaline waters.

KÖNIGSTEIN (1190 feet) and CRONBERG (1015 feet) are popular summer resorts quickly reached from Frankfurt-am-Main. Near Königstein, and two and one-half miles from the railway station of Cronberg, is the establishment of FALKENSTEIN (1315 feet), the well-known sanatorium for pulmonary tuberculosis, in a fairly sheltered position on the southern declivity of the Taunus. The name of Dettweiler will always remain as inseparably connected with the Falkenstein sanatorium as that of Brehmer with Goerbersdorf. At RUPPERTSHAIN, about three miles to the west of Königstein, is a large sanatorium (1310 feet) for consumptive patients of the poorer classes.

SODEN IN THE TAUNUS (450 feet), at the southern foot of the Taunus Mountains, seven miles to the west of Frankfurt, has several gaseous muriated springs, differing from one another in their temperature, which ranges from 52° F. to 86° F.; and in the amount of sodium chlorid (2 to 15 per mille) and free carbonic acid that they contain. The mean summer temperature is 65.6° F., and the mild climate is suitable in some irritable catarrhal conditions of the respiratory organs. Formerly the waters were much prescribed for drinking in cases of pulmonary tuberculosis.

HOMBURG, or HOMBURG-VOR-DER-HÖHE (600 feet), lies on elevated ground at the south of the Taunus range, half an hour distant by railway from Frankfurt. Its open position, with a northern aspect, makes the climate cooler than that of neighboring localities on the Main; the mean summer temperature is given as 62.6° F. This fashionable spa is much frequented for its cold gaseous muriated springs that, in addition to common salt, contain various amounts of iron bicarbonate, in some instances enough to be termed chalybeate. In Part III of this work we shall speak of the utility of Homburg in chronic gout and various other disorders.

NAUHEIM (400 feet), at the northeastern foot of the Taunus, is an attractive place with excellent accommodations. Its gaseous thermal muriated waters have of late years attracted world-wide attention, chiefly owing to the treatment of cardiac affections by gaseous baths and methodic exercises, introduced by the brothers Schott at

this health resort. We shall refer again to the Nauheim treatment in Part III of the present work, and it will be further considered from appropriate viewpoints in the volume on "Hydrotherapy, etc.," and in that on "Mechanotherapy."

The Taunus district possesses also several gaseous muriated alkaline springs, not too highly mineralized to be used as 'table waters.' We need mention only those of CRONTHAL, near Cronberg, and the LUDWIGSBRUNNEN and SCHWALHEIMERBRUNNEN, near Nauheim.

RHENISH BAVARIA

In the **Bavarian Palatinate**, in the region of the Hardt Mountains, are several places that can be used for the **grape cure** in autumn. Commencing in the north, we shall mention some of them in the following order: DÜRKHEIM (380 feet), with brine baths; NEUSTADT-AN-DER-HARDT (460 feet); EDENKOBEN (485 feet); and GLEISWEILER (1020 feet), with a hydrotherapeutic establishment.

ALSATIAN RESORTS

NIEDERBRONN (620 feet), with muriated waters, lies at the eastern foot of the Vosges, in a pleasant valley of the most northern portion of Alsace. HOHWALD (2000 feet), situated amidst beautiful pine forests, about eight and a half miles from the railway station of Barr, is one of the most popular summer resorts of the Vosges. Among other summer resorts of this region are the ODILIENBERG (2470 feet) and the DREI Aehren (1910 feet), much frequented by tourists, the latter on a hill overlooking the Münsterthal and the Rhine valley. The ALTENBERG HOTEL, at the head of the Münsterthal, has already been alluded to in speaking of the French Vosges, although it belongs to the German part of Alsace. We may here likewise mention ALTWEIER (2620 feet), in an open position not far from Rappoltsweiler. RAPPOLTSWEILER itself, situated at a much lower elevation (820 feet), has subthermal waters and is used as a climatic resort in cases of **pulmonary emphysema**, etc.

THE ODENWALD

In the country to the east of the Rhine, between Darmstadt and Heidelberg, there are several places used as summer resorts, such

as JUGENHEIM (530 feet), AUERBACH (330 feet), and WEINHEIM (345 feet), all on the 'Bergstrasse,' as the ancient road that skirts the western slopes of the Odenwald is called; and LINDENFELS (1170 feet), sometimes regarded as the finest spot in the Odenwald, with shady walks in the neighboring woods.

THE BLACK FOREST REGION

The mountain range of the Black Forest, or Schwarzwald (latitude 49° to $47^{\circ} 30'$ north), extends over the region to the east of the Rhine valley, between Karlsruhe and Basel (Bâle). It is famous for its pine-clad valleys, its varied and picturesque scenery, and, especially from a medical point of view, for its numerous climatic and mineral water health resorts. The health resorts are, as a rule, open only from about the middle of May to the end of September; the height of the season being between the middle of June and the middle of August. A few of them, however, such as Baden-Baden and St. Blasien, and, of course, the **Nordrach Sanatorium**, remain open throughout the year.

BADEN-BADEN (650 feet) is situated at the northwestern foot of the Black Forest, in the lower part of the Oos valley, close to the fertile plain of the Rhine. There is good shelter from cold winds, and the climate is mild and moderately moist. The mean temperature for the year is 48° F.; for spring, 48° F.; for summer, 62.4° F.; for autumn, 47.6° F.; for winter, 34.3° F. The heat of the middle of summer is too great here for some persons, chiefly on account of a certain degree of stagnation of the atmosphere caused by the surrounding hills. The thermal weak muriated waters (2 per mille sodium chlorid) are used for drinking, particularly in **chronic catarrhal affections** of the respiratory mucous membranes, but are employed chiefly, like simple thermal waters, for baths and douches in various forms of **chronic gout** and **lithemia**, **rheumatoid arthritis**, etc., in delicate subjects. The thermal establishments include excellent hot-air and vapor baths, Zander's medicomechanical appliances, and the like. Baden is visited not merely for its climate and baths, but also on account of the wonderful beauty of its situation, the variety of the excursions that can be made, the excellent accommodation, and the fashionable character

of the resort. It is admirably adapted for graduated walking and climbing exercise (the 'Terrain-Cur' of Professor Oertel), under medical guidance, and during autumn is likewise a suitable locality for the **grape cure**. It is often selected as an intermediate climatic station on the way to or from warmer winter resorts, and as a locality for an '**after-cure**' ('Nachkur') after courses of more active mineral waters.

The following localities in the hills, at some distance to the south of Baden-Baden, may be mentioned as summer resorts: PLAETTIG (2550 feet), SAND (2730 feet), HUNDSECK (2920 feet), HERRENWIES (2500 feet), and WIEDENFELSEN.

WILDBAD (1410 feet), in the kingdom of Württemberg, nearly due east of Baden-Baden, is situated in the deep pine-clad valley of the Enz, in the northeastern part of the Black Forest. The mean summer temperature is about 62.2° F. Its simple thermal springs, chiefly employed in the form of baths and douches, are useful in the class of cases likely to be benefited by the simple thermal baths (German, 'Wildbäder') in general, aided by the mild mountain and woodland climate.

At SCHÖMBERG (2130 feet), not far from Wildbad, is a **sanatorium** for the treatment of **consumptive patients**, on similar lines to those of Falkenstein.

LIEBENZELL (1100 feet), situated in a pleasant valley about eight miles to the east of Wildbad, has similar waters, but their temperature is lower (72° to 82° F.), so that they have often to be heated for bathing purposes.

HERRENALB (1230 feet), with a hydrotherapeutic establishment, is a beautiful summer resort about eleven miles to the northwest of Wildbad.

TEINACH (1280 feet), about eight miles to the southeast of Wildbad, is a pretty summer resort with facilities for hydrotherapeutic treatment and for **milk and whey cures**. It has gaseous alkaline 'table waters.'

The four places mentioned after Wildbad are all in Württemberg. We shall now direct attention to a group of health resorts situated near the **Kniebis Mountain** (3165 feet), mostly in Baden.

RIPPOLDSAU (1856 feet), the best known of the 'Kniebis spas,'

lies in a narrow part of the Wolfthal, a typical, thickly wooded Black Forest valley, at the southeastern base of the Kniebis. Its gaseous chalybeate waters contain small amounts of calcium bicarbonate and sodium sulphate. The other Kniebis spas—namely, GRIESBACH (1850 feet), PETERSTHAL (1330 feet), and FREIERSBACH (1260 feet), in the Renchthal, and ANTOGAST (1640 feet), in the beautiful Maisachthal, likewise possess gaseous alkaline earthy chalybeate springs, useful in anemia and similar conditions.

On the Württemberg side of the Kniebis is FREUDENSTADT, a favorite summer resort, situated near pine forests, on a plateau 2380 feet above sea-level.

Here we may conveniently mention IMNAU (1140 feet), with gaseous chalybeate springs, pleasantly situated in the Eyachthal, in the west of the principality of Hohenzollern.

OPPENAU (Baden), in a broad part of the Renchthal (910 feet), to the west of the Kniebis spas, is often used as a summer resort on account of the various excursions to be made in the neighborhood; it is the terminus of a branch railway from Appenweier. ALLERHEILIGEN (2035 feet), in a wooded valley some distance to the north of Oppenau, is a summer resort for those contented with simple accommodation.

Dr. Walther's well-known sanatorium, NORDRACH-COLONIE (1470 feet), has a sheltered position facing southward, amidst pine-clad hills, on which numerous sloping paths serve for the patients' exercise. It is four and one-half miles from the village of Nordrach, and nine miles from the nearest railway station, Biberach-Zell. At NORDRACH itself sanatorium treatment is likewise carried out.

TRIBERG (2250 feet), situated near the well-known waterfalls, with a station on the famous Black Forest railway, is greatly frequented as a summer resort, but is rather too much of an industrial town to be regarded as a health resort proper. The deep valleys and pine-clad slopes of the neighborhood are typical of this most interesting district of the center of the Black Forest. Three miles from the station of Triberg is SCHÖNWALD, a quiet summer resort at a higher elevation (3260 feet). HORNBERG (1260 feet), on the Black Forest railway, a few miles to the north of Triberg, attracts many summer visitors. There is, likewise, a hotel on the Schlossberg, about 240 feet above the railway and town.

We come now to the localities in the southern portion of the Black Forest—that is, to the south of Freiburg.

BADENWEILER (1370 to 1470 feet), beautifully situated at the northwestern foot of the Blauen, is sheltered on the north, east, and south by a semicircle of pine-clad mountains. It is open toward the west, and in that direction commands a view across the Rhine valley to the Vosges Mountains. Its simple subthermal springs were known from Roman times. The air is pure and of moderate humidity, and the summer, though occasionally rather hot, is, on the whole, relatively cool, the mean temperature being 63.5° F. Badenweiler is much used as a summer resort by delicate persons with **chronic catarrhal disease** of the respiratory organs, **chronic neuralgias**, **irritable nervous disorders**, and similar affections. It is an excellent place for **milk cure** and **wey cure**, and for a stay after courses of active mineral waters at other spas ('Nachkur'). In the neighborhood of Badenweiler are a number of localities, at various elevations, that can be used as climatic resorts according to the time of the year and the patient's constitution: OBERWEILER (1115 feet), HAUS BADEN (1750 feet), SCHLOSS BÜRGEN (2180 feet), and, for persons who are not fastidious and require only bracing air, even the inn on the summit of the BLAUEN (3830 feet).

ST. BLASIEN (2530 feet) has a sheltered sunny position in the upper Albthal, in the southeastern part of the Black Forest. The climate is said to be relatively mild and equable and suitable for spring and autumn residence. The place is likewise kept open during winter, and at this season dry and sunny, though cold, weather prevails for several weeks. The mean winter temperature is about 29.6° F. The air is pure and fresh, and the pleasant walks in the surrounding pine woods can be used for graduated walking and climbing exercises, as at the so-called 'Terrainkurorte.' It is a good place for **courses of milk**. There is a **sanatorium** for the special treatment of **consumptive patients**.

The following **summer resorts**, in the southern Black Forest, must likewise be mentioned: TITISEE (2815 feet) and SCHLUCHSEE (3120 feet), near pretty lakes and pine forests; BAD BOLL (3215 feet), near Bonndorf; and HÖCHENSCHWAND (3310 feet), one of the high-

est villages in the Black Forest. The last-named place is cool and refreshing during summer, the mean temperature for the three summer months, according to Reimer, being only 55.4° F.; but it is not well sheltered from winds.

Allusion may here be made to the **university towns** of FREIBURG-IM-BREISGAU (920 feet), at the western foot of the Black Forest, and HEIDELBERG (365 to 640 feet), at the entrance of the Neckar valley. These two towns of Baden vie with each other, and also with Baden-Baden, which lies midway between them, in the extreme beauty of their situations. Though not exactly health resorts, both towns are much visited by strangers, not only an account of their picturesque scenery and architectural attractions, but likewise on account of the educational facilities and the opportunities for medical advice and treatment that they afford. Heidelberg has a slightly cooler summer and a warmer winter than Freiburg. The sites of the Heidelberg hotels are of various elevations: those near the station are about 365 feet above sea-level; those near the Schloss, about 640 feet; while the KOHLHOF has an altitude of 1485 feet.

THE HARZ MOUNTAINS

The Harz Mountains (latitude $51^{\circ} 25'$ to $51^{\circ} 55'$ north), the most northerly of the principal mountain groups of Germany, are nearly isolated on every side. Owing to the more northerly latitude and isolated position of these mountains, the health resorts situated among them have, as a rule, far more bracing climates than those of places in the Swiss Alps at equal elevations. The summer resorts in the Harz are very popular among North Germans, and are generally crowded with visitors during the middle of the season. They are relatively but little visited by the English.

HARZBURG lies on the northern declivity of the Harz Mountains, at the entrance of the Radauthal. The railway station is about 800 feet above sea-level, but some portions of the health resort, including the brine baths of JULIUSHALL, are situated about fifty feet higher. On account of its beautiful situation, its shady walks, its easy access, and the numerous excursions to be made into the Harz Mountains, Harzburg is one of the most popular summer resorts in North

Germany. On the summit of the **BURGBERG** (1555 feet), above Harzburg, there is likewise limited accommodation.

ST. ANDREASBERG (1665 to 2165 feet above sea-level) has a sheltered position in the upper Harz, and its bracing climate has a good reputation in **scrofulous affections** and supposed tendency to **pulmonary tuberculosis**. It is used in winter as well as in summer. The mean temperature for the year is said to be 44° F. ; for spring, 42.6° F. ; for summer, 58.8° F. ; for autumn, 44.4° F. ; for winter, 30.2° F. Near St. Andreasberg two excellent **sanatoriums** for **poor consumptives** have been established by the Hanse Towns Insurance Company—the **ODERBERG SANATORIUM** (2100 feet) for men, and the **GLUCKKAUF SANATORIUM** for women.

On the northern declivity of the Ober-Harz (northwestern portion of the Harz Mountains) we may mention **ILSENBURG** (780 feet) and **WERNIGERODE** (770 feet), which owe much of their popularity to the beautiful excursions that can be made in their neighborhood. Higher up in the mountains are **Braunlage** (1840 feet), **Schiercke** (1850 feet), **Clausthal** (1840 feet), and the hotels of **Stoberhey** (2360 feet) and the summit of the **Brocken** (3415 feet). **BRAUNLAGE** lies in a fairly sheltered valley, and is open to invalids throughout the year. **SCHIERCKE**, on the southern declivity of the **Brocken**, has a quiet position in the midst of extensive pine forests, and is a cool resort for the summer months. **CLAUSTHAL**, an important mining place, is rather bleak and has a bracing climate—too rough for those seriously ill. Owing to their exposed and windy positions, **STOBERHEY** and the top of the **BROCKEN** are suitable only as very bracing summer resorts for healthy persons.

The resorts in the Unter-Harz, or southeastern division of the Harz Mountains, are now to be considered.

ALEXISBAD (1080 feet), with chalybeate waters, is a sheltered and sequestered summer resort in the beautiful **Selke** valley of the lower Harz. The air is fresh and moderately moist, and there are charming walks in the neighboring woods.

THALE (630 feet) is a summer resort at the northern foot of the Unter-Harz, at the entrance to the **Bodethal**, one of the most beautiful districts of the whole Harz Mountains. The **HUBERTUSBAD** at **Thale**, on a small island in the **Bode**, possesses muriated waters. Close

to Thale are the heights of the ROSSTRAPPE (1315 feet) and the HEXENTANZPLATZ (1525 feet), but the hotels on these popular points of view are often crowded with excursionists, and the constant coming and going of tourists make them, like the top of the Brocken and the hotels on the Rigi and Pilatus in Switzerland, too noisy for the stay of persons who require rest.

Among other summer resorts on the northern side of the Unter-Harz are BLANKENBURG (750 feet), GERNUDE (730 feet), and BALLENSTEDT (690 feet). Close to Gernrode is SUDERODE (620 feet), with a rather weak brine spring.

FRANKENHAUSEN (370 feet), in a valley on the southern declivity of the Kyffhäuser, to the south of the Harz Mountains, possesses brine baths.

THE THURINGIAN FOREST (THÜRINGER WALD)

The Thuringian Mountains (latitude $50^{\circ} 30'$ to 51° north) are not quite so high as the Harz Mountains and have a milder climate than the latter. Most of the summits are covered with pine trees. The Thuringian summer resorts, and especially the localities on the northern slopes, are very popular among Germans.

FRIEDRICHRODA (1320 to 1430 feet) should be mentioned first. It is perhaps the most frequented summer climatic resort of the Thuringian Forest. It lies amidst extensive forests, in a valley of the northern declivity, about ten miles to the southwest of Gotha. The mean temperature for the three summer months is 62.8° F.; for September, 59.4° F. Owing to the surrounding forests the climate is relatively rather moist and equable. The mean relative humidity for the summer months is about 75 per cent.,—considerably higher than that of neighboring towns in the plain,—and the daily range is not more than 9° F. The surroundings are well adapted for graduated walking and climbing exercise. In the adjoining pine woods there are abundant pleasant walks, sheltered both from sun and wind, and the park of Schloss Reinhardsbrunn, only a short distance off, is open to the public. Friedrichroda is a good place for **milk** and **whhey** cures.

TABARZ (1300 to 1370 feet), consisting of the three villages, Gross-Tabarz, Klein-Tabarz, and Kabarz (or Cabarz), is a summer

resort with similar advantages. It lies about two and one-half miles to the northwest of Friedrichroda, at the northern foot of the Inselsberg.

OBERHOF, the highest health resort of the Thuringian Forest, is situated in its center, on a plateau about 2625 feet above sea-level, not far from the Schneekopf (3210 feet) and the Beerberg (3240 feet), the highest summits of the Thuringian Mountains. To its open position and relatively high altitude Oberhof owes its bracing climate. The mean summer temperature is 56.5° F. Though the main roads are dusty, there are beautiful walks in the neighboring woods, and special mention may be made of the excursion to the beautifully situated 'SCHMÜCKE' (2990 feet), partly by the Rennstieg, a famous ancient boundary between Thuringia and Franconia.

RUHLA (1595 feet), BROTTRODE (1896 feet), and TAMBACH (1480 feet), are summer resorts in the heart of the mountains.

ELGERSBURG (1790 feet) and ILMENAU (1565 feet), on the northern declivity, have well-known hydrotherapeutic establishments; one of the Elgersburg establishments was founded as early as 1837 by the self-taught Jakob Gräser.

On the northern declivity, rather further to the east, BLANKENBURG (738 feet), at the entrance of the romantic part of the Schwarzthal, and RUDOLSTADT (645 feet), the capital of the little principality of Schwarzburg-Rudolstadt, are likewise used as summer resorts, although the heat at these places is often great.

EISENACH (725 feet) is famous for its position at the foot of the Wartburg, in the northwestern corner—one of the most beautiful parts—of the Thuringian Forest. Though rather hot for midsummer, the slopes around Eisenach offer well-situated hotels and villas suitable for late summer and autumn residence. The Hainstein Kurhaus, with arrangements for hydrotherapy, affords a magnificent view of the Wartburg.

LIEBENSTEIN (1450 feet), in Saxe-Meiningen, is well known among North Germans for its gaseous alkaline earthy chalybeate springs, and for its beautiful position in a well-wooded, district of the southwestern declivity of the Thuringian Forest, near Schloss Altenstein and the picturesque ruins of the Burg Stein. Liebenstein is shel-

tered on the north and east and has a fairly equable climate of medium humidity.

SALZUNGEN (780 feet), in the broad Werrathal, at the southwestern foot of the Thuringian Forest, not far from Liebenstein, has brine springs of various strengths, with arrangements for brine baths ('Soolbäder'). Inhalation treatment is much employed, both by ordinary pulverization of the brine and by a large 'Gradirhaus,' which is kept up merely on account of the patients. There is an excellent sanatorium for scrofulous and weakly children of the poorer classes.

In the extreme south of Saxe-Meiningen is FRIEDRICHSHALL, with muriated sulphated 'bitter waters,' largely exported for their laxative action.

ARNSTADT (920 feet), at the northern foot of the Thuringian Forest, and KOESTRITZ (550 feet), much further east, in the Elsterthal, have arrangements for brine baths; Koestritz is chiefly known for its hot sand-baths, which were first employed there in 1865.

On the EMSKOPF, in the HARTH FOREST, not far from BERKA, is the new Thuringian sanatorium for poor consumptives; it stands in the midst of a dense pine forest, in which level walks can be taken. There are likewise arrangements on the Harth for the treatment of paying patients.

There are a number of health resorts in the **Frankenwald**, or Franconian Forest,—a range that unites the southeastern portion of the Thuringian Forest with the Fichtelgebirge,—in the **Fichtelgebirge**, and in the 'Franconian Switzerland,' as a northern portion of the **Franconian Jura** to the west of the Fichtelgebirge is called.

LOBENSTEIN (1650 feet) is pleasantly situated on the southern declivity of the Thuringian Forest, at the commencement of the Frankenwald. Owing to the neighboring woods, the climate is rather moist. The mean summer temperature is 62.4° F. There are chalybeate springs, rather poor in free carbonic acid gas, and arrangements for ferruginous peat baths.

STEBEN, situated on the wooded plateau of the Frankenwald, at an altitude of about 1950 feet above sea-level, has a decidedly bracing summer climate. It possesses gaseous chalybeate springs

and arrangements for peat baths. It is said to be the most elevated chalybeate spa in Germany.

BERNECK (1280 feet) is a favorite summer resort, picturesquely situated in the narrow valley of the Oelsnitz, on the western declivity of the Fichtelgebirge. It is a place well suited for excursions into this mountain group.

ALEXANDERSBAD (1915 feet) is a bracing resort in the Fichtelgebirge, close to the Luisenburg, possessing gaseous chalybeate waters and good arrangements for hydrotherapeutic treatment.

KÖNIG-OTTO-BAD (1680 feet), named after the late King Otto of Greece, situated on the southern declivity of the Fichtelgebirge, not far from the railway station of Wiesau, has chalybeate waters and peat baths.

STREITBERG (1910 feet) and MUGGENDORF (1780 feet), two and a half miles from each other, in the western part of the 'Franconian Switzerland,' are summer resorts with good arrangements for milk and whey cures. The soil is chalky.

THE ERZGEBIRGE AND THE KINGDOM OF SAXONY

The **Erzgebirge** (latitude 50° to 51° north) are a range of mountains constituting the natural boundary between Bohemia and the kingdom of Saxony, and having a northeasterly direction from Bavaria on the southwest, toward Prussian Silesia on the northeast. The mountains attain a height of about 2600 feet, and the highest summit, Keilberg in Bohemia, has an altitude of 4080 feet. Situated on the declivities of these mountains are several health resorts of moderate elevation.

BAD-ELSTER, in the Elstergebirge, the western portion of the 'Erzgebirge, will, for convenience, be described further on, together with Marienbad and the Bohemian spas. SCHOENECK (2515 feet), to the northeast of Elster, may be used as a summer resort on account of its relatively elevated situation.

REIBOLDSGRÜN (2270 feet), on the Saxon side of the Erzgebirge, not far from the railway station of Auerbach, is surrounded by an extensive pine forest that helps greatly to shelter the place from winds, as also to make the temperature more equable and to purify the air. According to meteorologic observations taken at a rather

higher level (Reimer), the mean temperature for summer is 57.8° F.; for autumn, 42.1° F.; for winter, 27.8° F.; for spring, 41.4° F. The mean annual relative humidity is 83.8 per cent. Dr. Driver's private sanatorium for consumptive patients was founded in 1873.

REITZENHAIN (2490 feet), a summer resort in the central portion of the Erzgebirge, on the border-line between Saxony and Bohemia, has a station on the railway that crosses the frontier at this point. WIESENBAD (1480 feet) and WARMBAD, or BAD-WOLKENSTEIN (1500 feet), to the northwest of Reitzenhain, possess simple subthermal waters. In the portion of the Erzgebirge to the east of Reitzenhain are several pleasantly situated places that may be used as summer resorts by those who are not very fastidious as to accommodation and food.

In the so-called 'Saxon Switzerland,' at the eastern end of the Erzgebirge, we may mention as summer resorts SCHANDAU (395 feet) and SCHWEIZERMÜHLE (1150 feet), the latter with a well-known hydrotherapeutic establishment; and in the neighboring portion of Bohemia, BODENBACH (440 feet) and DITTERSBACH (1090 feet) may be referred to.

AUGUSTUSBAD (720 feet), about eleven miles to the northeast of Dresden, in a sheltered position amidst beautiful pine woods, has arrangements for hydrotherapeutic treatment, milk and whey cures, etc. Its chalybeate waters are rather poor in free carbonic acid gas. THARANDT (685 feet), in a beautiful situation eight and one-half miles to the southwest of Dresden, is a summer resort with good opportunities for milk and whey cures, etc. Among other localities near Dresden is the WEISSER HIRSCH (780 feet), a popular summer resort about three miles to the east of the town, at the southern edge of the wooded plateau called the Dresdner Heide. It possesses a well-known sanatorium for dietetic and open-air treatment, with arrangements for sun-baths, hydrotherapy, etc.

Here may be mentioned, for convenience, MUSKAU (320 feet), on the Neisse, in Prussian Silesia, with springs containing iron salts, both bicarbonate and sulphate. The bath establishment lies in the middle of a fine park, and has arrangements for ferruginous peat baths, etc.

THE RIESENGBIRGE (GIANT MOUNTAINS) AND THE SUDETIC RANGE

The **Isergebirge**, the **Riesengebirge**, the **Eulengebirge**, **Adlergebirge**, **Sudeten**, etc., which are sometimes all included under the term 'Sudetic Mountains' (latitude $49^{\circ} 40'$ to 51° north), form a chain of mountains occupying the northeastern borders of Bohemia and Moravia with the adjacent parts of Silesia, and extending from the eastern end of the **Erzgebirge** toward the southeast as far as the sources of the Oder and the Carpathians. The **Riesengebirge** group, in the narrow sense of the term, reaches an average height of 4300 feet, its highest summit, the **Schneekoppe**, being 5260 feet above sea-level. Forest trees cover the slopes for the most part, to a height of about 3500 feet. The summer resorts are likely to be excessively crowded with passing tourists.

FLINSBERG (1720 feet) is a long-stretched-out village in the picturesque **Queisthal**, at the northern foot of the **Tafelfichte** (3690 feet), the highest point of the **Isergebirge**. It is a summer resort of medium altitude, with a rather moist forest climate, and possesses gaseous chalybeate springs and arrangements for hydrotherapeutic treatment.

LIEBWERDA (1420 feet), on the western declivity of the **Tafelfichte**, about eight miles to the west of **Flinsberg**, and on the Bohemian side of the frontier, has gaseous chalybeate springs.

Among the summer resorts on the north, or German, side of the **Riesengebirge** proper may be mentioned: **SCHREIBERHAU**, the highest village of Silesia, 2060 feet above sea-level; **PETERSDORF** (1300 feet), **HERMSDORF** (1310 feet), **WARMBRUNN** (1130 feet, with simple thermal springs), **SCHMIEDEBERG** (1470 feet), and **KRUMMHÜBEL** (1750 feet, at the northern foot of the **Schneekoppe**), places at no great distance from one another.

On the southern side of the **Riesengebirge** are the Bohemian summer resorts, **SPINDELMÜHL** (2660 feet) and **JOHANNISBAD** (2070 feet); the latter has a simple thermal (tepid) spring and is a good place for **milk** and **whew** cures.

Near the Bohemian frontier, between the **Riesengebirge** and the **Eulengebirge**, is **GOERBERSDORF** (1840 feet), in a beautiful valley

sheltered practically on all sides by high slopes covered with pines. At this small Silesian village, in 1854, Dr. Hermann Brehmer commenced his treatment of **consumptive patients**, and in 1859 began to establish his private **sanatorium**, the oldest institution of its kind, which was afterward much enlarged. The open-air treatment was here for the first time persistently and systematically carried out. Besides Brehmer's original establishment, Goerbersdorf can boast of Dr. Roempler's large sanatorium, opened in 1875, and a smaller sanatorium belonging to Dr. Weicker. There are likewise arrangements for the treatment of a large number of consumptive patients of the poorer classes on the 'colony' system. In the régime pursued at Goerbersdorf stress is laid upon the graduated walking and climbing exercises, afforded by picturesque paths laid out upon the hill-slopes at various gradients, and furnished with resting places at measured distances.

BAD-SALZBRUNN, or **OBERSALZBRUNN** (1320 feet), in a shallow valley of the northern outskirts of the Sudetic range, is the southern (upper) portion of the long, straggling village of Salzbrunn, about forty miles to the southwest of Breslau. Its cold gaseous alkaline waters are chiefly used for drinking, but there are likewise good arrangements for baths, douches, etc., and apparatus, as at Ems, for expiration into rarefied air and inspiration from air at increased pressure. The spa is much resorted to by patients with **chronic catarrhal affections** of the respiratory organs, including some cases of quiescent or chronic **pulmonary tuberculosis** without fever. **Chronic disorders of the digestive and urinary organs**, especially if connected with a **gouty tendency**, are likewise frequently treated here. Salzbrunn is not much sheltered from the north, and has a decidedly bracing climate. It is a good place for **milk and whey cures**, etc. Special attention is devoted to the purity of the milk supplied, and besides ordinary cow's milk, the milk of goats, asses, and sheep can be obtained, and likewise whey from cow's and goat's milk, and kephyr. Whey mixed with mineral water (warm or cold), and whey or kephyr mixed with an iron preparation (German, 'Eisenmolke,' 'Eisenkephyr'), are much employed, the latter in **anemic cases**. Among popular attractions in the neighborhood is the romantic gorge known as the 'Furstensteiner Grund.' ALT-

WASSER, not far from Salzbrunn, was well known as a chalybeate spa up to the year 1869, but the springs were then damaged by coal-mining work.

Attention may now be given to a number of small health resorts in a picturesque district of the Sudetic Mountains, of which the lofty old stronghold of Glatz may be imagined to form the central point.

BAD-REINERZ (1860 feet), seventeen miles to the west of Glatz, is situated in a pleasant valley between the Heuscheuergebirge and the Adlergebirge. It possesses gaseous chalybeate springs and arrangements for baths, douches, etc. Good milk, whey, and kephyr are provided. Its tonic climate, of moderate humidity (mean summer temperature, 60.8° F.), its shady walks, and its chalybeate waters make it a suitable summer resort in some cases of **convalescence from acute diseases**. It is much resorted to by patients with **chronic or quiescent pulmonary tuberculosis** without fever.

BAD-CUDOWA (1310 feet) is about nine miles to the northwest of Reinerz, near the Bohemian frontier. It is situated at the side of a broad valley, to the south of a wooded slope connected with the Heuscheuergebirge, the main elevations of which lie to the east. Its gaseous alkaline chalybeate waters are employed internally and for gaseous baths. The Eugenquelle, richest in iron, contains likewise an appreciable amount of arsenic.

BAD-LANGENAU, or NIEDERLANGENAU (1170 feet), about sixteen miles to the south of Glatz, a quiet little place pleasantly situated in the valley of the Glatzer Neisse, possesses gaseous chalybeate waters. So also does ALT-HAIDE, or ALT-HEIDE (1310 feet), between Glatz and Reinerz. The chalybeate waters of CHARLOT-
TENBRUNN (1550 feet), about twenty-eight miles to the northwest of Glatz, are rather poor in carbonic acid gas. Charlottenbrunn is a summer resort in a wooded valley, sheltered from cold winds.

BAD-LANDECK (1530 feet), twenty-one miles to the southeast of Glatz, is pleasantly situated in the Bielathal, to the west of the Schneegebirge. Its simple thermal waters, ranging from 68° to 83.3° F., contain minute quantities of sodium sulphid and hydrogen sulphid. Its baths, its mountainous position, and the affections

treated have led to a rough comparison of Landeck with Saint-Sauveur in the Pyrenees. The mean temperature for summer is 60° F.; for autumn, 43.7° F. The summer mean of relative humidity is about 77 per cent.

GRAEFENBERG-FREI WALDAU, in Austrian Silesia, is a pleasant summer resort and well-known station for hydrotherapeutic treatment. Here Vincent Priessnitz (1799-1851) founded his establishment in 1826. Graefenberg (2070 feet) lies in the Sudeten proper, not far to the north of the ALT VATER (4890 feet), the highest summit of the group. The various establishments are built on the slopes at the head of a small branch valley, facing southeast, sheltered from cold winds. On a ridge higher up are promenades with beautiful views, both toward Prussia on the north and in the direction of Moravia on the south. The walks in the woods are very fine. Freiwaldau lies in the valley at a much lower elevation (1450 feet) and has a decidedly less tonic climate than Graefenberg.

ULLERSDORF, or GROSS-ULLERSDORF (1240 feet), with weakly mineralized subthermal springs, is a summer resort in a Moravian valley at the southern foot of the Altvater.

For convenience may here be mentioned GOCZALKOWITZ (850 feet) and KÖNIGSDORFF-JASTRZEMB (870 feet), two places in the south of Prussian Silesia, with brine baths of local utility.

OTHER REGIONS OF GERMANY

OLDESLOE and SEGEBERG, in Schleswig-Holstein, have pleasantly situated establishments for brine baths, etc.

PLÖN, situated between the Grosse and the Kleine Plöner See, and GREMSMÜHLEN, on the Dieksee, may be mentioned as summer resorts in the picturesque region known as 'Holstein Switzerland.'

BAD STUER, in Mecklenburg-Schwerin, lies on the Plauer See, and has sheltering wooded hills and arrangements for hydrotherapy, etc.

EBERSWALDE, twenty-eight miles to the northeast of Berlin, and FREIENWALDE, twelve miles from Eberswalde, in pleasant, well-wooded districts, are summer resorts for the people of Berlin. They both possess weak chalybeate waters. POTSDAM, near Berlin, may be used for a stay in summer, owing to its beautiful royal parks.

OEYNHAUSEN, or REHME-OEYNHAUSEN (230 feet), in the north of Westphalia, lies on the Werre, in a shallow, fertile valley not far from Minden and the picturesque 'Porta Westphalica.' It is chiefly used for its thermal gaseous muriated waters, analogous to those of Nauheim, but the 'Thermal-Soolbäder' of Oeynhausien have obtained a special reputation in **chronic affections of the nervous system**, and are annually resorted to by numbers of patients suffering from **tabes dorsalis** and various **organic nervous diseases**, as well as by sufferers from **muscular rheumatism**, **debility after acute diseases**, etc. The walks in the fresh air of the well-wooded Kurpark are very pleasant.

PYRMONT (420 feet), in the principality of Waldeck, in the beautiful valley of the Emmer, is famous for its cold gaseous alkaline earthy chalybeate springs, and has likewise excellent arrangements for brine baths and ferruginous peat baths. It is partially sheltered by the surrounding wooded hills, on the slopes of which there are numerous shady paths suited for graduated walking and climbing exercise. Up the Bomberg (1010 feet) there is a funicular railway. The green avenues, Kurpark, pretty villas, and surrounding scenery give Pyrmont a very bright and cheerful appearance. The air is pure, and rather moist for this part of Germany. The mean summer temperature is 60.8° F. (Reimer). The chalybeate waters and brine baths cause the place to be resorted to by large numbers of patients, especially women, suffering from various conditions of **anemia and debility**. It is much frequented as a summer resort by Hanoverian families, and was, like Spa, in Belgium, among the earliest 'spas' of the European Continent to obtain a reputation in England. The living is not very expensive.

BAD DRIBURG (730 feet), in a pleasant valley of the southeastern portion of the Teutoburger Wald, is a quieter chalybeate spa than Pyrmont. Besides its cold gaseous alkaline earthy chalybeate springs, it provides sulphurous peat baths, for which a peat from the Saatz sulphur spring is employed.

LIPPSPRINGE (450 feet), near Paderborn, in Westphalia, and not far from Driburg, lies on the plain about three and one-half miles to the southwest of the Teutoburger Wald. The weakly mineralized Arminiusquelle (70° F.) contains small quantities of calcium sul-

phate, sodium sulphate, iron bicarbonate, etc., together with a relatively large amount of nitrogen gas. Lippspringe is chiefly frequented as a summer resort by patients with **chronic catarrhal and tuberculous affections of the lungs** without fever. The rather moist, equable climate and the internal employment of the Arminiusquelle doubtless help to relieve **irritable bronchitic complications**, while the open-air life tends to increase the appetite and promote nutrition. The mean summer temperature is about 62.4° F. The neighboring INSELBAD is used as a private **sanatorium for asthmatic and bronchitic disorders**.

DETMOLD (440 feet), the little capital of Lippe-Detmold, on the northeastern side of the Teutoburger Wald, not far from the colossal Arminius monument, may serve as a summer resort for families of this part of Germany. Twelve miles to the northwest of Detmold are the brine baths of SALZUFLEN (320 feet).

MEINBERG (660 feet), at the northern foot of the Teutoburger Wald, six miles to the southeast of Detmold, has cold earthy sulphurous waters and sulphurous mud-baths (German, 'Schwefelschlambäder'). BAD-EILSEN (230 feet), near Bückeberg, and BAD-NENNDORF (230 feet), about fifteen miles to the west of Hanover, have similar earthy sulphurous waters, but, like Meinberg, are probably best known for their mud-baths. Nenndorf has likewise arrangements for brine baths, but a large, recently erected establishment is devoted exclusively to mud-baths. Here may likewise be mentioned BAD-BENTHEIM (290 feet), pleasantly situated amidst woods, near the town and castle of Bentheim, in the west of Hanover, close to the frontier of Holland. It has cold earthy sulphurous waters and sulphurous mud-baths.

A few miles to the northwest of Nenndorf is BAD-REHBURG (330 feet), in a sheltered position amidst some beautifully wooded hills, near the Steinhuder Meer, twenty-five miles from Hanover. This small health resort is chiefly frequented by persons with **chronic tuberculous affections of the lungs**. It contains two private **sanatoriums** for paying patients, as well as the 'Bremer Heilstätte' for patients of the poorer classes. Excellent **goat's whey** is provided. The climate is relatively moist and equable for this part of the Continent.

WILHELMSHÖHE (about from 820 to 1820 feet), near Cassel, on the eastern declivity of the Habichtswald, with a park and château, formerly the summer residence of the electors of Hesse, is a beautiful, well-wooded locality for a summer stay, and offers facilities for hydrotherapeutic treatment, **milk cures**, gentle climbing exercises, etc. It is connected by steam tramway with Cassel.

WILDUNGEN (980 feet), in the principality of Waldeck, is situated in a picturesque hilly district about twenty-three miles to the southwest of Cassel. The mean summer temperature is 61.6° F. (Reimer). There are pleasant shady walks in the neighboring woods. The weakly mineralized cold gaseous alkaline earthy Georg-Victorquelle is probably the most employed of the Wildungen springs. The Helenenquelle, which rises in the neighboring Helenenthal, and the Königsquelle, are cold gaseous muriated alkaline springs containing a little over 1 per mille of each of the three salts—calcium bicarbonate, magnesium bicarbonate, and common salt. These three springs contain a certain amount of iron bicarbonate, and at least one of the neighboring springs—the Stahlquelle—contains a sufficient quantity of this salt to be termed strongly chalybeate. The Wildungen waters are used chiefly for drinking, but there are likewise arrangements for gaseous mineral water baths. The place is mainly resorted to by patients suffering from **affections of the urinary organs**, and has long acquired a reputation as a 'surgical spa,' owing to the skilful surgical treatment carried out there for **vesical calculus, urethral stricture**, and the like.

SALZSCHLIRF (820 feet), in a valley of the northeastern declivity of the Vogelsberg, not far from Fulda, possesses cold gaseous muriated waters, used, like those of Homburg and Kissingen, both for drinking and for bathing. The neighboring village of GROSSEN-LÜDER has a slightly laxative water, termed 'Hessisches Bitterwasser,' containing about 15 per mille sodium chlorid and rather more than 1 per mille magnesium sulphate, with much free carbonic acid gas. SALZHAUSEN (470 feet), near Nidda, at the southern foot of the Vogelsberg, has weak muriated waters that can be strengthened artificially for brine baths. SODEN-STOLZENBERG (1040 feet), with brine baths, is a little place in the Kinzigthal between the outermost ridges of the Spessart, Rhöngebirge, and Vogelsgebirge. About

six miles to the south is ORB (480 feet), with cold gaseous muriated waters used for baths. SODENTHAL (470 feet), in a sheltered, well-wooded valley of the Spessart, four miles from Aschaffenburg, has a rather moist and equable woodland climate. Its cold muriated waters, containing small quantities of magnesium bromid and calcium sulphid, are used for drinking, baths, douches, etc.

LUDWIGSBAD-WIPFELD (715 feet), in the Main valley to the south of Schweinfurt, has cold earthy sulphurous waters and sulphurous mud-baths.

BRÜCKENAU (980 feet) is a quiet health resort in the north of Bavaria (lower Franconia), beautifully situated at the southwestern foot of the Rhöngebirge, amidst forests of beech and oak. It has cold gaseous weak chalybeate waters and arrangements for douches, ferruginous peat baths, etc. Good milk and whey are provided. In some cases it is a suitable place for a stay after courses of mineral waters at Kissingen, etc.

BOCKLET (690 feet), to the southeast of the Rhöngebirge, in the well-wooded valley of the Franconian Saale, four and one-half miles to the north of Kissingen, has gaseous chalybeate waters containing a small quantity of sodium chlorid.

KISSINGEN (650 feet), the most important mineral water health resort of Bavaria, is situated amidst the meadows and wooded slopes of the valley of the Franconian Saale, to the southeast of the Rhöngebirge. The mean summer temperature is 62.8° F. The mean relative humidity is 74.7 per cent. Its cold gaseous muriated waters (Rakoczy and Pandur springs) may be grouped in the same class as the well-known springs of Homburg; in Part III of the present work we shall again refer to the utility of these two health resorts in various chronic affections. The Maxbrunnen is weakly mineralized and much used as a gaseous table water. The Salinen-Sprudel and the Schönborn-Sprudel, with about 1 per cent. of common salt, are used for ordinary brine baths, wave baths, etc.; the latter of these springs is much the richer in carbonic acid gas, and well suited for effervescent baths after the Nauheim methods. For stronger brine baths 'Mutterlauge' may be added. Near the Salinen-Sprudel are Gradirhäuser, as at Kreuznach, Reichenhall, etc. There are several private sanatoriums at Kissingen for special

dietetic and other treatment. There is likewise a **sanatorium for weakly children**.

In Württemberg we have still to mention JAGSTFELD (450 feet), near Heilbronn, and the picturesque old town of HALL, or 'SCHWÄBISCH HALL' (980 feet), on account of their brine baths. Other places in Württemberg have already been alluded to under the heading Black Forest.

THE BAVARIAN HIGHLANDS

The Bavarian Highlands, which, with the adjacent lakes, lie between latitudes $47^{\circ} 20'$ and 48° north, constitute the northern border of the eastern Alps. They contain a number of pleasant summer resorts of low and medium elevations, and, like the adjoining (northern) portions of the Austrian Alps, are rich in picturesque lakes and in muriated mineral waters, which can be used for brine baths ('Soolbäder').

REICHENHALL (1570 feet) is situated on the Saalach, close to the Austrian frontier, in a fairly broad valley (latitude $47^{\circ} 43'$ north), sheltered by mountains toward the east, south, and west, but open toward the northeast in the direction of Freilassing. Winds from the north and northeast are, however, during the season at least, infrequent. The mean summer temperature is about 63° F. The mean summer relative humidity is 75.5 per cent. The summer climate is, therefore, rather moist, and there is a good deal of rain—seventeen rainy days in June. The mean autumn temperature is 54° F.

The arrangements for brine baths are very good, and artificial gaseous baths can likewise be provided in suitable cases. A diluted brine is sometimes employed for internal treatment, and excellent whey from goat's milk is likewise made use of. For inhalation of the finely pulverized brine there are 'Gradirwerke' and a salt-water fountain, as well as special inhalation rooms. **Chronic catarrhal conditions** of the respiratory organs and **scrofulous affections** are among the cases most frequently treated. Compressed-air chambers, on which G. von Liebig has written much, are frequently used at Reichenhall in cases of **emphysema**, of **asthma**, and of **chronic bronchitis** and other affections of the respiratory tract, and in

some cases of **skin diseases**. The resident physicians are, of course, thoroughly familiar with the management of **chronic pulmonary tuberculosis**. The wooded slopes and beautiful surroundings are admirably adapted for graduated walking and climbing exercise ('Terrain-Kur') in **disorders of the circulatory system**, etc. The season lasts from May to October.

BERCHTESGADEN is situated on the southern declivity of the Untersberg, twelve miles by railway to the southeast of Reichenhall. The mean temperature for the three summer months is 61.7° F.; for September, 55.4° F. It possesses a 26.5 per cent. brine and arrangements for brine baths, peat baths, aromatic pine baths, and inhalation treatment. It is a capital place for **milk cures**. The altitude generally given is about 1870 feet, but accommodation can be obtained in the scattered houses and hotels of the town itself and of the neighborhood, at various levels between 1650 and 3300 feet above the sea; for instance, at Vordereck, altitude 3180 feet. The pure, fresh, moderately moist air, the beautiful scenery, and the interesting walks and excursions to be made to the salt mines, to Salzburg, to the Königssee, to the Obersee, and, rather further off, to the Steinerner Meer, cause Berchtesgaden to be visited by crowds of tourists. Invalids frequent the place as a climatic summer resort for **chronic affections of the respiratory organs, anemic conditions**, etc.

The KÖNIGSSEE (1975 feet), considered by some to be the most beautiful and picturesque lake in the eastern Alps, can be reached by a drive of about three miles to the south of Berchtesgaden, but there is no regular accommodation for invalids. Many of the places on the various lakes of upper Bavaria are good summer bathing resorts. We may mention TEGERNSEE (2400 feet), SCHLIERSEE (2580 feet), WALCHENSEE (2640 feet), KOCHEL (2000 feet), BADERSEE (2510 feet), and STARNBERG (1920 feet), on the lakes of those names.¹

KREUTH, or WILDBAD KREUTH (2700 feet), in a sheltered position between the Tegernsee and the Achensee, is a summer resort of medium elevation, with a pure, rather moist atmosphere and a good deal of rain. It is a good place for **milk and whey cures**.

¹ The lake of Starnberg is, however, as well or better known as the Würmse.

KRANKENHEIL and TÖLZ are pleasantly situated on the Isar, at an elevation of about 2150 feet above sea-level, thirty-six and one-half miles by railway to the south of Munich. Bad Krankenheil possesses weakly mineralized muriated waters containing a little sodium iodid.

HEILBRUNN (2620 feet), a few miles to the west of Krankenheil, possesses the Adelheidsquelle, a muriated spring containing small amounts of sodium bromid and iodid.

Among other summer resorts of the Bavarian Highlands may be mentioned :

TRAUNSTEIN (1960 feet), twenty-two miles by railway to the west of Salzburg, with brine baths and facilities for milk and whey cures.

PRIEN (1740 feet), in the Priental, near the Chiemsee.

GARMISCH (2290 feet), PARTENKIRCHEN (2350 feet), KAINZENBAD (2460 feet), and MITTENWALD (3020 feet), the last place close to the Tirolese frontier.

BAD KOHLGRUB (2950 feet), with chalybeate waters poor in carbonic acid gas, not far from Ober-Ammergau, noted for the survival of medieval passion plays.

HOHENSCHWANGAU (2650 feet), near the beautiful Alप्see and the romantic castles of Hohenschwangau and Neu-Schwanstein.

OBERSTDORF (2680 feet), in a broad valley in the center of the Algäu Alps, with beautiful walks in the neighboring valleys, is a popular summer resort.

SULZBRUNN (2680 feet), in the northern part of the Bavarian Algäu, possesses weakly mineralized muriated waters.

WÖRISHOFEN (1870 feet), in Bavarian Swabia, has recently attained notoriety owing to the late Pfarrer Kneipp's treatment.

THE AUSTRO-HUNGARIAN EMPIRE

THE AUSTRIAN ALPS

For convenience in describing the health resorts of the Austro-Hungarian empire we shall consider the heading 'Austrian Alps' to include the portion of the Austrian dominions bounded by Italy, Switzerland, Bavaria, Bohemia, Moravia, Hungary, Croatia, and the

Adriatic Sea. This region comprises Tirol, Salzburg, Upper and Lower Austria, Styria, Carinthia, Carniola, and the Austrian coast-land. It includes the greatest part of the so-called 'Eastern Alps,' of which we have already taken portions when describing the health resorts of Italy and of upper Bavaria; the resorts in the Austrian coast-land, however, including Gorizia (Görtz), have been referred to under Marine Climates; Riva and Arco have been grouped with the Italian lakes; and the note on Bregenz has been added to the remarks on the other resorts of the lake of Constance.

TIROL

We shall commence with Meran and Botzen and the localities in their neighborhood.

MERAN lies in latitude $46^{\circ} 41'$ north, in a broad part of the Etsch (Adige) valley, surrounded by high mountains on the north, northeast, and northwest. Immediately on the north rise the slopes of the Küchelberg, in the angle between the Etsch and Passer valleys. The shelter from cold winds is not complete, since north or northeasterly winds are to some extent admitted through the narrow valley of the Passer, and northwest winds through the continuation upward of the Etsch valley. The place itself and its surroundings are beautiful and interesting, and its ancient importance is apparent from the many old castles in its immediate neighborhood, especially in the region of Obermais. The visitors' quarters, including OBERMAIS and UNTERMAIS,—these two places forming the southern suburbs of Meran, separated from it only by the Passer stream,—have an elevation of from 920 to 1180 feet above sea-level, and consist chiefly of scattered villas and gardens. The mean temperature of Meran for autumn is 54° F.; for winter, 35.2° F.; for spring, 54° F.; for January, 32.6° F.; for July, 67.6° F. The mean annual relative humidity is said to be only 67.8 per cent., and the neighborhood of the high roads may be unpleasantly dusty. Meran is an old-established autumn, winter, and spring resort. Hotel and other accommodations are excellent, and the cost may be very moderate if one so wishes. In summer the heat is very great, and the hotels are mostly closed. The winter is decidedly colder than that of the Western and Eastern Rivas, Venice, and Abbazia, and

even colder than the winter resorts of the Italian lakes and Gorizia (Görtz). The climate of Meran may be compared to that of Montreux, and these two places are almost equally popular resorts for the **grape cure** in autumn. The grapes of Meran are larger and have thinner skins and a more watery juice than those of Montreux. Meran is likewise a good place for courses of **milk** and **whey**. While the mean temperature of Meran during winter is relatively low for a southern winter resort, the sun warmth is great, and though the rainfall is considerable from September to December ($11\frac{7}{10}$ inches), yet with ordinary precaution invalids can sit in the open air during about seventy days between the beginning of November and the end of March. There is less wind during winter than during summer. Although snow falls on about seven days in the year, it seldom remains long on the ground. There are facilities for hydrotherapeutic and inhalation treatment. The promenades and slopes around Meran are admirably adapted for graduated walking and climbing exercise—the so-called ‘Terrain-Cur.’ We may mention especially the attractive promenades on both banks of the Passer, with the pines and deciduous trees on the slopes of Obermais; the gently sloping zigzag path called the ‘Tappeiner Weg,’ constructed on the side of the Küchelberg; and lastly, among many longer excursions, the excellent road to the famous Schloss Tirol, the earliest residence of the Counts of Tirol, situated at an elevation of about 2100 feet on the western declivity of the Küchelberg.

BOTZEN (880 feet), an important commercial town with quaint old-fashioned and more modern quarters, lies in a broad, luxuriant expansion of the Etsch, or Adige, valley, called the ‘Botzen Boden,’ about twenty miles by railway to the southeast of Meran, amidst surroundings remarkable for their beautiful mountain scenery and the great number of picturesque old castles. Its winter temperature differs little from that of Meran, but as the sheltering mountains are further distant, it is more exposed to winds. It is therefore unsuitable as a winter resort and too hot for summer residence,¹ but is a

¹ Cooler sites near Botzen could be found on the plateau of the RITTEN, between the Talfer and the Eisak—for instance, near the village of KLOBENSTEIN, 3770 feet above sea-level—or in the SARNTHAL, as the valley of the Talfer is called above Botzen.

good place for the **grape cure** in autumn. The grapes are, of course, similar to those of Meran.

GRIES (906 feet), on the opposite, or right, side of the Talfer, the western suburb of Botzen, is a better resort for winter residence. It lies just under the mountains, and is therefore more sheltered from the north and northeast than is Botzen; it is a sunny place, and partly, perhaps, owing to reflection from the cliffs, is warmer in the middle of the day than Botzen or Meran. The dust is often disagreeable. The mean winter temperature is 34.7° F.—that is, practically the same as at Meran. The place must not be confused with numerous other places of the same name, such as Gries, on the Brenner route, mentioned further on.

In southern Tirol are several summer resorts with chalybeate waters, to which we shall now refer. RABBI, or BAGNI DI RABBI (4100 feet), the most frequented of these spas, lies in the Val-di-Rabbi, a branch of the Val-di-Sole (valley of the Noce River), to the east of the Ortler group of mountains; it is chiefly visited from the end of June to the end of August. PEJO (4430 feet), nearer to the Italian frontier, is situated to the south of the Ortler group, in the Pejo valley, another branch of the Val-di-Sole; it is frequented by Italians and Tirolese. MITTERBAD (3110 feet), eleven miles from Meran, and RATZES (3900 feet), in a wooded ravine at the foot of the Schlern Mountain, have iron sulphate waters; the latter has also a cold sulphur spring, but the accommodation is rather rough.

LEVICO (1700 feet) and RONCEGNO (1750 feet), to the east of Trent, are well known for their iron sulphate and arsenical waters, which are largely exported. Levico lies at the entrance of the Val Sugana, twelve and one-half miles from Trent, and its mineral waters are obtained from near the bath establishment of VETRIOLO, on the southern slope of Monte Fronte, nearly 4900 feet above sea-level. The stronger of the Levico waters is said to contain in 1000 parts 4.6 parts of iron sulphate and 0.0086 part of arsenous acid, together with small amounts of copper sulphate, zinc sulphate, aluminum sulphate, etc. Roncegno is situated in the Val Sugana, seven and one-half miles to the east of Levico. Both Levico and Roncegno have stations on the new Val Sugana railway and can

boast of modern hotel accommodation. During very hot weather, however, the lofty and more bracing position of Vetriolo is preferable in many cases.

The city of TRENT (Trient, Trento) is not a health resort, yet its historic importance, especially in ecclesiastic history, and its beautiful situation in the Adige valley (640 feet above sea-level), draw persons on their way to and from health resorts, somewhat in the same manner as does the still more attractive Innsbruck.

The mountain valleys of Tirol contain many beautifully situated summer resorts, among which may be mentioned the following, mostly with altitudes above 3500 feet:

SULDEN, or ST. GERTRAUD (6050 feet), and TRAFOI (5080 feet), in northern valleys of the Ortler group, with excellent hotel accommodation.

CAMPIGLIO, or MADONNA DI CAMPIGLIO (4970 feet), seven miles from Pinzolo, in a sheltered position to the northeast of the Adamello mountain group. It is an excellent high altitude and mountaineering summer resort, possessing first-class hotel accommodation and fairly well frequented by the English.

The MENDEL PASS (4475 feet), to the southwest of Botzen.

The KARERSEE (5580 feet), in the 'Fassa Dolomites,' five hours to the southeast of Botzen, with excellent hotel accommodation amidst woods.

SAN MARTINO DI CASTROZZA (4800 feet), in the heart of the Dolomites, in a sheltered position between wooded slopes, with beautiful views toward the south over the Primiero valley.

LANDRO, or HÖHLENSTEIN (4600 feet), SCHLUDERBACH (4730 feet), and CORTINA-DI-AMPEZZO (4025 feet), in the 'Ampezzo Dolomites.' These places lie on the 'Ampezzo road,' which leads southward from Toblach, in the Pusterthal, by Cortina and the beautiful Ampezzo valley, to Pieve-di-Cadore and Belluno, in Italy. To the east of Monte Cristallo, and not far from Schluderbach, is the LAGO DI MISURINA, 5760 feet above sea-level, with modern hotel accommodation.

BRUNECK (2670 feet), NIEDERDORF (3800 feet), TOBLACH (4080 feet), and INNICHEN (3850 feet), all in the Pusterthal. Toblach, at

the entrance of the Ampezzo valley, is the highest place of the Pusterthal. WILDBAD INNICHEN (4370 feet) is situated amidst forests in a side valley not far from Innichen.

ALT-PRAGS (4535 feet), NEU-PRAGS (4320 feet), and PRAGER WILDSEE (4910 feet), in the beautiful Pragerthal, a branch of the Pusterthal.

SCHLOSS WEISSENSTEIN (3410 feet), beautifully situated near Windisch-Matrei, to the southeast of the Venediger mountain group. Here may, likewise, be mentioned HEILIGENBLUT (4100 feet), in the neighboring portion of Carinthia, to the southeast of the Gross-Glockner group.

BRENNER POST, at the summit of the Brenner Pass (4490 feet), BRENNERBAD (4390 feet), and GOSENSASS (3610 feet), with stations on the Brenner railway. Among other places on this famous mountain railway, which was opened in 1867, GRIES (3810 feet), STEINACH (3430 feet), and STERZING (3110 feet), said to be the highest town ¹ in Tirol, may likewise be mentioned.

HINTER-TUX (4900 feet), in the Tuxerthal.

EGGERHOF (4110 feet), beautifully situated above Meran.

SCHRÖCKEN, or SCHRECKEN (4135 feet), in Vorarlberg.

LADIS (3900 feet) and OBLADIS (4550 feet), with sulphur waters, above the Inn valley, not far from the railway station of Landeck.

OETZ (2690 feet) and LÄNGENFELD (3860 feet), the latter with sulphur waters, in the picturesque Oetzthal.

INNSBRUCK (1870 to 1910 feet), the capital of Tirol, is situated in latitude 47° 18' north, in a broad part of the valley of the Inn, surrounded in almost every direction by mountains. The beauty of its position, its treasures of art and archæology, its excellent hotel accommodation, and the excursions to be made in its neighborhood, all attract visitors and help to make the place a suitable autumn and winter resort for many persons who merely require change and recreation in a fairly clear and sunny climate.

¹ Many Tirolese villages, of course, are situated at much higher elevations than Sterzing. Those of OBERGURGL (6265 feet) and VENT (6250 feet), in the Oetzthal Alps, are said to be the highest villages in Austria.

HALL IN TIROL (1835 feet), an old-fashioned town a few miles lower down the Inn valley, is supplied with a strong brine from the Salzburg, used for brine baths ('Soolbäder').

IGLS (2900 feet), on a plateau about two and one-half miles to the south of Innsbruck, is a summer resort with magnificent views.

The ACHENSEE (3045 feet) is one of the most attractive of the beautiful lakes of the eastern Alps, and a good place for bathing. The temperature of its water reaches about 60° F. in the height of summer. There is fair accommodation on its banks.

As summer resorts in the northeastern part of Tirol for those who require only moderate bracing we may likewise mention JENBACH (1740 to 1840 feet), BRIKLEGG (1690 feet), and KUFSTEIN (1600 feet), in the lower Inn valley; ZELL-AM-ZILLER (1885 feet), the chief place of the Zillertal, specially famed among Tirolese valleys for the beauty of its scenery; KITZBÜHEL (2420 feet), and WALCHSEE (2190 feet), on the small lake of that name, not far from the Bavarian frontier.

SALZBURG, UPPER AND LOWER AUSTRIA, STYRIA, CARINTHIA, AND CARNIOLA

SALZBURG (1350 to 1780 feet), the capital of the province of the same name, is situated on the Salzach, in latitude 47° 47' north. In its picturesqueness and historic and archæologic interest it may be compared with Innsbruck, but the circle of sheltering mountains is much less complete, for to the north of Salzburg are only low hills, and to the west there is a level plain. The climate is typically continental, with hot summers and cold winters. The mean temperature for the year is 46.8° F.; for July, 65.2° F.; for January, 28.3° F. The mean annual rainfall is about 45 $\frac{2}{3}$ inches.

ISCHL (1550 feet), in the Salzkammergut, is beautifully situated in a broad fertile valley at the junction of the Traun and the Ischl. It is a fashionable health resort, very much resorted to by Austrians for its climate, its brine baths ('Soolbäder'), and its picturesque position. There are arrangements for brine baths, for salt mud-baths, for inhalation of the pulverized water, and for ordinary hydrotherapeutic treatment. Owing to the shelter from winds afforded by the surrounding mountains the climate is mild—for some persons

rather too hot during the middle of summer (mean summer temperature, 63.5° F.). In early autumn it may be used for a stay after courses of active mineral waters. It is a good place for **milk** and **whey cures**. The paths in the pine forests and on the surrounding slopes make the place suitable for a course of graduated walking and climbing exercises under medical supervision (Terrain-Cur).

In this neighborhood there are likewise several resorts of mild climate, and mostly of medium elevation, that may be visited in spring, summer, and autumn. Some of these are frequented for their brine baths and some for their open-air lake bathing, as well as for their climatic advantages and fine scenery. Many of them are situated on the shores of beautiful mountain lakes, for which the northern portions of the Austrian Alps, like the adjoining Bavarian Highlands, are famous.

GMUNDEN (1390 feet), the chief town of the Salzkammergut, at the northern extremity of the Traunsee, possesses a strong brine derived from the Ebensee salt-works. EBENSEE is at the southern extremity of the Traunsee.

AUSSEE (2150 feet), a popular summer resort with brine baths, lies in a broad fertile valley, surrounded by pine-clad mountain slopes and sheltered from winds on every side. The climate is mild and rather moist. The mean temperature for the three summer months is 61° F. ; for May, 57.8° F. There is a **sanatorium** here ('Alpenheim') for hydrotherapy, brine baths, special dietetic treatment, etc. Three miles from Aussee is the attractive lake of Alt-Aussee (2320 feet), with the summer resort ALT-AUSSEE.

HALLSTATT, on the western shore of the picturesque lake of Hallstatt (1620 feet), squeezed between the lake and the slope of the Plassen Mountain, has brine baths.

Other localities deserving of notice are : MONDSEE (1575 feet), on the lake of that name ; ST. WOLFGANG (1820 feet), on the Aber-See or St. Wolfgang-See ; and KAMMER and UNTERACH, on the Attersee. Between the three lakes just mentioned rises the isolated SCHAFBERG (5840 feet) ; the hotel on its summit, connected by a rack and pinion railway with St. Wolfgang, is, of course, not suitable for the majority of invalids.

BAD HALL, in **Upper Austria** (1230 feet), has a sheltered position in the Sulzbach branch of the Krems valley, and possesses a muriated water (Tassilloquelle) containing small amounts of magnesium bromid and iodid, and formerly known as the 'Haller Kropfwasser.'

ZELL-AM-SEE (2460 feet) is a small summer resort on the western shore of the Zeller See, a picturesque lake surrounded by mountains. Thermal springs arise in the lake, it is supposed, and in summer the temperature of the water often reaches 72° F. The bathing is good, and there are interesting excursions to be made in the neighborhood.

GASTEIN, or **WILDBAD-GASTEIN** (3430 feet), famous for its simple thermal springs (78° to 121° F.), has a picturesque position on the mountain slopes at the southern extremity—the head—of the Gastein valley, about fifteen miles south of the railway station of Lend. The shelter from cold winds is quite complete. The mean temperature for the three summer months is 57.2° F.; for May, 50.4° F.; for September, 51.8° F. The summer climate is therefore relatively cool, but it is also rather moist. July and August, when the fashionable season is at its height, are especially wet, rainfall being noted on about seventeen days in each of these months. In this respect the colder spring and autumn months have an advantage. The indications for Gastein are those for simple thermal baths in a summer mountain climate of considerable elevation above sea-level. Some nervous persons are disturbed at night by the perpetual roar of the waterfall unless they obtain rooms at a considerable distance.

HOF-GASTEIN (2850 feet), in a lower part of the valley, five miles to the north, is supplied with thermal water from Wildbad-Gastein, and is a somewhat less expensive place.

FUSCH, or **BAD ST. WOLFGANG** (4040 feet), is a much frequented summer resort to the northeast of the Gross-Glockner, in a sheltered side valley of the beautiful Fuscherthal. The cold springs, known from the fifteenth century, appear to be good ordinary water. There are arrangements for hydrotherapeutic treatment.

We shall now pass to several resorts in **Lower Austria**, situated in the Wiener Wald or its outskirts, and easily reached from Vienna.

BADEN-IN-AUSTRIA (700 feet), pleasantly situated at the entrance of the Helenenthal, sixteen and one-half miles by railway to the southeast of Vienna, is a popular summer resort of the Viennese, and possesses thermal earthy sulphur waters (80° to 96° F.) known in Roman times. Arrangements for bathing in common are maintained at Baden, as they still are in the large piscinæ of Loèche, in Switzerland, and of some French spas, and as they formerly were at Bath, in England, and, as would seem to be indicated by old engravings, at most other thermal springs. There are likewise arrangements for separate thermal baths, mud-baths, swimming baths, and ordinary hydrotherapeutic treatment. VÖSLAU (810 feet), two and one-half miles to the south of Baden, well known for its wines, has simple subthermal waters, with arrangements for hydrotherapeutic treatment. It is a good place for **milk and whey cures**, and in autumn for the **grape cure**. In a valley of the Wiener Wald, on a sheltered southern slope ten miles to the west of Baden, stands the ALLAND SANATORIUM (1410 feet) for **consumptive patients** of the poorer classes, in a beautiful and extensive estate of its own, consisting of woods, meadows, and cultivated land. The erection of this sanatorium was brought about largely by the exertions of Professor Schrötter, Dr. Conrad Clar, and Hofrath Christian Lippert. Between Baden and Vienna is MÖDLING (700 feet), a popular resort ten miles from Vienna. KALTENLEUTGEBEN (1150 feet), finely situated in a valley of the Wiener Wald in this neighborhood, is well known, and attracts not only invalids, but many medical visitors, owing to its **hydrotherapeutic establishment** under the direction of Professor Winternitz. On the border of the Wiener Wald, just to the north of Vienna, is the KAHLENBERG (1400 feet), which can be ascended by a rack and pinion railway, and is a favorite object of short excursions from Vienna.

The SEMMERING, separating Lower Austria from Styria, about half-way between Vienna and Gratz, is a favorite mountain resort of the Austrians. The Semmering Hotel (3280 feet), on the slope of the Kartnerkogel, one mile from the station of Semmering (2840 feet), stands about sixty feet higher than the highest point of the Semmering Pass. Among summer resorts of lower elevation on the Semmering railway are GLOGGNITZ (1430 feet), on the Vienna

side, where the line begins, SPITAL-AM-SEMMEERING (2520 feet), MÜRZZUSCHLAG (2200 feet), and KRIEGLACH (1970 feet).

GRATZ (1160 to 1230 feet), the capital of Styria and an industrial place, cannot be termed a climatic health resort proper, but, owing to its picturesque position, its healthfulness, the moderate cost of living, and the facilities for the education of children, it is frequently chosen as a place of residence by retired officers and civil servants. It is situated in $47^{\circ} 4'$ latitude north, in the northern part of a broad expansion of the valley of the Mur. The mean annual temperature is 48.6° F. As at Vienna and other continental places, there is a great range between the mean temperatures for the various months—*e. g.*, January, 29° F.; July, 67.8° F.

GLEICHENBERG (980 feet), in Styria, is situated to the southeast of Gratz, seven miles from the railway station of Feldbach, not far from the Hungarian boundary. The hotels and villas of the health resort lie amid pleasant woods and meadows, in a valley open to the southeast and sheltered from north and northwest winds. The mean temperature for the three summer months is 63.2° F.; for September, 55.4° F. The mean summer relative humidity is about 75 per cent. Its cold gaseous muriated alkaline waters and its mild climate have caused Gleichenberg to be especially frequented during the season from May to September for the treatment of **chronic catarrhal affections** of the respiratory organs. There is apparatus for the inhalation of the mineral water spray, and there is likewise a chamber for compressed-air treatment. Good milk and whey can be obtained. The health resort has a wide reputation in Austria-Hungary and South Germany.

TOBELBAD, DOBELBAD, or DOBBELBAD (1090 feet), with simple subthermal waters, lies in a pleasant valley seven and one-half miles to the southeast of Gratz, and is a good place for **milk** and **whey cures**. NEUHAUS (1200 feet), TÜFFER (820 feet), and RÖMERBAD (800 feet), in the south of Styria, not far from Cilli, have simple thermal waters and beautiful positions, with pleasant walks in the neighborhood. About twenty miles to the east of Cilli, in a beautiful sheltered valley, is ROHITSCH-SAUERBRUNN (730 feet), with mild climate and cold gaseous springs. These waters are weak members

of the sulphated alkaline group, and are used in **chronic dyspeptic conditions with constipation**; some of them are exported and used as table waters.

On the beautiful WÖRTHER SEE (1440 feet), in **Carinthia**, VELDEN, at the west end, and PÖRTSCHACH, on the northern shore, may be mentioned as summer resorts with bathing arrangements. Some places on the neighboring OSSIACHER SEE (1600 feet) can likewise be used for a summer stay.

VELDES (1560 feet), in a fine position on the lake of Veldes, in the northern part of **Carniola**, possesses a simple subthermal spring, but is better known as a summer resort where treatment by 'sun baths' and hydrotherapy can be obtained. The charming little WOCHENER SEE (1730 feet), to the southwest of Veldes, likewise offers simple summer accommodation. ADELBERG (1800 feet), in the south of Carniola, famous for its immense cavern, is used as a summer resort by the inhabitants of Trieste, from which it is distant about fifty miles by railway.

BOHEMIA AND MORAVIA

The three great **Bohemian spas**, Carlsbad, Marienbad, and Franzensbad, are situated in the northwestern corner (Eger district) of Bohemia. With them we shall, for convenience, describe the **Saxon spa**, Bad Elster, both on account of its proximity to Bohemia and on account of the resemblance of its mineral waters to those of the famous Bohemian health resorts.

CARLSBAD, or KARLSBAD (altitude about 1230 feet), is a long, narrow town stretching upward in the narrow valley of the Tepl, on both sides of the stream, from its entrance into the Eger for about two miles in a southward direction. The houses in the streets bordering the Tepl are somewhat cramped, but there are hotels and pensions on the slopes of the Schlossberg and vicinity that have a more open position. The mean temperature for the three summer months is about 58.6° F. In the pine woods on the sides of the valley are numerous shady walks for hot weather.

The thermal sulphated alkaline springs differ from one another chiefly in temperature and their proportions of carbonic acid gas.

They contain about 2.4 per mille of sodium sulphate, 1.2 per mille of sodium bicarbonate, and 1 per mille of sodium chlorid. The Carlsbad treatment consists chiefly in the internal use of the water and appropriate regulation of diet, exercise, and habits to suit individual cases. The fine modern bath establishment there is equipped so as to furnish ordinary and mineral water baths, peat baths, similar to those obtained at Franzensbad, douches, hot-air and vapor baths, massage, and Swedish gymnastics.

MARIENBAD (2090 feet) lies in quite a broad valley, surrounded on all sides except the south by beautiful pine-clad slopes that afford opportunity for shady walks in different directions. The climate is more nearly Alpine in character than that of Carlsbad, and the Marienbad springs offer greater variety in regard to their mineralization than do those of Carlsbad. The Kreuzbrunnen and the Ferdinandsbrunnen resemble the springs of Carlsbad, but are cold and more highly mineralized; the new Alfredsquelle belongs to the same class, although it is somewhat less highly mineralized; the Waldquelle contains much less sodium sulphate than do these three springs; the Rudolfsquelle is a cold, alkaline earthy spring, comparable to the Helenenquelle at Wildungen; while the Karolinenbrunnen and the Ambrosiusbrunnen are chalybeate, the latter being one of the richest examples of its kind. Marienbad thus furnishes mineral waters suitable in various conditions besides those for which sulphated alkaline waters are usually recommended. Suitable facilities are provided for the taking of effervescent baths, peat baths, hot-air and vapor baths, and for the administration of ordinary hydrotherapeutic treatment.

FRANZENSBAD (1500 feet) is situated on a somewhat flat, elevated plateau, the surrounding scenery being less picturesque than that of Marienbad and Carlsbad. Its cold sulphated alkaline springs contain various quantities of iron bicarbonate; the Salzquelle, containing the smallest quantity of iron, most nearly resembles the Carlsbad springs, and this similarity is increased by warming the water. The Stahlquelle is strongly chalybeate. The bathing arrangements are satisfactory. It is to its 'Moorbäder,' or peat baths, that Franzensbad owes its renown, the peat used for the baths being derived from moorlands immediately adjoining the

town. The great majority of the patients treated at Franzensbad are females.

BAD ELSTER (1550 feet), in the upper Vogtland of the kingdom of Saxony, is situated close to the Bohemian frontier, in the pleasant valley of the Weisse Elster, and may, for convenience, be mentioned here. It has a rather invigorating climate. The Salzquelle is comparable to the Kreuzbrunnen and Ferdinandsbrunnen of Marienbad, and is employed in the same class of cases. The Marienquelle, which may be termed a compound chalybeate spring, contains sodium sulphate, sodium bicarbonate, and sodium chlorid, and resembles the chalybeate springs of Franzensbad. There are facilities for taking effervescent mineral water baths, ferruginous peat baths, etc. Whey and kephyr are likewise obtainable.

The season at these health resorts lasts from May to the end of September, but Carlsbad is available at other times of the year. Tarasp, in Switzerland, also famous for its sulphated alkaline waters, has a higher altitude and a shorter season. The indications for the therapeutic employment of this group of spas will be referred to in Part III of this work, but a more elaborate consideration of the uses of the mineral waters belongs to the volume on "Hydrotherapy, Thermo-therapy, and Balneology." A sojourn at some suitable climatic resort should always be recommended after the mineral water treatment ('after-cure,' German, 'Nachkur'); patients should be cautioned against resuming their ordinary work immediately, and likewise against the risk of fatigue from joining shooting parties, climbing excursions, and the like. The choice of a health resort for the after-cure must depend on individual conditions.

TEPLITZ, or TEPLITZ-SCHÖNAU (730 feet), in the north of Bohemia, about thirty miles south of Dresden, is situated in the broad Biela-thal, sheltered by the Erzgebirge on the north and by the Bohemian Mittelgebirge on the south. Its simple thermal springs (83° to 114° F.) are among the oldest and best known of their class, but the town has attained considerable industrial importance, which tends somewhat to impair its usefulness as a health resort. In a gorge of the southern declivity of the Erzgebirge, three and one-half miles to the northwest of Teplitz, is located the summer resort of EICHWALD (1180 feet).

BILIN, near Teplitz, possesses a well-known cold, gaseous alkaline spring ('Biliner Sauerbrunn'); and between Teplitz and Carlsbad are PÜLLNA, SAIDSCHITZ, and SEDLITZ, the sources of the laxative sulphated 'bitter waters,' containing magnesium sulphate, or 'Epsom salt.' The 'Sedlitz powders' of apothecaries contain tartaric acid and resemble the salts of the mineral water only in their name. The springs of GIESSHÜBL and KRONDORF, near Carlsbad, yield gaseous weakly alkaline table waters that are largely exported.

BAD-KOENIGSWART (2230 feet), situated amidst woods on a southern mountain slope between Marienbad and Eger, possesses cold gaseous chalybeate waters.

BAD-LUHATSCHOWITZ (1600 feet), in the eastern part of Moravia, near the Hungarian frontier, lies in a sheltered wooded valley of the northern declivity of the western Carpathians. The summer climate is quite moist and relatively cool. The mean summer temperature is 59° F. (Reimer), and the season lasts from the middle of May to the end of September. Luhatschowitz possesses gaseous muriated alkaline springs that contain small quantities of iodids and bromids, and differ from the better known springs of Ems in being cold, instead of warm. The Luhatschowitz waters are useful in **catarrhal affections** of the respiratory and digestive systems in **gouty subjects**, and help to overcome the tendency to the formation of **uric acid gravel**.

The health resorts of Austrian Silesia and the Bohemian resorts in the Riesengebirge have been, for convenience, grouped with those on the German side of the frontier.

THE CARPATHIAN MOUNTAINS, GALICIA, HUNGARY, AND TRANSYLVANIA

The **Carpathian Mountains** (between latitudes 45° and 50° north), including the western, central, eastern, and Transylvanian, or southern, groups, form a sort of semicircle that separates Hungary and Transylvania from Moravia, Galicia, and Roumania. The main chain stretches in a southeasterly direction from the eastern end of Moravia to the southeastern extremity of Transylvania, and then curves around Transylvania to the west; this southern portion is termed the 'Transylvanian Alps,' or southern Carpathians. The

northeastern slopes toward Galicia and Roumania are much more precipitous than the southwestern slopes toward the plain of Hungary. The High Tatra Mountains ('Hohe Tatra'), a group of the central Carpathians, possess the loftiest peaks, which attain a height of over 8000 feet above sea-level, and are surrounded by particularly grand and picturesque scenery. Although there are no glaciers in the Carpathians, some of the gorges, especially those on the northern side, are always filled with snow. Trees cover the slopes, for the most part, to heights of from 3000 to 4000 feet. The imposing and attractive regions of the Carpathians are being rendered accessible to tourists, while the accommodation and other arrangements at the health resorts and ordinary summer resorts are gradually improving.

SCHMECKS, or SMEK SZ, is the name of three well-known health resorts in the Hungarian county of Zips, on the southern declivity of the High Tatra. ALT-SCHMECKS, or TATRA-FÜRED, occupies a well-sheltered position at an elevation of 3320 feet above sea-level, and has weakly mineralized gaseous waters with facilities for hydrotherapeutic treatment. NEU-SCHMECKS (3300 feet), situated about half a mile to the west, in the midst of pines, is a climatic resort, open during the winter as well as during the summer. The mean temperature (Reimer) for summer is 59.7° F.; for autumn, 44° F.; for winter, 27.5° F.; for spring, 41.6° F. The bright days during winter far outnumber the cloudy ones. There are arrangements for hydrotherapy and for the modern treatment of **pulmonary tuberculosis**. UNTER-SCHMECKS (3080 feet), one and one-fourth miles below Alt-Schmecks, possesses ferruginous peat baths, effervescent mineral water baths, and a hydrotherapeutic establishment.

TATRA-HÖHLENHAIN, or TATRA-BARLANGLIGET (2510 feet), in the Kotlina valley, about six miles to the northeast of Schmecks, and TATRAHAZA (2280 feet), in the Weisswasserthal, are summer resorts in this vicinity.

Here, too, may be mentioned: BARTFELD (1000 feet), at the southern foot of the Carpathians, in the Hungarian county of Saros, with cold gaseous muriated alkaline chalybeate waters; SZCZAWNICA (1700 feet) and KRYNICA (2000 feet), both on the Galician side of the Carpathians, the former with cold gaseous muriated

alkaline waters, the latter with cold gaseous alkaline earthy chalybeate springs. IWONICZ (1340 feet), also on the Galician side, has muriated waters containing small quantities of iodids and bromids; SZOBRAN CZ (425 feet), on the Hungarian side, in the county of Ung, possesses cold muriated sulphur springs.

In the Transylvanian portion of the Carpathians are BORSZEK (2890 feet) and ELÖPATAK, or ARAPATAK (2030 feet), spas that have cold gaseous alkaline earthy chalybeate waters.

HERCULESBAD (570 feet), near MEHADIA, one of the most frequented and finest spas of Hungary, is situated in a picturesque valley of one of the offshoots of the Carpathians, close to the Roumanian and Servian frontiers, and not far to the north of the Iron Gates of the Danube. Its thermal muriated springs (70° to 133° F.), mostly containing hydrogen sulphid, were known to the Romans (*Thermæ Herculis*). They are analogous to the springs of Aachen (Aix-la-Chapelle), in Germany, and are much frequented for similar affections, especially by the people of southeastern Europe. The season lasts from May to the end of September.

Among the Carpathian ranges, which occupy a great portion of northern Hungary, are scattered a number of **mineral water health resorts**, among which may be mentioned Parad, Koritnicza, Szkleno, Szliacs, Vihnye, Rajecz-Teplitz, Trencsin-Teplitz, and Pistyan.

PARAD (660 feet), on the northern declivity of the Matra Mountains, to the northeast of Buda-Pest, possesses iron sulphate and sulphurous springs.

KORITNICZA, or KORYTNICA (2780 feet), is a summer resort in a pine-clad valley of the lower Tatra, and possesses cold gaseous chalybeate waters containing small quantities of magnesium sulphate, calcium bicarbonate, and calcium sulphate. It is adapted for hydrotherapeutic treatment and for **whye cures**.

SZKLENO (1130 feet), in a deep, thickly wooded valley, has thermal calcium sulphate waters resembling those of Loèche-les-Bains, in Switzerland, and a natural vapor bath similar to the grotto of Monsummano, in Italy.

SZLIACS (1180 feet), near Altsohl, and VIHNYE (1015 feet), in the Eisenbach valley, are noted for their thermal chalybeate (iron bicarbonate) waters. The temperatures of these springs range from

78.8° F. to 101° F.; that of the old spring of Vihnye being the hotter.

RAJECZ-TEPLITZ (1380 feet), in the Sillinka valley, not far from Sillein, has tepid, weakly mineralized springs containing minute quantities of alum.

TRENCsin-TEPLITZ (850 feet), beautifully situated in a branch of the Waag valley, possesses thermal sulphurous waters (99° to 104° F.), and, like the baths of Pistyan, is well known in the Austro-Hungarian empire.

The baths of PISTYAN, or PÖSTYEN-TEPLITZ (490 feet), situated in the Waag valley, to the south of Trencsin, are supplied with thermal sulphurous waters (135° to 146° F.). An abundance of fine mud, described as 'butter-like,' is obtained from about the thermal springs, and is used for hot sulphurous mud-baths. These mud-baths, both general and local, are very much employed, chiefly in the treatment of **gouty and rheumatic affections**.

BUDA-PEST, the capital of Hungary, possesses simple thermal and thermal sulphurous waters and commodious thermal establishments. Among these the MARGARETHENBAD, on the Margarethen-Insel in the Danube, and the large KAISERBAD deserve to be mentioned specially on account of the excellence of their arrangements. The climate of Buda-Pest will be referred to further on, under the heading Large Towns of Europe. The sulphated 'bitter waters' from the neighboring springs, including the HUNYADI JÁNOS, FRANZ-JOSEPH, AESCULAP, and APENTA waters, are largely exported on account of their laxative properties.

On the northwestern shore of the large PLATTENSEE, or BALATON LAKE (425 feet above sea-level), is the popular summer health resort of FÜRED, or BALATON-FÜRED, with gaseous weakly mineralized alkaline earthy springs. The water of the lake has a mean summer temperature of 68° F., and contains a relatively large quantity of carbonic acid gas; bathing in the lake is much resorted to as a means of treatment. The mud from the banks of the lake is used for mud-baths, often in association with massage. Good whey is provided at this health resort, and in autumn the **grape cure** can be carried out.

BALF (390 feet), on the other large Hungarian lake, the NEUSIED-

LERSEE, has muriated alkaline sulphurous springs and offers facilities for bathing in the lake. It is visited by inhabitants of the neighborhood.

HARKANY (300 feet), in the southwest of Hungary, in the county of Baranya, has thermal sulphurous waters (145° F.) in which Karl von Than, in the year 1867, discovered the inflammable gas, carbonyl sulphid, said to be present over the spring in quantities sufficient to be ignited.

SLAVONIA, CROATIA, BOSNIA, AND HERZEGOVINA

LIPIK (500 feet), in a sheltered valley of Slavonia, has weakly mineralized muriated alkaline waters (147° F.) containing small quantities of iodids; DARUVAR (320 feet), to the north of Lipik, possesses simple thermal springs (104° to 117° F.).

In Croatia may be mentioned WARASDIN-TEPLITZ (900 feet), with thermal sulphur springs (about 136° F.) and facilities for taking mud-baths; KRAPINA-TEPLITZ (530 feet), possessing simple thermal waters (100° to 110° F.); and TOPUSKO (410 feet), having simple thermal waters (122° to 135° F.) and affording mud-baths.

Bosnia and Herzegovina, now under Austrian administration, possess at least one fairly well-known health resort, and will doubtless in time, by the beauty and variety of their mountainous scenery, attract many travelers.¹ SARAJEVO, the capital of Bosnia, is situated 1770 feet above sea-level, lies in latitude $43^{\circ} 54'$ north, and has a continental type of climate. The mean annual temperature is 50° F.; the mean January temperature, 29.1° F.; the mean July temperature, 67.4° F.; the mean annual rainfall, $31\frac{1}{2}$ inches.

MOSTAR, the capital of Herzegovina, is 195 to 350 feet above sea-level, forty-seven miles southwest of Sarajevo, in latitude $43^{\circ} 24'$ north. It occupies a less elevated position than does Sarajevo, is nearer the coast, and has a warmer climate and a heavier rainfall. The mean annual temperature is said to be 56.8° F.; the annual precipitation, $44\frac{1}{10}$ inches. ILIDZE, a health resort beautifully situated at an altitude of about 1600 feet, is eight miles from Sarajevo, and

¹ See Pojmann, in "Wiener medizinische Wochenschrift," 1900, No. 27.

possesses thermal sulphurous waters (124° F.) that have an established reputation in the treatment of **rheumatoid arthritis**.

ROUMANIA

Roumania boasts of several **mineral water health resorts**, and, doubtless, some of its springs were known to the Romans.¹ Among the muriated waters are those of MONTEOR-SARATA, SLANIC, and VULCANA, and of the lakes of BALTA-ALBA and LACUL-SARAT, where salt mud-baths are employed, as at some resorts in Russia. STRUNGA and CACIULATA possess sulphurous and other mineral waters. CAMPU-LUNGU is a summer resort at the foot of the Carpathians, close to which are the muriated waters of BUGHEA. DORNA-SCHARU, at an altitude of 3600 feet, possesses arsenical waters. SINAÏA, the summer resort of the Roumanian court, is beautifully situated, amidst parks and pine woods, at an altitude of 2620 feet, in a picturesque portion of the Carpathian Mountains, not far from the Transylvanian frontier. It possesses a good hydrotherapeutic establishment. CONSTANZA, the Roumanian port on the Black Sea, is frequented as a seaside summer resort. Close to Constanza, on a tongue of land between the Black Sea and the salt lake of TIGHIR-GHIOL, the administration of the hospitals of Bucharest have founded a **sanatorium for scrofulous children**. According to Dr. Berger, the same administration is about to erect a **sanatorium for consumptives** at MOUNT TIGVELE, in the district of Gorju, in a sheltered position, at an elevation of 3600 feet above sea-level.

In the remainder of the **Balkan Peninsula**—in the mountainous districts of SERVIA, BULGARIA, MONTENEGRO, ALBANIA, and GREECE—there are health resorts that, at present, are of but local importance.

THE CAUCASUS AND INLAND RUSSIA

Russia possesses a group of health resorts in the Caucasus that are known mainly for their **mineral waters**. The chief of these spas, and the most important town of the district, is PIATIGORSK, or PYATIGORSK, situated just north of latitude 44° north and just east

¹ See Dr. M. S. D. Berger, "Les Eaux Minerales en Roumanie," Paris, 1900.

of longitude 43° east. It lies at an altitude of about 1685 feet, on the southwestern slope of the Mashuka Hill, facing the snow-topped mountains of the main Caucasus ridge, with Elbruz, their loftiest peak, attaining a height of more than 18,000 feet above sea-level. The mean annual temperature is 48° F. The summer is hot, and the winter, cold; the mean July temperature being 72° F., and the mean January temperature, 24° F. According to Dr. F. G. Clemow,¹ visitors begin to leave the town at the end of August, although the official season lasts until the end of September. The annual rainfall is $21\frac{3}{10}$ inches, the downpour being heaviest in the early spring and late summer. The thermal muriated sulphurous waters (85° to 116° F.) are employed in **neuralgias, muscular rheumatism, syphilis, etc.**

JELEZNOVODSK (1890 to 2100 feet), situated amidst pine forests on the Jeleznui Hill, is about eight miles from Piatigorsk. The summer is somewhat cooler than at the latter spa. The thermal chalybeate waters are, perhaps, comparable to those of Lamalou, in France.

ESSENTUKI, about ten miles from Piatigorsk, resembles it in altitude and climate. It has muriated alkaline waters that are of great repute in Russia for **chronic disorders of the digestive organs, chronic gout, glycosuria, gravel, and similar affections.**

KISLOVODSK, about fourteen miles to the southeast of Essentuki, is a climatic resort of moderate elevation (2700 feet), and is open throughout the year. The winter is very cold, but though snow-storms and fogs occur, the number of fine sunny days is said to be great,² and the temperature in the sun may rise to 55° or 60° F. during the middle of the day.

ABBAS-TUMAN, possessing thermal springs (110° to 120° F.), is beautifully situated amidst pine forests and rocky heights, in the central government of Tiflis, at an elevation of 3505 feet above sea-level. The mountain climate of this Caucasus resort has been recommended in **pulmonary tuberculosis**, and the late Grand Duke George of Russia resided there. BORJOM, with its thermal alkaline

¹ The "Medicinal Waters and Muds of Russia," 1897.

² See Dr. F. G. Clemow, *loc. cit.*

springs, not far from Abbas-Tuman, has been termed the 'Russian Vichy.'

Among health resorts in other parts of Russia may be mentioned LIPETSK, picturesquely situated on the river Voronezh, in the government of Tambof, and having chalybeate springs and peat baths. CIECHOCINEK, in the northwest of Russian Poland, two miles from the Prussian frontier, has common salt waters, with arrangements for inhalation treatment and mud-baths. BUSKO, in the southwest of Russian Poland, not far from Galicia, has sulphur waters and mud-baths. The resorts on the Baltic and Black Seas, noted for their salt- and mud-baths, have been mentioned under Seaside Resorts. Russia has likewise mineral springs and health resorts in Siberia and her Asiatic dominions, but although they have considerable local value, they are not as yet of sufficient general interest to merit a description here.

CHAPTER VIII

THE BRITISH ISLANDS

Characteristics of the British Climate. Seaside Resorts of the British Islands. Seaside Resorts of Great Britain. Seaside Resorts of Ireland.

The characteristics of the climate of the British Islands may be explained by their latitude (between 50° and 60° north) and by their insular position—close to the Continent of Europe on the southeast, and open to the Atlantic and washed by the warm Gulf Stream on the southwest and west. With this position is necessarily associated, during the greater part of the year, the prevalence of southwest winds laden with moisture from the ocean and warmed by the Gulf Stream. Some of the peculiarities of the British climate may be considered separately.

1. Humidity, Rain, and Sunshine.—The winter fogs and the great number of rainy days that occur in the British Islands are proverbial among inhabitants of the neighboring countries. Although the total amount need not be greater than in more southern countries, the rainfall is more equally distributed over the different seasons, and there are many more rainy days and hours at English health resorts than at most of the health resorts on the Continent of Europe. The clouds and moisture in the atmosphere diminish the amount of light and heat received from the sun, thus making the climates of English health resorts relatively dull when compared with those of the Swiss Alps, the Riviera, Egypt, and other regions of clearer sky. On the other hand, drier regions often have the disadvantage of being more dusty than England. The western parts of the British Islands are more humid than the eastern. The mean annual rainfall of London and Dublin is between 24 and 28 inches, and that of different parts of Cornwall, between 30 and 50 inches. The rainfall is greatest where the west coast is mountainous, as in parts of the west of Ireland, where the annual rainfall reaches from 40 to almost

90 inches, and as in parts of the northwest of Scotland and the lake district of Cumberland, where the annual rainfall reaches from 80 to 150 inches. The mean annual amount of bright sunshine in the British Islands varies from about 19 to 40 per cent. of the possible duration, and from about 820 to 1800 hours.¹ If the Channel Islands are excluded, the highest figures in the tables of the Meteorological Office belong to places on the south coast of Great Britain, such as Hastings, Falmouth, Brighton, Eastbourne, and Torquay, all having over 1690 hours. Tenby, in the south of Wales, and Newquay, in the north of Cornwall, have also over 1690 hours, and in this respect resemble localities on the south coast. Valencia, on the southwestern coast of Ireland, has 1487.7 hours, slightly less than Dublin. Braemar, in the Highlands of Scotland, has 1187 hours, about the same as Edinburgh. Fort Augustus and Fort William, in Invernesshire, have only 822 hours (19 per cent. of the possible) and 1098 hours (25 per cent. of the possible) respectively.

2. Equability of the Climate, Summer and Winter Temperatures, and Mean Annual Temperatures.—The humidity and prevalence of southwest winds render the climates of the British Islands relatively equable. Sudden changes in the weather are common, but the extremes of heat and cold are rare. Glasgow has a difference of less than 20° F. between its mean temperatures for January and July, while Moscow, almost in the same latitude, shows a difference of about 52.5° F.; this difference is, of course, still greater in parts of Siberia. The daily range of temperature in England is less than at the Swiss mountain resorts and on the Riviera, and there is not the same danger of chills at sunset at English health resorts that there is at Riviera resorts.

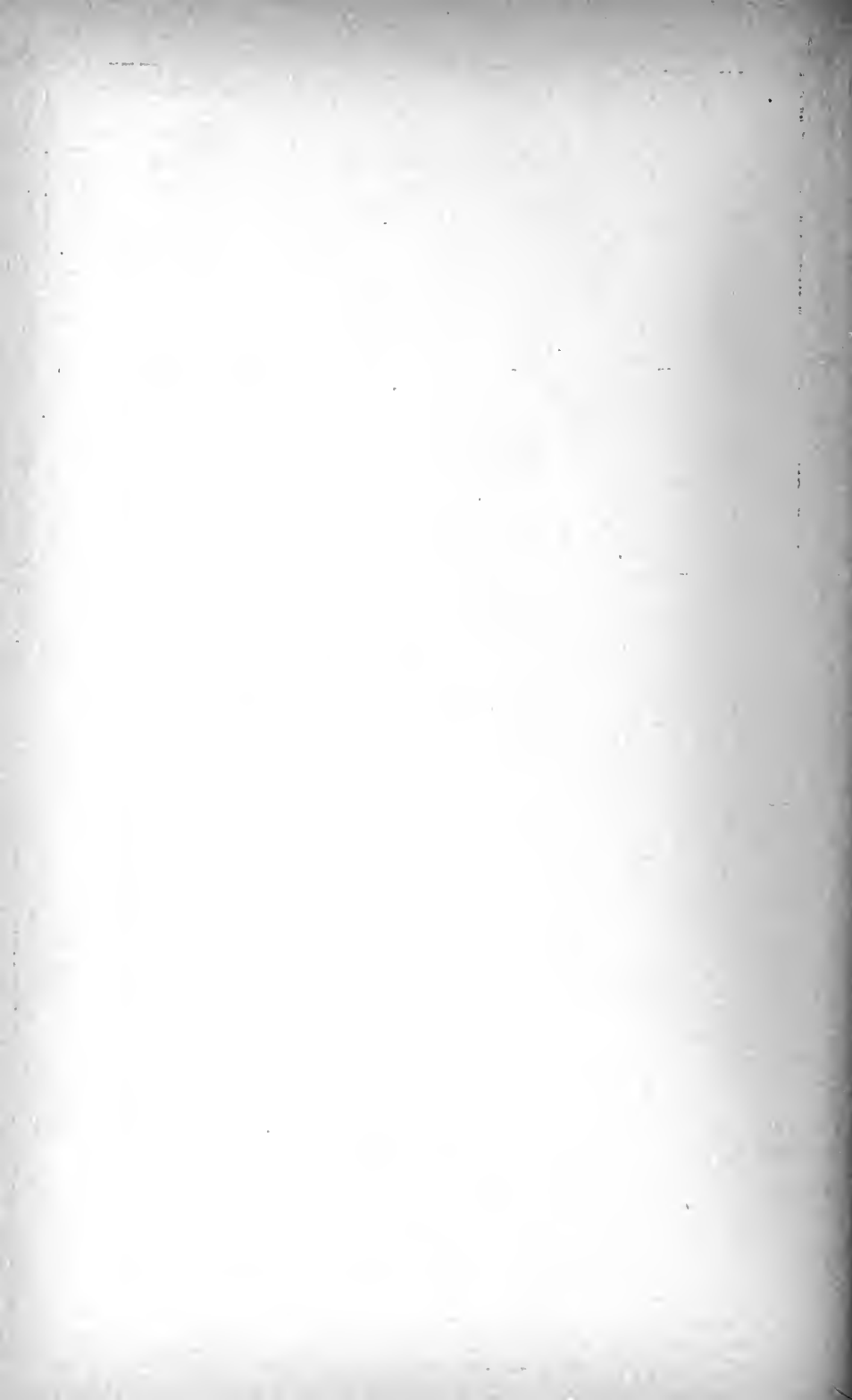
The English summers are relatively cool, and the winters, relatively warm. The mean July temperature of London is 63° F., while that of Berlin, which has a somewhat more northerly latitude, is 66.7° F.

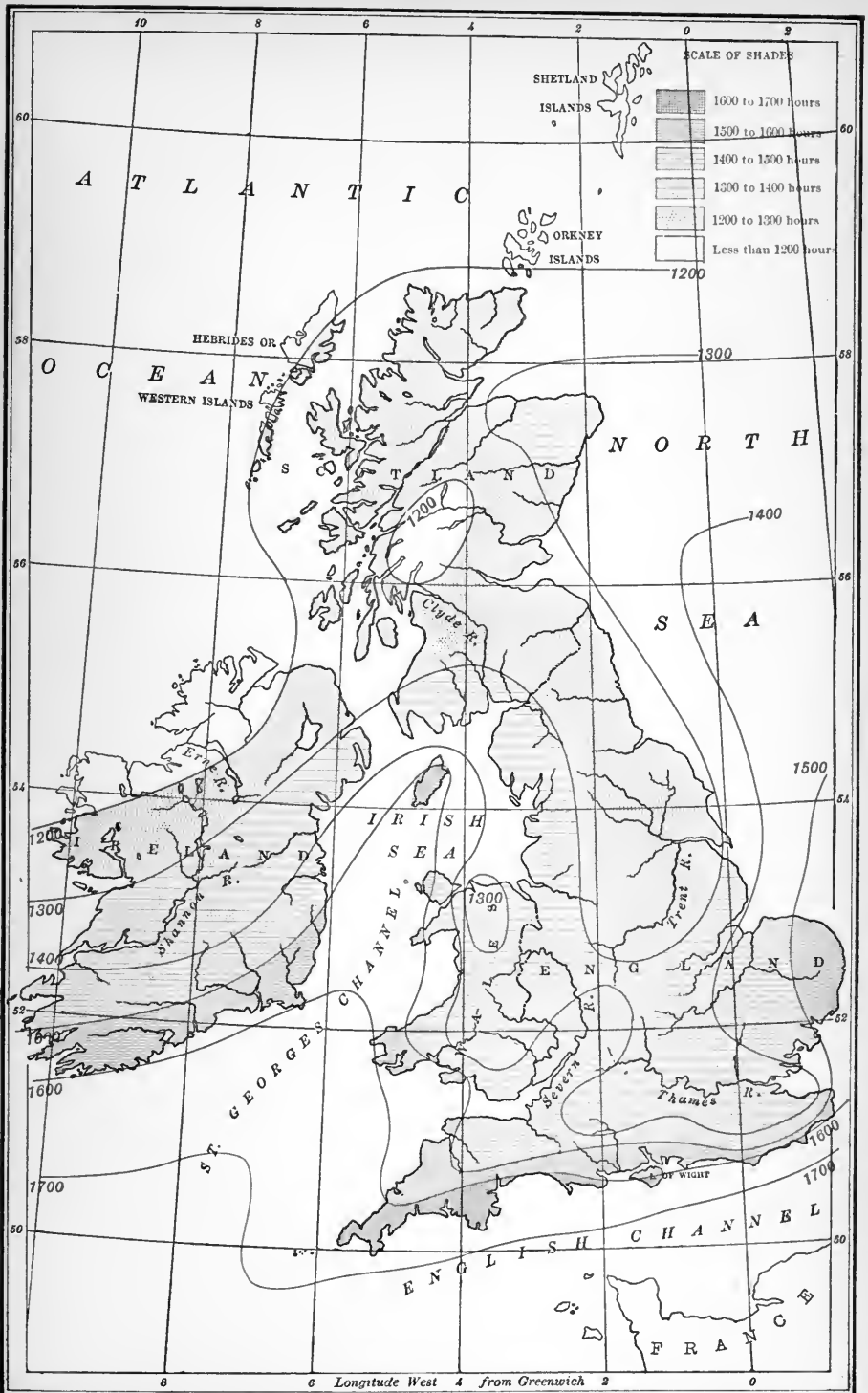
¹ Average figures for fifteen years are given in "Weather Reports of the Meteorological Office," vol. xii, 1897. Much importance should not be attached to slight differences in the amount of sunshine, for the figures obtained from different sources contradict one another to some extent. (See Hastings and Eastbourne.)



Longitude West 4 from Greenwich 2

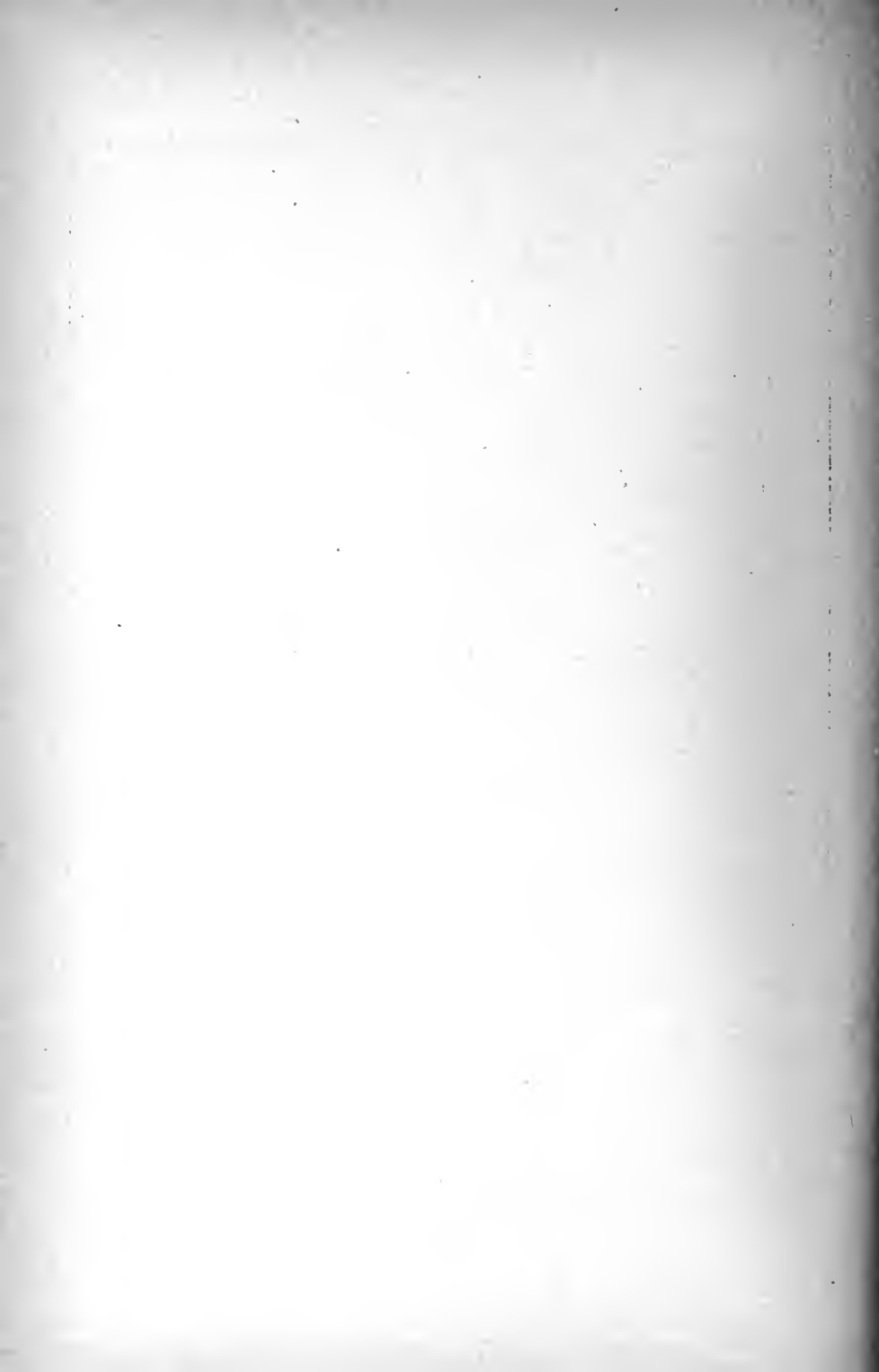












The following table of monthly means, compiled from Hann, de la Harpe, Glax, and other trustworthy sources, and converted into degrees Fahrenheit, will serve as a rough comparison of the temperatures of London and of certain typical winter resorts of England with those of Mediterranean and other European winter resorts :

	NOVEMBER.	DECEMBER.	JANUARY.	FEBRUARY.	MARCH.	REMARKS.
London (Brixton Meteorological Station)	44.0	39.2	38.3	40.0	42.7	For the years 1871-1895.
Ventnor (Mitchell Bruce, 1895)	47.8	42.3	41.6	41.9	43.1	For the years 1881-1890.
Hastings (Meteorological Office), Bournemouth (Mitchell Bruce, 1895)	45.1	40.3	38.9	40.0	42.2	For the years 1875-1895.
Torquay (Symes Thompson and Lazarus-Barlow, 1895)	45.2	39.7	39.6	39.7	41.7	For the years 1881-1890.
Falmouth (Meteorological Office)	46.6	42.7	40.8	41.9	42.3	For the years 1880-1889.
Meran, } (Hann, 1897)	47.7	44.3	43.1	43.7	44.3	For the years 1871-1895.
Botzen, } (Hann, 1897)	42.1	34.5	33.1	38.1	45.5	
Gorizia, } (Hann, 1897)	41.9	34.3	32.0	37.6	45.7	
Abbazia, } (Glax, 1900)	45.1	38.5	37.6	39.6	45.5	
Arco, } (Glax, 1900)	48.4	42.8	39.9	40.8	46.8	For the years 1886-1897.
Gardone-Riviera (Koeniger, 1901)	45.7	36.9	36.1	39.2	45.5	For the years 1885-1890.
Pallanza, } (Hann, 1897)	47.8	39.7	38.3	40.6	47.3	For the years 1885-1900.
Cadenabbia, } (Hann, 1897)	45.3	38.8	36.5	40.1	45.3	
Lugano, } (De la Harpe, 1897)	45.5	39.6	37.6	40.6	46.0	Observations at the Villa Calotta near Cadenabbia. From the years 1876-1887.
Locarno, } (De la Harpe, 1897)	42.4	36.1	34.5	39.4	45.0	Mean of 11 years (Mariani).
Montreux (Swiss Central Meteorological Office)	43.0	36.9	35.1	39.9	45.3	Mean of 18 years with breaks, 1864-1894.
Spezia (Clar, 1894)	42.1	35.4	34.0	36.9	40.6	Mean of 18 years with breaks, 1864-1894.
Genoa, } (Hann, 1897)	52.3	46.9	45.1	48.0	51.1	The temperatures for the neighboring health resort of Nervi are doubtless somewhat higher.
San Remo, } (Hann, 1897)	53.1	47.5	46.0	48.7	51.6	
Nice, } (Hann, 1897)	53.2	47.8	47.1	49.5	51.4	
Cannes, } (Hann, 1897)	53.8	48.6	47.1	48.2	51.8	
Pau, } (Hann, 1897)	52.7	47.5	48.0	48.7	51.1	
Venice, } (Hann, 1897)	47.8	43.3	42.3	44.4	48.2	
Naples, } (Hann, 1897)	46.6	38.7	36.9	40.3	46.0	
Corfu, } (Hann, 1897)	53.8	48.9	46.8	48.7	50.9	
Ajaccio (Glax, 1900)	59.2	53.1	50.5	51.3	54.1	
Palermo, } (Hann, 1897)	58.8	50.9	48.0	50.2	56.8	For the years 1894-1897 (Pompéani). The figures generally given for the winter months are higher.
Malaga, } (Hann, 1897)	59.9	54.1	51.8	52.7	55.0	
Funchal, Madeira, } (Samler Brown, 1898)	60.6	54.7	54.9	57.0	58.5	Mean of 25 years' records.
Las Palmas, Grand Canary, } (Samler Brown, 1898)	65.0	61.8	60.3	60.3	60.8	Mean of 5 years' records.
Orotava, Tenerife, } (Hann, 1897)	67.6	64.7	62.3	62.9	63.0	Mean of 8 years' records.
Algiers, } (Hann, 1897)	67.1	63.7	61.2	61.6	62.6	
Cairo, } (Hann, 1897)	60.4	54.7	53.8	54.7	57.0	The figures given further on under Cairo are higher than these.
	65.3	56.7	52.9	54.9	60.6	

In regard to the relative warmth of English winters, Buchan¹ points out that if no more heat were received than is due to its position on the globe in respect to latitude, the mean winter temperature of London would be 17° F., but that, owing chiefly to the heat given out by the Gulf Stream and carried over England by winds, the actual winter temperature of London is 21° F. higher. The winter temperature of Shetland is modified still more than that of London by the warm waters of the Atlantic. Naturally, the winters are warmer and the climate is more equable on the southwest coasts of the British Islands than on the eastern coasts. Thus the mean January temperature is 45.4° F. for Scilly; between 43° and 44° F. for most of the coast of Cornwall and the southwestern coast of Ireland; and about 37° F. for the entire eastern coast of Great Britain. In apposition to this may be placed the mean January temperatures of Paris, Berlin, and Moscow, which are 36.3°, 32.8°, and 14° F., respectively.

The mean annual temperature of resorts in the British Islands is likewise increased by their proximity to the Gulf Stream. Thus, the mean annual temperature reaches 52° F. in the Scilly Islands (St. Mary's) and on the southwest coast of Ireland; but only from 49° to 50° F. in the Isle of Thanet (Ramsgate and Margate), London, and Dublin; and still less in the more inland localities. Braemar, in the Highlands of Scotland, has a mean annual temperature of only 43.2° F.

Generally speaking, the climates of the British Islands are tonic, but somewhat dull and not exhilarating, and require the power of resistance to winds, cold damp weather, and sudden changes. It is to the winds and the very frequent moderate variations of the weather that the health-giving powers of English climates may be attributed; but the patient's resisting powers must not have been too much reduced by acute illnesses, nervous exhaustion, senility, or other debilitating influence. "A good climate," says Sir H. Weber,² "is that in which all the organs and tissues are kept evenly at work in alternation with rest. A climate with constant

¹ "Introductory Text-book of Meteorology," 1871, p. 70.

² Address before the British Balneological and Climatological Society, April 27, 1899, "Lancet," May 20, 1899.

moderate variations in its principal factors is the best for the maintenance of health. It calls forth the energy of the different organs and functions, their power of adaptation and resistance, and keeps them in working condition." He adds that "such are the climates of England, and they belong to the most health-giving in the world. They produce the finest animals, the finest trees, and the finest men and women, and are most conducive to health and longevity."

Among health resorts of the British Islands will be considered first those upon the coast.

SEASIDE RESORTS OF THE BRITISH ISLANDS

No other country has so many seaside resorts with satisfactory hygienic arrangements and accommodation as have the British Islands. A great many of these, besides affording facilities for sea-bathing and boating, possess excellent grounds for golf, lawn-tennis, and other open-air games. Some of these resorts have establishments that are equipped with sea-water swimming baths and hydrotherapeutic appliances for cases requiring special treatment. Most of the seaside resorts are used chiefly or entirely as summer resorts, but some of them, owing to specially favorable conditions, are known equally as well, or even better, as winter resorts. Among the latter class are Ventnor and the Undercliff of the Isle of Wight, Bournemouth, Torquay, Falmouth, Penzance, and Hastings, with St. Leonards; Rothesay, on the island of Bute, in Scotland; Glengarriff and Queenstown, in Ireland.

It is in winter that the modifying influence of the Gulf Stream on the climate is most obvious. The mean temperatures for July of places in the British Islands vary from about 55° to 57° F. in the north of Scotland, to about 64° F. in the south of England, the range in Ireland being from about 58° to 59° F. in the north, to about 62° F. in the south. Localities on the eastern coast of the two islands have generally slightly higher mean temperatures for the summer months than localities of the same latitude on the western coasts. The whole eastern coast of Great Britain has nearly the same mean temperature for January—viz., about 37° F., and the climate

gradually becomes warmer as the southwest is approached. Thus the mean January temperature for Wales and the southwest promontory of England is from 40° to over 43° F.; that of the southwest coast of Ireland reaches 43° F.; and that of the Scilly Islands exceeds 45° F.

Generally speaking, the east and southeast coasts of Great Britain are colder and drier than the west and southwest coasts and the whole of the coast of Ireland, while the central and main portion of the south coast of England combines the relative dryness of the eastern, with the relative warmth of the western, coast. As has already been mentioned, it is in winter that the peculiarities in temperature caused by the Gulf Stream are most apparent. Buchan has illustrated this graphically by the monthly isothermal lines, which are seen to curve along the coast-lines—sometimes running parallel with them—in January, and to run nearly parallel with the lines of latitude, though having a northerly inclination from west to east, in July.

There are in the British Islands some striking instances of local modifications of climate produced by peculiar shelter from winds. These will be described in connection with special resorts. Here we may cite one or two of the most marked as illustrations: The climate of the Undercliff of the Isle of Wight presents a marked contrast to that of the more exposed regions in the neighborhood. Similarly, Penzance, on the south coast of Cornwall, and St. Ives, on the north coast, differ much in their climates, although separated from each other only by a strip of land about eight miles wide. The sheltered positions of Pwllheli, in Cardigan Bay, and Grange, in Morecambe Bay, give them, to some extent, 'local climates.'

The winter resorts on the coast may be used as summer resorts in cases requiring a mild summer climate with absolute shelter from wind. The best season for the summer resorts is from the end of June to the end of September, and they are often satisfactory places until November. Many of them can be visited during winter by persons of strong constitution who require a holiday in a bracing climate, and who can endure a fair amount of wind and cold. During the spring months, when east winds are prevalent, many resorts on the west and southwest coasts have relative advantages.

SEASIDE RESORTS OF GREAT BRITAIN

In summarizing the seaside resorts of the British Islands, the coast of Kent will be considered first, proceeding thence along the southern, western, northern, and eastern coasts of Great Britain, and describing the Irish seaside resorts last. The Channel Islands have already been considered with the coast of Normandy.

Passing by SHEERNESS, on the island of Sheppey, with its great attractions for those interested in shipping, and WHITSTABLE, famous for its oyster fisheries, HERNE BAY is the seaside resort on the north coast of Kent that is nearest to London. It is a flat town, situated on a bay of the estuary of the Thames, facing directly north, and has a bracing climate, with but slight shelter from winds. We come then to the eastern extremity of Kent, still known as the 'Isle of Thanet,' owing to the channel that in Roman times separated it from the remainder of Kent and that was guarded on the north by the stronghold of Reculver (Regulbium) and on the south by Richborough (Rutupiæ). MARGATE (latitude $51^{\circ} 23'$ north), on the north coast, only about three miles from the North Foreland, is the most bracing resort of the Isle of Thanet. As has been pointed out by Burney Yeo,¹ the northeast winds of spring reach Margate directly from the sea, whereas at many southern coast resorts they are land-winds. The sandy shore affords excellent bathing, especially for children and for those who prefer to bathe in shallow water. On a hot day the odor around the harbor during low tide is not always agreeable; Cliftonville, the 'East Hill' portion of the town, naturally has not this disadvantage, and is the most elevated and probably the most healthful part of Margate. The climate of Margate has long been noted for its good effects upon **scrofulous** and **weakly children**, upon **convalescents**, and upon others with fair reactive powers. The Royal Sea-bathing Infirmary, founded in 1791, is probably the oldest **seaside sanatorium** for the poor in Europe. There are likewise numerous homes for convalescents at Margate, in connection with London and its suburbs. RAMSGATE (latitude $51^{\circ} 19'$ north), in the southern part of the Isle of Thanet,

¹ "Climate and Health Resorts," London, 1893, p. 60.

rivals Margate in popularity. On either side of the harbor rise the east cliff and the west cliff, and the health resort lies chiefly on terraces of these cliffs, differing from Margate in having considerable shelter from north and northeast winds. The sands are excellent for bathing, but somewhat limited at rising tide. The suburb of ST. LAWRENCE, which lies mainly on elevated ground to the northwest of Ramsgate, is quieter and more bracing than the central part of the town. BROADSTAIRS, situated on the cliffs between Margate and Ramsgate, about one and one-fourth miles to the south of the North Foreland, has a full easterly exposure. It is a much quieter place than either Margate or Ramsgate, and does not so much attract the cheap excursionists from London, who often overcrowd the sands of these two places during the warm weather, and especially on Sundays. It has the large Yarrow Home for **convalescent children** of better-class families of limited means. ST. PETER'S, on the plateau of Thanet, about one mile inland from Broadstairs, is sheltered to some extent by plantations and higher land—the highest portion of Thanet is only 180 feet. WESTGATE-ON-SEA and BIRCHINGTON, two miles and three and one-half miles respectively to the west of Margate, are relatively quiet seaside resorts. The climate of the Isle of Thanet is influenced by its chalky soil and its exposure to winds. The vegetation is scanty nearly everywhere. Thermometric observations ¹ at Ramsgate and Margate agree so closely that the mean between them may be regarded as fairly correct for Thanet in general. Thus the mean annual temperature is 49.25° F.; for July, 61.3° F.; for January, 39° F. The mean annual relative humidity is about 82 per cent. The mean annual rainfall is 25 inches. The flatness of the country gives Thanet a large amount of possible sunshine. The tables of the Meteorological Office, published in 1897, record 1503 hours as the actual average amount of bright sunshine per annum at Margate—34 per cent. of the possible.

The old-fashioned town of DEAL and the adjoining WALMER, on the east coast of Kent, to the north of the South Foreland, are quiet seaside resorts. In Walmer Castle the Duke of Wellington and other famous Lords Wardens of the Cinque Ports have resided.

¹ "Climates and Baths of Great Britain," by various authors, 1895, vol. 1.

DOVER, with its castle and chalk cliffs, forms a very striking picture to visitors from across the channel. It faces south, and is fairly well sheltered by the chalk hills to the north. The mean temperature for July is 61.4° F.; for January, 38.8° F. ST. MARGARET'S BAY,—that is, the bay proper,—about four miles to the north-east of Dover, is distinguished by its shelter from every wind except the southeast, south, and southwest.

FOLKESTONE, about six miles to the southwest of Dover, is one of the most popular seaside resorts of England. The greater part of the health resort lies on the elevated ground to the west of the old town, and in front of this new portion, above the western cliffs and facing the sea, is a very airy promenade called 'The Leas.' The climate of this portion of Folkestone is bracing and naturally somewhat windy, but the range of chalk downs to the north affords some shelter. The climate of the houses below the cliffs and close to the sea is, of course, milder, owing to greater protection from cold winds. The elevated ground to the east of the old town has not become popular, but it can boast of an excellent home—St. Andrew's—for convalescent patients of the poorer classes. The beach is shingly, and the bathing is rather deep for children. SANDGATE and HYTHE, about one and one-half and three miles respectively to the west of Folkestone, are much quieter places and have less invigorating climates than the upper portions of Folkestone. Toward the north they are sheltered by elevated ground, on part of which the large military camp of Shornecliffe is situated. LITTLESTONE-ON-SEA, in flat country near New Romney, to the north of Dungeness, has the advantage of excellent golf-links.

HASTINGS (latitude 50° 51' north) and its newer neighbor, ST. LEONARDS, are now practically one town, and lie on the Sussex coast, about half-way between the promontories of Dungeness and Beachy Head, not far from several places of historic and antiquarian interest. They face the south, and are sheltered from north and north-east, but not from east, winds, excepting a very limited portion of Hastings proper. The mean temperature¹ at Hastings for

¹ The meteorologic data are derived from Dr. W. Ewart's article, *loc. cit.* The tables of the Meteorological Office, however, which were published later than Dr. Ewart's article, give Hastings an average annual sunshine of 1761 hours.

the year is 49.9° F.; for winter, December to February, 40.5° F.; for spring, 46.9° F.; for summer, 60.4° F.; for autumn, 51.8° F.; for January, 39.8° F.; for July, 61.3° F. The mean daily range in January is 8.4° F.; in July, 13.5° F. The mean annual relative humidity is 84 per cent. The mean annual rainfall is 29.26 inches, with 187 rainy days. The most rain falls in the autumn months. There are 1691 hours of sunshine in the year at St. Leonards. The relative mildness of their climates has caused these places to become best known as winter resorts and to be somewhat neglected during the summer. The winter is, however, less mild and colder than at Ventnor and the southwestern winter resorts, which are preferable for weaker constitutions. During spring, especially when the east winds are keenly felt, Hastings and St. Leonards are less suitable for delicate invalids than Ventnor and the localities on the southwestern coast.

BEXHILL is a quiet, well-arranged seaside resort, six miles to the west of Hastings. It has first-class hotels.

EASTBOURNE is a very popular summer and autumn resort, with a southeasterly aspect and a good sandy beach for bathing. It is better laid out than are many other seaside resorts, and has golf-links, tennis-grounds, and attractive objects for excursions in the neighborhood. The mean temperature for the year¹ is 48.6° F.; for January, 37.8° F.; for July, 60.3° F. The mean annual relative humidity is 81 per cent. The annual rainfall is 26.9 inches. There are 1625 hours² of sunshine in the year. Three miles to the southwest of Eastbourne are the famous chalk cliffs of Beachy Head, which surpass in height (575 feet) those of the Stubbenkammer, near Sassnitz, on the Baltic Sea, although they are not, like the latter, crowned by magnificent forest.

SEAFORD is a quiet place on the other side of Beachy Head, by which it is sheltered, to some extent, from east winds.

BRIGHTON (latitude $50^{\circ} 50'$ north) is situated on a chalky soil, within reach of the South Downs, and nearly due south of London.

¹ Data from Dr. Ewart's article, *loc. cit.*

² The tables of the Meteorological Office, however, give 1698.3 hours ("Weather Reports," vol. XII, 1897).

Its great size and easy accessibility make it a 'seaside London' during the seasons. The Kemp Town portion on the east cliff is more bracing than Hove and the western parts. The 'Madeira Walks' under the east cliff are completely sheltered from the north, but are exposed to the east, and are quite different from what the word 'Madeira' implies. During the prevalence of east winds in spring Brighton is certainly not a suitable place for invalids, but during autumn and the early part of winter, up to January, it offers many advantages to Londoners and is much utilized. According to the tables of the Meteorological Office, Brighton receives 1706.8 hours of bright sunshine in the year—that is, 466 hours more than London. The mean temperature¹ for the year is 49.4° F.; for July, 60.5° F.; for August, 61.2° F.; for December, 40° F.; for January, 39.3° F. The mean annual relative humidity is 78 per cent. The mean annual rainfall is 30.43 inches. The mean temperature of the sea in July is about 62° F. Some portions of Brighton stretch a considerable distance inland. There is likewise hotel accommodation at HASSOCKS, seven and one-half miles inland, suitable for those who wish to be within easy reach of Brighton, and yet feel better when they reside away from the actual coast. On the South Downs, near Brighton, there are bracing sites at considerable elevation—as, for example, the neighborhood of the Devil's Dyke, five miles distant, and about 1000 feet above sea-level—that might be utilized in certain cases were suitable accommodation provided.

WORTHING lies on low ground, about ten miles to the west of Brighton, and is under similar conditions in regard to winds, excepting that the sheltering downs on the north are further removed. It is a much quieter place, and the climate is somewhat less invigorating, but the temperature figures of the two resorts do not differ widely.

LITTLEHAMPTON is a quiet little place, situated on flat ground, with excellent sands for children. BOGNOR (Sussex) and HAYLING ISLAND (Hampshire) have also fine sands for children. SOUTHSEA is practically a suburb of Portsmouth. Both Southsea and Little-

¹ Data from Dr. Ewart's article, *loc. cit.*

hampton have a strip of common ground separating the houses from the sandy shore, resembling in this respect some of the Baltic resorts. SOUTHAMPTON is not actually on the sea. Close to it is the great military hospital of Netley, which is under marine influence.

THE ISLE OF WIGHT.—The Isle of Wight (latitude $50^{\circ} 35'$ to $50^{\circ} 45'$ north), from three to six miles from the coast of Hampshire, owing to its hills—up to 830 feet—and cliffs and the local shelter they afford, has several different 'local climates.' COWES and RYDE, on the northern coast, are summer pleasure resorts, yachting stations, and good stopping-places for excursions on the sea. Close to Cowes is the royal residence of Osborne. SEA VIEW, in the district of ST. HELENS, about three miles east of Ryde, is a small, quiet summer and autumn resort that furnishes good bathing. SANDOWN, on Sandown Bay, facing southeast, is a bracing, breezy resort, poorly sheltered from winds. The ruins of a Roman villa give evidence that the value of this resort was recognized in early times. SHANKLIN, in Sandown Bay, about three miles to the southwest of Sandown, has, in common with many other health resorts, somewhat different climates in its several portions, owing to the slope of the land toward the shore. It has a chalybeate water that is poor in carbonic acid gas, and a modern thermal establishment for supplying various kinds of baths, etc. Shanklin Chine, a beautiful, rocky, wooded glen, is one of the great attractions of this health resort for ordinary visitors.

THE UNDERCLIFF OF THE ISLE OF WIGHT, WITH VENTNOR AND BONCHURCH.—The Undercliff is a narrow strip of coast-land between the sea and the high cliffs that form the precipitous face of the downs in the southeastern part of the island. It consists of irregular terraces of chalk and sandstone, formed as the result of landslides from the cliffs, and rising to a height of from 100 to 150 feet above sea-level. It extends for about six miles from Luccombe Bay, on the east, to Blackgang Chine, on the west, and its aspect is mostly due south, the eastern extremity, however, facing southeast, and the western extremity, southwest. The downs to the north of the Undercliff attain a height of from 400 to 800 feet above sea-level. The position is sheltered from the north, the northeast, the

northwest, the west, and partly from the southwest and the east, although it must not be assumed that winds from these directions are not felt. Ventnor is exposed to the south and southeast winds. The houses of Ventnor differ somewhat in relation to climate, for they are situated at various elevations—from that of the beach to that of portions of the cliff nearly 500 feet above sea-level. Bonchurch, which is practically the eastern suburb of Ventnor, is somewhat better protected from the east. The soil absorbs water and leaves the surface dry, and in dry weather the roads may be disagreeably dusty. The warmth of the sun is increased by reflection from the cliffs and sea, and the winter climate may be described as mild and equable, yet fairly dry and not 'relaxing.' The remarkable local climate of the Undercliff was thoroughly recognized by Sir James Clark, and the results obtained by the Royal National Hospital¹ for Consumption at Ventnor, situated somewhat to the west of the town of Ventnor, and founded in 1869 by Dr. A. Hill Hassall, have served to maintain the good reputation of this small district. It is one of the best of British winter resorts for a number of disorders. **The indications** for this and other mild seaside winter climates in pulmonary and other cases are discussed in Part III. The following **meteorologic data** are taken from Dr. Mitchell Bruce's article on "Hampshire" in the "Climates and Baths of Great Britain."²

The mean monthly temperatures (Fahrenheit), beginning with January, are: 41.6°, 41.9°, 43.1°, 47.3°, 53.3°, 58.3°, 61.2°, 61.8°, 59.1°, 52.1°, 47.8°, 42.3°. The mean annual temperature is 50.8° F. The mean daily range for the year is 10.6° F. The mean annual relative humidity for 9 A.M. is 81 per cent. The mean annual rainfall is 28.13 inches, with 164 rainy days equally distributed between the different seasons. The annual amount of sunshine at St. Lawrence—that is, near the Ventnor Hospital for Consumption—was 1638 hours.

At the western end of the Isle of Wight, FRESHWATER GATE, in Freshwater Bay, ALUM BAY, and TOTLAND BAY are quiet seaside summer resorts not far from the inland railway station of Fresh-

¹ Sanatorium treatment for paying patients can likewise be had near Ventnor. *

² London, 1895, vol. 1.

water; they are fully exposed to Atlantic breezes. YARMOUTH, a picturesque little town on the coast, two and a half miles to the north of Freshwater, and NEWPORT, near Carisbrooke Castle, nine and a half miles inland to the east of Yarmouth, hardly rank as health resorts.

BOURNEMOUTH, in the southwest of Hampshire, close to Dorsetshire and Poole Harbor, has a dry, sandy soil, and is fairly well sheltered by low hills and pine plantations from north and northeast winds, but to a very limited extent from east winds. The houses and hotels of the health resort proper are chiefly on the east and west cliffs, and between these two quarters are the sheltered public gardens of the valley of the Bourne. Bournemouth is perhaps slightly less sheltered from cold winds than Ventnor or Torquay, but its climate is more tonic, and it has the advantage of pine plantations and a sandy soil, in both of which respects it has been compared to Arcachon, in France. Bournemouth and Ventnor are probably the two most highly esteemed winter climatic resorts in England for cases of **chronic pulmonary tuberculosis**, and a number of private **sanatoriums** for consumptives have been established at Bournemouth. The mean monthly temperatures (Fahrenheit),¹ commencing with January, are: 39.6°, 39.7°, 41.7°, 46.2°, 53.3°, 59.4°, 62.6°, 61.7°, 57.7°, 49.8°, 45.2°, 39.7°. The mean annual temperature is 49.7° F. The mean annual relative humidity is 77.7 per cent. The mean annual rainfall is 27.26 inches, fairly equally distributed over 158 rainy days. The average annual amount of sunshine, taken at Southbourne, is about 1550 hours.

BOSCOMBE, to the east, and BRANKSOME, to the west, are suburbs of Bournemouth. SOUTHBOURNE-ON-SEA, a small resort on a plateau above a sandy cliff (100 feet), about three and one-half miles to the east of Bournemouth, occupies a less sheltered position and has a more bracing climate. PARKSTONE, a village in Dorsetshire, on Poole Harbor, three miles to the west of Bournemouth and close to Poole, is said to have a specially mild winter climate. SWANAGE,

¹ Taken for the "Council of the Borough of Bournemouth." See Dr. Mitchell Bruce, *loc. cit.*

in a little bay on the eastern side of the 'Isle of Purbeck' peninsula, is a quiet summer sea-bathing resort.

WEYMOUTH, or, rather, MELCOMBE REGIS, a suburb of Weymouth, is situated nearly due south of Dorchester, on a bay exposed to the east. It is a summer and autumn resort, and has an excellent sandy beach for bathing.

LYME REGIS, on the Dorsetshire coast, between Weymouth and Sidmouth, is sheltered from the north and has good sands for bathing. CHARMOUTH is a smaller place, one and one-half miles to the east.

SEATON and BEER, situated near each other, about half-way between Lyme Regis and Sidmouth, are quiet summer resorts.

SIDMOUTH, in the southeastern part of Devonshire, is sheltered from the north and east by a semicircle of hills, and has a mild climate and a reputation for affording an unusual amount of winter sunshine. In its shelter from winds it rivals Torquay. It possesses a good thermal establishment for supplying baths and douches of various kinds.

TORQUAY (latitude $50^{\circ} 32'$ north), situated on Tor Bay, faces south, and is sheltered from the north, northwest, and to some extent from the northeast by encircling hills. The houses are built along the shore and on the sides of the hills. There are good opportunities for walking exercise, both on level and on sloping ground. Torquay is one of the best known and most attractive of British winter resorts, and in regard to its climate may be compared to Queenstown, in Ireland. The mean temperatures (Fahrenheit) ¹ for the various months are the following, beginning with January: 40.8° , 41.9° , 42.3° , 45.7° , 51.3° , 56.5° , 59.5° , 59.9° , 56.4° , 49.8° , 46.6° , 42.7° . The mean annual temperature is 49.4° F. The mean daily range is 11.8° F. The annual amount of bright sunshine is 1698 hours. The mean annual relative humidity is 82.3 per cent. The mean annual rainfall is about 35 inches, distributed over 187 days.

BABBACOMBE, in Babbacombe Bay, and PAIGNTON, in the center of

¹ See the article on Devonshire by Dr. Symes Thompson and Dr. Lazarus-Barlow, in the "Climates and Baths of Great Britain," 1895.

Tor Bay, are both close to Torquay, but face east and are less sedative. DARTMOUTH, at the broad mouth of the Dart, likewise faces east.

BUDLEIGH SALTERTON, EXMOUTH, DAWLISH, TEIGNMOUTH, and SALCOMBE, also on the south coast of Devonshire, have a fair amount of shelter and tolerably warm, equable winters, but their sheltered grounds for taking open-air exercise are rather limited. These localities are much visited during summer. The facilities for sea-bathing are more limited at Salcombe than at the other resorts.

FALMOUTH, in Cornwall (latitude $50^{\circ} 8'$ north), has a beautiful and sheltered position on the western side of Falmouth Harbor, and has been highly extolled as an equable winter resort for patients who wish to remain in England, but who suffer from **bronchitic and other disorders** in colder and more inclement parts of the island. It is, of course, the newer portion of Falmouth, and not the cramped old town, that is the health resort. The small village of FLUSHING, on the opposite side of the harbor, has a westerly aspect and is still better sheltered: east winds are rarely felt there. The mean monthly temperatures (Fahrenheit) of Falmouth¹ are the following, beginning with January: 42.7° , 43° , 43.1° , 46.2° , 51.7° , 57.2° , 59.9° , 59.5° , 56.3° , 50.3° , 47.8° , 44.2° . The mean annual temperature is 50.1° F. The mean daily range is 8.5° F. The mean annual relative humidity is 82 per cent. The mean annual rainfall is 44 inches, distributed over 212 days. The tables of the Meteorological Office that were published in 1897 give Falmouth an average of 1734.4 hours of bright sunshine in the year.

PENZANCE (latitude $50^{\circ} 8'$ north), between Lizard Point and Land's-End, in Mounts Bay, is the most westerly seaside resort in England. It is built on the western side of the bay, facing southeast, and is sheltered by elevated ground behind it. It has slightly higher mean annual and mean winter temperatures, and a somewhat lower daily range than Falmouth.

MARAZION, opposite St. Michael's Mount, three miles to the east

¹ See Dr. W. H. Dickinson's article on "Cornwall" in the "Climates and Baths of Great Britain," 1895.

of Penzance, faces south, but is similar in climate. The mean monthly temperatures (Fahrenheit)¹ for Penzance are the following, beginning with January: 42.4°, 43.4°, 43.9°, 47.1°, 52.6°, 57.7°, 60.9°, 61.3°, 57.3°, 51.3°, 47.7°, 44.2°. The mean annual temperature is 50.7° F. The mean daily range is 7.8° F. The mean annual rainfall is 42.59 inches. If Falmouth and Penzance be compared with Torquay, it will be seen that the first two are somewhat warmer, but rather less sheltered, than the last.

The SCILLY ISLANDS (latitude 49° 40' north) are a group of small islands to the southwest of Land's-End, forty miles from Penzance, from which they can be reached in about four hours. Situated right in the Gulf Stream, they are still warmer than Penzance. Tropical plants flourish in the gardens of TRESKO. In ST. MARY'S² the mean monthly temperatures (Fahrenheit) are the following, beginning with January: 45.4°, 45.2°, 45.3°, 47.5°, 51.9°, 56.6°, 70.2°, 60.5°, 58.1°, 52.4°, 50.1°, 46.8°. The mean annual temperature is 52.4° F. The mean daily range is 7.1° F. The mean annual relative humidity is 85 per cent. The mean annual rainfall is about 32 inches, covering 212 days. There are no elevations to speak of in the islands, so that very few portions are sheltered from winds.

On the north coast of Cornwall and Devonshire there are several summer resorts, some of which, such as St. Ives, in Cornwall, and Ilfracombe, in Devonshire, although more fully exposed to winds than Torquay, Falmouth, and Penzance, might be useful for winter residence in certain cases. ST. IVES, on the western side of St. Ives Bay, chiefly facing the east and fairly sheltered from the west, has a more bracing climate than Penzance, from which it is separated by a strip of land only about eight miles wide. The cramped old fishing town itself can hardly be classed as a health resort, but the Tregenna Castle Hotel, an old manor house in grounds of its own, a short distance from the town, has suitable accommodation. NEWQUAY, to be distinguished from New Quay in Cardiganshire, is doubtless the most popular summer and autumn resort on the north coast of Cornwall, and has good firm sands for bathing.

¹ Dickinson, *loc. cit.*

² Dickinson, *loc. cit.*

There is a certain amount of shelter from the east. According to the tables of the Meteorological Office, it receives 1691 hours of bright sunshine in the year. About two miles to the north-east of Newquay, situated just above the sandy TREGURRIAN or WATERGATE BEACH, is the new Watergate Bay Hotel, having fair shelter from the east. PADSTOWE can hardly be classed as a health resort at present. It is situated on the estuary of the 'Camel,' and not on the open sea. TINTAGEL is a moderately bracing summer and autumn resort, and affords good hotel accommodation. Some of the houses in the vicinity have an elevation of from 200 to 300 feet or more above sea-level. Here are situated, on a promontory, the ruins of the castle celebrated in the tales of King Arthur and the Round Table. BOSCASTLE, a few miles further east, likewise has hotel accommodation. Tintagel and Newquay have probably the most attractive coast scenery on the north of Cornwall. BUDE faces west, and is fairly well sheltered by high ground toward the east.

On the north coast of Devon are Ilfracombe, Lynmouth, Lynton, and several minor seaside resorts. CLOVELLY is a most picturesque village on the south side of Barnstaple, or Bideford, Bay. WESTWARD HO, in the same bay, twelve miles further east, is not so romantically situated as Clovelly, but is a quiet, modern little place, with good firm sands and excellent golf-links. WOOLACOMBE, in the center of Morte Bay, faces west, and is sheltered by high ground on the east. It has extensive sands and good golf-links, and is a spring, summer, and autumn resort with modern hotel accommodation. MORTHOE, further north, close to Morte Point, has a more exposed position than Woolacombe. ILFRACOMBE is the chief health resort of North Devonshire. The heights surrounding the harbor give good shelter, but easterly and westerly winds are often much felt. LEE-ON-SEA is a small summer resort about two and one-half miles to the east of Ilfracombe. LYNMOUTH lies to the north of Exmoor, on low ground, between high hills at the mouth of the Lynn, and LYNTON is situated on the steep slopes to the west of the stream, from 400 to 500 feet above the sea. Both places are very picturesque and offer satisfactory accommodation. They are connected by a funicular railway.

MINEHEAD, WESTON-SUPER-MARE, and CLEVEDON are summer resorts on the Bristol Channel, in Somersetshire, and are much frequented by inhabitants of the west of England. The large expanse of muddy sand at low tide may help to generate ozone, but is generally regarded as a drawback from an artistic, if not from a sanitary, point of view. Pleasant walks and interesting excursions may be made in the neighborhood of these places. About six miles to the west of Minehead is PORLOCK, in a very picturesque location, and close by, about one mile inland, is the pretty village of BOSSINGTON. Weston has a mean temperature for July of 61° F.; for January, 40.5° F.; for the year, 49.9° F. Clevedon has facilities for hydropathic treatment.

In Glamorganshire, on the northern side of the Bristol Channel, PENARTH and THE MUMBLES may be regarded as sea-bathing suburbs of the important towns of Cardiff and Swansea, respectively.

TENBY, one of the most important seaside resorts of Wales, and perhaps the most fashionable, is situated on a rocky promontory of the western side of Carmarthen Bay. It has a fairly mild climate, and is used to some extent for winter residence, as well as during the summer season. Its annual amount of bright sunshine averages 1694 hours.

ABERYSTWITH, on Cardigan Bay, faces west, and has an equable, mild climate, with about 46 inches of rainfall in the year. Among nearby resorts in Cardigan Bay are ABERAYRON and NEW QUAY, to the south, and ABERDOVEY and TOWYN to the north.

BARMOUTH, further north on Cardigan Bay, has a dry, sandy soil and extensive muddy sands at low tide. The inland country near Barmouth, including Dolgelly and the heights of Cader Idris, is most picturesque. Harlech Castle is about ten miles north. Barmouth is sheltered from the north and east, and may serve as a winter resort for those able to endure a certain amount of cold wind.

CRICCIETH, on the northern shore of Cardigan Bay, to the south of the Snowdon district, has a mild climate, and Pwllheli, a little further west, has a peculiarly sheltered position, owing to the neighboring mountains.

BEAUMARIS, on the Menai Straits, the chief town of the Isle of Anglesey, has a position open to the east. It is a moderately

bracing summer resort, and, like BANGOR, on the opposite side of the Menai Straits, is a center for excursions. HOLYHEAD, from which point the mail steamers start for Dublin, has a July and August temperature of about 59.4° F., and a range of less than 18° F. between its mean monthly temperatures.

LLANDUDNO, on the north coast of Wales, is situated at the southeastern foot of the high ground of Great Orme's Head, in a valley connecting Orme's (Llandudno) Bay with Conway Bay. It is a spring, summer, and autumn resort, has an equable climate, and might occasionally be recommended as a winter resort for persons from the west of England who can endure a good deal of wind. The mean temperature for the year is 49.7° F.; for July, 60.1° F.; for January, 40.9° F. The mean annual rainfall is 31.14 inches. The average annual amount of bright sunshine is about 1350 hours. There is, likewise, accommodation at CONWAY, close by, with its magnificent castle, at the opening of the beautiful vale of Conway, in which lie TREFRIW, LLANRWST, and BETTWS-Y-COED. About four and a half miles west of Conway is the seaside resort of PENMAENMAWR, situated in a semicircle of hills facing northwest. A few miles to the east of Conway is COLWYN BAY, affording good sea-bathing and beautiful inland walks. Further east is RHYL, on flat ground, with good sands for bathing, frequented as a summer resort by the inhabitants of Liverpool, Chester, etc. It has a good hospital and convalescents' home, where patients of the poorer classes from the neighborhood can get the benefit of seaside treatment.

HOYLAKE and NEW BRIGHTON are situated respectively at the western and eastern extremities of the strip of coast (Cheshire) between the estuaries of the Dee and the Mersey. They can be reached quickly by railway from Liverpool, and New Brighton is likely to be crowded with excursionists. SOUTHPORT, on the Lancashire coast, eighteen miles north of Liverpool, and BLACKPOOL, further north, beyond the estuary of the Ribble, are much frequented by the inhabitants of Liverpool, Manchester, and the commercial and industrial towns of this part of England. South of Blackpool are the small resorts of ST. ANNE'S-ON-THE-SEA and LYTHAM; to the north is FLEETWOOD, whence steamers run to the Isle of Man during the excursion season.

GRANGE-OVER-SANDS has a sheltered position on the northern shore of Morecambe Bay, to the south of the beautiful Lake District, and in some cases may be utilized as a winter resort for this part of England. Grange may, perhaps, be said to bear a relation to the English Lake District similar to that which Glengarriff in Ireland bears to the Killarney Lake District. MORECAMBE, further south, near Lancaster, is much frequented by excursionists. On a hill 200 feet high, near Kendal, about a mile inland from Morecambe Bay, is the small Westmorland Sanatorium for the **consumptive poor** of this county. Further north may be mentioned ST. BEES and SILLOTH, quiet seaside resorts on the coast of Cumberland, the former near the rocky promontory of St. Bees Head, the latter on the Solway Firth.

The **Isle of Man**, situated in the midst of the Irish Sea, between latitudes 54° and 54.5° north, is much frequented in summer, rather as a holiday than as a health resort. It has quite an 'insular' climate, with cool summers and comparatively warm winters. DOUGLAS, located on a fine harbor on the east side of the island, is the largest town, and likewise that most frequented by visitors. RAMSEY, on the northeast, PEEL, on the west, and PORT ERIN, on the southwest coast are other Manx resorts. The mean temperature of Douglas for July is 57.5° F.; for January, 40.2° F. The mean annual rainfall is $41\frac{1}{4}$ inches. The average annual amount of sunshine is 1592 hours.

On the **west coast of Scotland**, on the Firth of Clyde, there are several summer resorts, mostly with beautiful scenery, including ARDROSSAN, MILLPORT (Great Cumbrae Island), LARGS, WEMYSS BAY, HELENSBURGH, and DUNOON. At Wemyss Bay and near Helensburgh (SHANDON, on the Gareloch) there are well-known 'hydropathics.' The ISLE OF ARRAN, in the Firth of Clyde, is a summer holiday resort of the Scotch, with fine mountain, woodland, and marine scenery, good walks, and sea-bathing. ROTHESAY (latitude $55^{\circ} 50'$ north), in the island of Bute, is a favorite summer resort of this region, and is often crowded. It has a moist, equable climate, with a mean temperature for the three summer months of

about 58.1° F., and for the three winter months of 39.3° F. The annual rainfall averages about 40 inches. Its cloudiness and absence of sunshine affect its usefulness as a winter resort, and it is too moist for most invalids, excepting those with **chronic bronchitis**. OBAN, further north, in Argyleshire, is a rainy place, and perhaps best known as a starting-point for tours in the western Highlands. The mean temperature for January is 39.8° F.; for July and August, 57.3° F.; for the year, 48.2° F. The mean daily range is 10.3° F., and the mean annual rainfall is 52 inches. Owing to the free drainage and dry, sandy subsoil, the mean annual relative humidity is apparently only 74.8 per cent.¹

On the **east of Scotland**, which is drier and more bracing, the best known seaside resorts are probably Nairn, Portobello, and North Berwick. It may be well to repeat here, before proceeding with the eastern seaside places of Great Britain, that the mean January temperature is, as Buchan has shown, about the same along the whole extent of the eastern coast,—that is, about 37° F.,—whereas the July temperature means increase gradually from north to south—from about 56° to 62° F. The government meteorologic records of NAIRN for twenty-five years quite accord with this. The mean temperature for January is 37.1° F.; for July, 57.5° F.; for the year, 46.2° F.; for the three summer months, about 55.4° F. Nairn is situated on the southern shore of the Moray Firth, and at the northern edge of a level, sandy plain, with the mountainous country of the Highlands to the windward; this position, as Cruickshank² points out, accounts for the relatively small rainfall—only 24.53 inches on the average for the year, about the same as that of London. The subsoil is porous and dries rapidly after rain. Further north than Nairn is DORNOCH, the county town of Sutherland, facing east, with good sea-bathing and golf-links. Considerably further south, in latitude $57^{\circ} 8'$ north, is the city of ABERDEEN, which has good sands for sea-bathing to the north of its seaport, although they are at some distance from its dwellings. On the 'DEESIDE,' five miles from Aberdeen, is a large 'hydropathic.' About

¹ See Dr. Baily's "Oban: a Health and Holiday Resort."

² See Dr. Brodie Cruickshank's "Notes on Nairn," "Journal of Balneology and Climatology," 1899, vol. III.

thirty miles along the coast to the north of Aberdeen is CRUDEN BAY, with bracing air, modern hotel accommodation, and golf-links. STONEHAVEN, the county town of Kincardine, sixteen miles south of Aberdeen, is sometimes used as a summer resort for its bracing air and sea-bathing. BROUGHTY FERRY, at the mouth of the Firth of Tay, is practically a seaside suburb of Dundee, just as PORTOBELLO, on the Firth of Forth, is of Edinburgh; both places are naturally often crowded with excursionists. The old university town of ST. ANDREWS, on the coast of Fifeshire, has a bracing climate for strong constitutions and is a great golfing center. ELIE, with EARLSFERRY, further south, on the opposite side of Fife Ness, has good golfing facilities, and there are also other seaside places on the coast of Fifeshire, such as CRAIL, near Fife Ness, and LARGO, in Largo Bay, which are invigorating summer resorts and afford opportunity for sea-bathing and golfing. On the southern shore of the entrance to the Firth of Forth, opposite to Elie, is the bracing and popular seaside summer resort of NORTH BERWICK, much frequented by visitors from Edinburgh, from which it is twenty-two miles distant. Still nearer to England is DUNBAR, with its historic associations, bracing climate, and good golf-links.

Continuing along the **eastern coast**, the seaside resorts of **England**, down to the estuary of the Thames, will now be described.

TYNEMOUTH, in Northumberland, at the mouth of the Tyne, is a popular summer resort with the inhabitants of Newcastle-upon-Tyne, from which it is only twenty minutes distant by railway. ROKER-ON-SEA is the sea-bathing suburb of Sunderland (Durham). In Yorkshire there are Redcar, Saltburn, Whitby, Scarborough, Filey, and Bridlington. REDCAR and SALTburn-BY-THE-SEA, five miles apart, have fine open positions and good sands for bathing. Saltburn is the more picturesque of the two resorts, and has brine baths supplied from wells at Middlesborough. WHITBY is picturesquely situated at the mouth of the Esk, and on the steep slopes of the cliffs on each side. The sea is on its east and north, with moorland in all other directions. It is a favorite and bracing summer resort, somewhat quieter than Scarborough. The ruins of St. Hilda's Abbey

are one of the attractions of the place. Robin Hood Bay is seven miles off. SCARBOROUGH (latitude $54^{\circ} 17'$ north), the most important seaside resort of the north of England, has a splendid and picturesque position at various altitudes above sea-level. The promontory, crowned by the castle ruins, 290 feet high, helps to shelter the health resort from the northeast. The south cliff, the most fashionable portion, is separated from the old town by a deep chasm spanned by two imposing bridges. Although the Spa Promenade and Spa Gardens are interesting features of this health resort, the mildly aperient mineral waters of the 'Spa' are of secondary importance in most cases compared to the bracing and relatively dry seaside air. Scarborough, like Lowestoft and some other summer resorts of the east coast, may, under certain circumstances, be visited during the colder months, or even during winter, by patients of vigorous constitution. The mean temperature for January is 38° F.; for July, 59.3° F. The mean annual rainfall is 28 inches. FILEY, in Filey Bay, eight miles from Scarborough, likewise on elevated ground, is a much quieter place. Three miles further south is BRIDLINGTON QUAY, possessing good sands and cliffs. It is sheltered on the north by Flamborough Head, a bold promontory that separates Bridlington Bay from Filey Bay. Between Bridlington and the mouth of the Humber are HORNSEA and WITHERNSEA, two small Yorkshire seaside resorts.

SKEGNESS, a little to the north of The Wash and fully exposed to the east, is an important seaside resort in Lincolnshire.

HUNSTANTON, in Norfolk, on the southern side of the mouth of The Wash, has cliffs and sands with a northwesterly aspect toward Lincolnshire. It is a quieter place than Cromer, Great Yarmouth, and Lowestoft. CROMER is a popular resort on the northeast coast of Norfolk, with pretty inland scenery in the neighborhood and fine bracing cliffs—as high as 200 feet—above the beach. The open position of the hotel at the golf-links on the Lighthouse Hills to the east of the town will certainly commend itself to healthy persons that are fond of very breezy places. A few miles along the coast to the west of Cromer is SHERRINGHAM, a smaller resort with very fine scenery. Near MUNDESLEY, on the other side of Cromer, situated on sandy soil on the southern slope of a hill, is the **Mundes-**

ley Sanatorium for the treatment of pulmonary tuberculosis. GREAT YARMOUTH (latitude $52^{\circ} 36'$ north), about eighteen miles east of Norwich, has an extensive, breezy sea-front and all the sea-side features that attract excursionists. CAISTER-ON-SEA, to the north, and GORLESTON-ON-SEA, to the south, of Yarmouth, have the same climatic advantages and are less noisy. The mean July temperature at Yarmouth is 60.5° F.

LOWESTOFT, in Suffolk, ten miles south of Yarmouth, is an equally popular place, but is less thronged with excursionists. Many pleasant excursions to the 'Norfolk Broads' can be made both from Lowestoft and Yarmouth. Further south on the Suffolk coast are the summer resorts of SOUTHWOLD, ALDEBURGH (or Aldborough), and FELIXSTOWE, with similar relatively dry, bracing climates. Southwold and Aldeburgh, about twelve miles apart, with the once famous town of Dunwich between them, are quiet resorts. Felixstowe, which has a rather more southerly aspect, is a bright, well-frequented place with excellent golf-links.

On the opposite side of the mouth of the Stour is the port of HARWICH, in Essex, with its sea-bathing suburb, DOVERCOURT. The other resorts on the coast of Essex—WALTON-ON-THE-NAZE and CLACTON-ON-SEA, not far from Colchester, and SOUTHEND-ON-SEA, on the estuary of the Thames, close to Shoeburyness—are often overcrowded with excursionists and pleasure-seekers who come by rail and steamboat from London.

SEASIDE RESORTS OF IRELAND

The coast climates of Ireland (latitude $51^{\circ} 30'$ to $55^{\circ} 20'$) are in general much more humid than are the coast climates of England. The mean annual rainfall, except in the east, around Dublin, varies from 30 to almost 90 inches, the district that lies between Dingle Bay and Bantry Bay, in the southwest of Ireland, being among those having the greatest rainfall. At the border of this region of the coast, at the head of Bantry Bay, is Glengarriff, well known both as a winter and summer resort. Glengarriff and Queenstown, the two most generally recognized winter resorts of Ireland, are both in County Cork. Beginning with a summary of the seaside

resorts of this county, we shall proceed thence up the western coast, and so on around the whole island, concluding with Waterford on the south coast. In regard to places in Ireland, special help has been derived from the writings of Dr. D. E. Flinn.¹

QUEENSTOWN (latitude $51^{\circ} 52'$ north) is probably the best known and gayest winter resort of Ireland, and has a most beautiful position on the **south coast**, in Cork Harbor. It is situated on the shore of Great Island, the houses rising in terraces from the harbor, facing south, and sheltered from the north and east. The climate is generally likened to that of Torquay, in England. The mean temperature for the year is 51.9° F.; for winter, 44.2° F.; for spring, 50.2° F.; for summer, 61.8° F.; for autumn, 52.8° F. The mean annual rainfall is apparently only 34 inches.

MONKSTOWN, PASSAGE, and other pleasant resorts are situated amidst attractive surroundings, between Queenstown and Cork. BLARNEY, seven miles inland from Cork, has a dry, sandy soil and a number of beautiful sheltered walks. The mean temperature for the year is 51° F.; for the three winter months, 44.5° F. The neighboring hydrotherapeutic establishment of ST. ANNE'S HILL, situated in extensive grounds of its own, offers good accommodation for invalids, and is one of the best known places of its kind in the United Kingdom.

GLANDORE, on Glandore Harbor, an inlet of the more western portion of the south coast, is remarkable for its picturesque scenery, and may develop into a frequented health resort.

GLENGARRIFF (latitude $51^{\circ} 45'$ north), on Bantry Bay, a large inlet of the **southwestern coast**, is sheltered by mountains on the north and east and even on the west. It ranks with Queenstown as a winter resort, but is slightly warmer. The mean temperature for winter is 45° F.; for spring, 50.1° F. The mean annual temperature is nearly 52° F., higher than that of Torquay, Falmouth, and Penzance, though just lower than that of the Scilly Islands (52.4° F.). Dr. J. A. Lindsay, speaking of Glengarriff, says: "The arbutus blooms in the neighborhood, and the flora witnesses

¹ See "Journal of Balneology and Climatology," January, 1897; and "Irish Health Resorts and Watering-places," second edition, 1895.

to a degree of mildness unknown in other parts of the United Kingdom. The scenery is the most lovely in Ireland, and Bantry Bay, with its numberless inlets, merits higher praise than has ever been accorded to it."

PARKNASILLA, in Kerry, is a new resort in a sheltered position on the northern shore of Kenmare Bay. The mean annual temperature is 52° F. Flinn draws attention to the special attraction of its combined mountain, woodland, and water scenery. Other beautiful spots on the coast of Kerry are WATERVILLE, DINGLE, TRALEE SPA, BALLYBUNNION, at the mouth of the Shannon, and the island of VALENCIA, where there is a terminal station of the Atlantic cable. At Valencia the mean temperature for the year is 51° F.; for January, 44.4° F.; for July, 58.8° F. The mean annual rainfall is 55.8 inches. The mean annual amount of bright sunshine is 1488 hours—34 per cent. of the possible.

KILLARNEY, in Kerry, although some distance inland, may for convenience be mentioned here. The district in which it lies, like the lake district of Cumberland, is much frequented by tourists, on account of the famous and beautiful scenery of its lakes and mountains. The climate is moist, equable, and mild. The mean temperature for the year is 50° F.; for January, 43.1° F.; for July, 58.7° F.

KILKEE is a popular summer resort on the west coast of County Clare. It is built in a semicircle facing a bay of the Atlantic. KILRUSH lies on the estuary of the Shannon, on the southern side of the peninsula terminating in Loop Head, by which it is separated from Kilkee. High winds and waves prevail at both these places. MILTOWN-MALBAY, north of Kilkee, is a good locality for sea-bathing and for fishing. LAHINCH, a little further north, was more frequented before Miltown-Malbay and Kilkee came into favor.

On the shores of Clew Bay are WESTPORT, NEWPORT, and MALLARANY, all summer resorts where bathing and fishing may be had. Not far from the last named is ACHILL.

In the northwest region, BUNDORAN, in Donegal Bay, not far from Lough Erne and from the Donegal Highlands, is the best known resort.

In the north of Ireland, BUNCRANA, on Lough Swilly, is a

pleasant summer resort with good accommodation. PORTRUSH, near the Giant's Causeway, is a very popular summer resort, and has a bracing, breezy climate, with less rainfall than most of the resorts in the western part of Ireland. PORT STEWART, three miles distant, has a similar climate. Hotel accommodation may be had at a bracing altitude, close to the Giant's Causeway, which is 400 feet above sea-level.

In the east of Ireland is BANGOR, in the County Down, a quiet health resort on the southern shore of Belfast Lough. HOLYWOOD, situated between Bangor and Belfast, is practically a suburb of the latter town, being only five miles off. DONAGHADEE lies on the coast of County Down, just south of Belfast Lough, one hour by railway from Belfast. NEWCASTLE, in Dundrum Bay, is noted for its fine scenery and the many excursions that may be made in its neighborhood. DUNDRUM itself is visited less frequently than Newcastle.

ROSTREVOR and WARRENPOINT, in the County Down, are situated in picturesque country on Carlingford Lough. Rostrevor is on the northern shore, facing south, and being sheltered on the north and east by the beautifully wooded Mourne Mountains, has some claim to be regarded as a resort for winter and spring, as well as for summer and autumn. On the declivity of the Mourne Mountains, at an elevation of about 350 feet above sea-level, and one and one-half miles from the Lough, is a small, recently established sanatorium for the treatment of pulmonary tuberculosis.

MALAHIDE and HOWTH, in County Dublin, are seaside summer resorts to the north of Dublin Bay. KINGSTOWN, on the south shore of Dublin Bay, may be regarded as a seaside residential suburb of the Capital, from which it is but a few miles distant. Its harbor is the chief yachting station in Ireland, and there is good bathing. The accommodation is satisfactory, and the attractions of a great city are within easy reach. The mean annual temperature is about 50° F. The rainfall here, and in the whole region around Dublin, is the lowest in Ireland. As at other places on the east coast, easterly winds prevail in spring.

BRAY, the 'Irish Brighton,' thirteen and one-half miles from Dublin, is a very popular summer resort, situated on the boundary

between the Counties of Dublin and Wicklow, not far from the beautiful scenery of the Wicklow Hills. Close by is Bray Head, a wooded promontory reaching a height of about 650 feet above the sea, and near which there is hotel accommodation. A little further south is the quiet seaside resort of GREYSTONES. At NEWCASTLE, not far from the coast, a few miles to the south of Greystones, is the Irish National Hospital for Consumption, with arrangements for the **open-air treatment**.

Some **inland localities** not many miles from the coast may, for convenience, be mentioned here. The village of ENNISKERRY, in Wicklow, three and one-half miles from Bray, is sheltered on all sides by wooded hills, and has a mild, equable climate. It is close to Powerscourt and the beautiful glen of the river Dargle. DUNDRUM, nearer Dublin, has a sheltered position and a mild climate, and is suitable for residence in spring. WOODENBRIDGE, in the south of Wicklow, about two hours distant from Dublin, is near Avoca and some of the finest scenery of Wicklow, and, owing to its sheltered position, is likewise recommended for residence in spring.

On the coast of County Wexford, between Wexford and the **southeastern** extremity of Ireland, is ROSSLARE, having but limited accommodation for visitors.

On the **south coast**, DUNMORE and TRAMORE, sea-bathing resorts not far from Waterford, remain to be mentioned.

CHAPTER IX

THE BRITISH ISLANDS (Continued)

Inland Resorts of Great Britain. Inland Resorts of Ireland.

INLAND RESORTS OF GREAT BRITAIN

Among the inland health resorts of Great Britain must be included :

1. The 'spas'—that is, the **mineral water health resorts** : Bath, Buxton, Harrogate, Llandrindod, Strathpeffer, Woodhall, Droitwich, and others, one of which—namely, Bath—has an important winter season.

2. A number of localities, including the ordinary inland summer holiday resorts, that offer visitors pure, fresh **country air** and more or less satisfactory accommodation. They are scattered over different parts of the country at various elevations above sea-level, and differ much in regard to their degrees of shelter from winds. The more bracing resorts are comparatively but poorly sheltered, and it is difficult to obtain suitable accommodation in Great Britain at altitudes over 1000 feet above sea-level. Many of the higher resorts, such as Braemar, Buxton, Hindhead, and others, owing to their more northerly latitude and to the absence of loftier heights in the neighborhood, exercise almost as invigorating an effect on visitors as localities in the Swiss Alps at three times their elevation above sea-level, although the influence of the rarefied atmosphere of places of really high altitude is, of course, lacking in the English resorts, however bracing they may be in other respects. Moreover, the great amount of bright sunshine, one of the most important characteristics of really high altitude resorts, is not found in the elevated British resorts, which in this respect yield also, especially in late autumn and winter, to their relatively sunny neighbors on the coast. Braemar (1100 feet), in Scotland, has, for instance, only 112.5 hours of bright sunshine in the three winter months,—

about 12 per cent. of the possible,—while Aberdeen, on the coast to the east, has 165.9 hours—about 23.5 per cent. of the possible; Davos-Platz, which may be taken as a type of Swiss high altitude resorts, is said to have, during the same period, about 300 hours of sunshine—57 per cent. of the possible; and Denver and Colorado Springs, in the Rocky Mountains of America, considerably more.

Among places possessing mineral waters,¹ some, such as Buxton, Tunbridge Wells, and Malvern,² must be regarded not only as spas,—that is, as places frequented for the sake of their mineral waters,—but also, and in the last two instances chiefly, as climatic health resorts. Several climatic resorts possess, likewise, facilities for hydrotherapeutic treatment, and some of them, such as Ilkley, Ben Rhydding, Matlock, and Malvern, originally owed their reputation, principally or in great part, to hydrotherapy. Under the popular term 'hydropathics' are included many hotels and boarding-houses where hydrotherapy is not specially, if at all, practised at present.

Health resorts proper, where there are special facilities for invalids, such as Malvern and Buxton, must be distinguished from mere summer holiday resorts, where rest, relaxation, and open-air life are the only therapeutic factors. Great Britain is rich in the latter class of summer and autumn country resorts with abundant facilities for open-air exercises and pastimes, including walking, riding, driving, cycling, swimming, rowing, sailing, fishing, lawn-tennis, golf, and the like. Not only are there many country villages and small towns that belong to this class of resorts, but there are also a number of more or less isolated hotels and 'hydropathics' in various parts of the country that may be included under this heading. As instances may be mentioned the hotels on Hindhead, near Haslemere, and the Lake Vyrnwy and Elan Valley Hotels in Wales.

Those for whom especial quietude and seclusion are required should avoid the most frequented tourist resorts, and if constant medical supervision and attention are unnecessary, may sometimes be advised to secure lodgings or hire a cottage or farm-house out

¹ Under the term 'mineral waters' are, of course, included 'simple thermal' waters.

² Supplied with brine from Droitwich.

of the beaten track in preference to visiting any of the well-known health resorts.

At nearly all the inland resorts of Great Britain summer and autumn are the best seasons; very few of them are entirely sheltered from the east winds of spring. The recently established sanatoriums for the treatment of **pulmonary tuberculosis** are, of course, open all the year round.

In considering the inland health resorts of Great Britain the **spas** will first be described, and later the simple climatic and summer resorts.

BATH (100 feet), in Somersetshire, the 'Aquaë Solis,' or 'Aquaë Sulis,' of the Romans, has the only really hot springs in the British Islands, the waters of Buxton (82° F.) being tepid, and those of Matlock (68° F.), Bakewell (60° F.), the 'Hot-well' of Clifton and Bristol (73° F.), and Mallow, in Ireland (70° to 72° F.), being all subthermal. The Bath waters have a temperature of from 104° to 120° F., and although they contain as much as 1.3 parts of calcium sulphate (gypsum) in a thousand, are, like most other thermal earthy waters, chiefly used externally, and best classified in the simple thermal group. It is interesting to note that the springs of Bath and Buxton were the first in which argon was discovered. The Bath waters likewise contain helium. Bath is situated in a pleasant district on the Avon, eleven miles to the west of Bristol. Much of the city is built on sloping ground, so that the houses are at various elevations above sea-level. The surrounding 'downs' attain a height of from 550 to 800 feet above sea-level; Lansdown, to the north, reaches 800 feet. The mean temperature¹ of the air at Bath for summer is 60.3° F.; for autumn, 50.7° F.; for winter, 41.4° F.; for spring, 48.4° F.; for the year, 50.5° F. The mean annual rainfall averages 32 inches. Bath was a very fashionable resort in the eighteenth century, but afterward was for a time neglected. It is now much frequented, and its winter season is especially deserving of attention. A sojourn at Bath is indicated in all cases in which benefit may be derived from simple thermal waters in general, or

¹ See "Climates and Baths of Great Britain," 1895, vol. 1, p. 517.

from the special methods that have been introduced at Bath in imitation of those practised at certain Continental resorts, such, for example, as the douche massage of Aix-les-Bains and the effervescent baths and exercises of Nauheim. There are also to be obtained local and general hot-air and vapor baths, including the so-called 'radiant heat baths,' with electric lights, and the like. Patients with stiff joints are lowered into their baths by means of a crane-chair.

BUXTON (1000 feet), in a valley of the Derbyshire Peak District, is one of the most bracing health resorts of Great Britain, and visitors other than invalids are attracted by the pure air and by the interesting excursions to be made in the neighborhood. Its simple thermal water (82° F.), containing only about 0.4 per mille of solids, has, like many waters of this class in various parts of the world, a large proportion of nitrogen gas in solution; argon forms about 2 per cent. of the total amount of gases. The baths are given at the natural tepid temperature of the water, and last for from four to seven minutes; or, for persons with enfeebled powers of resistance, they may be heated artificially. The Devonshire Hospital enables many patients of the poorer classes from various parts of England to obtain the advantages of the Buxton thermal treatment and the Buxton climate. The season lasts from April to September, but the health resort is kept open all the year round. The mean maximum and mean minimum temperatures for July are given as 65.1° F. and 48.4° F. respectively. The mean annual temperature is 45.2° F. The mean annual rainfall averages about 46 inches.

The Peak District abounds in places that are visited for their pure air, good fishing, beautiful scenery, and interesting excursions. Most of these may be classed as simple summer holiday resorts. MATLOCK BATH (300 feet), BAKEWELL (400 feet), and STONEY MIDDLETON have subthermal waters of quite secondary interest. MATLOCK is divided into different portions,—Matlock Bath, Matlock Bridge, Matlock Village, and Matlock Bank,—situated in the beautiful Derwent valley and on its slopes. Smedley made Matlock famous for its hydrotherapeutic treatment, and it contains a number of 'hydropathics,' some of which are considerably higher and occupy more open and more bracing positions than Matlock

Bath. BASLOW, near Chatsworth Park, likewise possesses a 'hydro-pathic.'

DROITWICH, celebrated for its brine baths, lies amidst pleasant country in Worcestershire, although the old town itself is not beautiful. The waters of Droitwich, in England, Rheinfelden, in Switzerland, and certain other places in various parts of the world are practically saturated brines having a specific gravity of about 1.200, and containing about 31 per cent. of sodium chlorid—that is, about ten times as much as ocean water. These waters may be compared to those of various inland seas and lakes that, owing to constant evaporation and the absence of any outlet, gradually become more and more concentrated solutions of salts.¹ The Droitwich brine baths, diluted and heated as required, are used in cases of **chronic muscular rheumatism, sciatica, neuralgias**, etc. The brine is also supplied to Malvern, a health resort that will be referred to further on.

NANTWICH (about 120 feet), in a pleasant, well-wooded district in Cheshire, possesses strong brines containing about 21 per cent. of sodium chlorid, somewhat less concentrated than the brines of Droitwich. There are, likewise, brine baths at MIDDLEWICH, in Cheshire, and at STAFFORD. At Northwich, the center of a rich salt district in Cheshire, the pumping-out of enormous quantities of brine for commercial purposes has, as at Droitwich, led to subsidence of the ground at certain spots.

WOODHALL SPA, in Lincolnshire, and ASHBY-DE-LA-ZOUCH, in Leicestershire, have brines containing only about 2 per cent. of sodium chlorid—much weaker than those of Droitwich and Nantwich. The Woodhall waters contain, in addition to sodium chlorid, small quantities of calcium chlorid and magnesium chlorid, and of bromids and iodids. Woodhall Spa has good bathing facilities and is visited for the treatment of **rheumatoid arthritis, muscular rheumatism, scrofulous complaints, leukorrhœa**, etc. A mother lye (German, Mutterlauge) is made from the Woodhall brine, and,

¹ Thus, the water of the Utah Salt Lake contains about 22 per cent. of salts; that of the Dead Sea, about 24 per cent.; and that of the Tuz-Gul Lake, in the center of Asia Minor, about 32 per cent. Some lakes of this kind have finally dried up altogether, leaving a solid deposit of salts to mark their former position.

like that of Kreuznach, may be used for local compresses or for strengthening the baths. Woodhall Spa is only about forty feet above the sea, and lies amidst an almost level kind of moorland bordering the fens, about twenty-three miles due west of the little seaside resort of Skegness. The climate is under the influence of sea-breezes, and, like that of the east coast generally, is bracing. The Scotch firs and woodland in the neighborhood contribute to the healthfulness of the locality. Although it would be considered by many a dull place for a sojourn, others are likely to be well suited there. The accommodation is satisfactory, and there are excellent facilities for golf, cycling, lawn-tennis, and the like, for those who are able to indulge in these amusements.

HARROGATE, in the west riding of Yorkshire, eighteen miles by railway to the north of Leeds, is perhaps at present the most flourishing English mineral water health resort. Its position among the Yorkshire moors, about half-way between the Irish Sea and the North Sea, at an altitude of from 260 to 600 feet above sea-level, gives to its climate a bracing quality. This is most manifest perhaps in the upper town (high Harrogate), whose hotels and houses border a large tract of common ground called the 'Stray.' The lower town (low Harrogate) is naturally more sheltered and less invigorating. Of the large number of mineral springs, the best known belong to the cold muriated sulphurous group, containing sodium chlorid, hydrogen sulphid, and sodium sulphid. The spring generally preferred for internal use is the Old Sulphur Spring, which contains 12.7 per mille of sodium chlorid, 0.09 per mille of barium chlorid, 0.07 per mille of sodium sulphid, and 37 volumes per mille of hydrogen sulphid. The bathing arrangements are modern. Harrogate is well adapted for those who require a bracing climate, and especially patients for whom this class of mineral waters is suited, or who are likely to derive benefit from the various kinds of balneotherapeutic treatment it offers, including the Aix douche massage and hot-air and vapor baths. Some of the Harrogate springs contain iron, but they are not gaseous chalybeate like the best known chalybeate springs of the Continent of Europe. The season lasts from May to September, but the place is open at other times of the year.

LLANDRINDOD WELLS, in Radnorshire, the most flourishing inland health resort of **Wales**, lies in the center of an elevated plateau, and toward the east is protected, to some extent, by Radnor Forest. Of the central Wales group of spas, comprising Llanwrtyd, Llangammarch, and Builth besides Llandrindod, the upper portion of the latter, owing to its open situation and rather bare surrounding country, can doubtless claim the most invigorating climate, that of Llangammarch coming next. The altitude of the upper portion of Llandrindod, with the Pump House Hotel, is 700 feet; the Rock House Hotel has a lower and a less bracing situation, but would be of service to delicate persons requiring shelter from winds, especially during the earlier and later periods of the year. The Llandrindod waters are employed chiefly internally, and may be divided into three groups:

1. Muriated waters, containing from 3.4 to 4.8 per mille of sodium chlorid, from 1 to 1.4 per mille of calcium chlorid, and from 0.04 to 0.7 per mille of magnesium chlorid.

2. Muriated sulphurous waters, analogous to those of Harrogate, containing, in addition to a little sodium chlorid, from 1 to 14 volumes per mille of sulphureted hydrogen. There is likewise a fairly pure sulphurous spring, similar to that at the neighboring spa of Llanwrtyd.

3. Weak, nongaseous chalybeate waters, of quite secondary importance.

All the springs of this spa are cold.

Llandrindod is largely resorted to by persons suffering from the effects of sedentary habits, mental fatigue, and a too copious or stimulating diet, including a number of **gouty**, **rheumatic**, and **digestive disorders**. The season lasts from May to October.

LLANWRTYD WELLS, in Brecknockshire, has a higher elevation (800 feet) than Llandrindod, to which it ranks second in importance among Welsh spas. It is, however, more sheltered and has a less exhilarating climate than its more frequented neighbor. The chief Llanwrtyd spring is a fairly pure representative of the sulphurous group, and is said to contain 36 volumes per mille of hydrogen sulphid. It possesses also a weak, nongaseous chalybeate spring, and the muriated waters of Builth can likewise be

obtained at Llanwrtyd. The chief accommodation is at the Dolecoed Hotel, situated in a pleasant park close to the springs, and on the most sheltered (western) side of the town.

BUILTH (400 feet), a market-town to the south of Llandrindod, is pleasantly situated on the Wye, in a broad sheltered valley, and has a less stimulating climate than its neighbors, Llandrindod, Llanwrtyd, and Llangammarch. In its various 'wells,' not far distant, it possesses waters similar to those of Llandrindod, but the muriated waters of Builth are rather more highly mineralized.

LLANGAMMARCH WELLS, about 600 feet above sea-level, is situated at the southern foot of a range of hills, in a wide valley, and lies between Builth and Llanwrtyd. It is sheltered to some extent on the north and east, and has a bracing climate. It has a weak muriated water with a total mineralization of 4.3 per mille, including small quantities of sodium chlorid, calcium chlorid, magnesium chlorid, and barium chlorid (0.096 per mille). The Llangammarch water has been termed 'barium water,' owing to the importance attached by some to the presence of the barium salt. For internal use it may be taken still or artificially charged with carbonic acid gas.

STRATHPEPPER (200 feet), the chief mineral water resort of **Scotland**, has a sheltered position in a valley of Rosshire, and, considering its latitude ($57^{\circ} 36'$ north), possesses a mild climate. Its chief springs are cold sulphurous, the Morrison Well being said to contain about 0.027 per mille of potassium and sodium sulphids, and about 40 volumes per mille of hydrogen sulphid. The Lady Cromartie Well is said to be still more sulphurous. There are likewise nongaseous chalybeate waters. Strathpepper is indicated for those who require cold sulphurous waters and a fairly mild climate. The place is sometimes resorted to by visitors from tropical countries when more bracing localities are unsuitable. The higher parts of Strathpepper have, of course, a climate somewhat different from the parts lower down in the valley.

MOFFAT (about 370 feet), in Dumfriesshire, in a sheltered position of the upper part of the Vale of Annan, has a tonic climate. The cold sulphur well, about one and a half miles distant, contains about 5.3 volumes per mille of hydrogen sulphid gas. The water

of the 'Hartfell Spa,' about four miles from the town, belongs to the iron sulphate group. There are many pleasant excursions to be made in the neighborhood.

Among other places in Great Britain having sulphurous waters may be mentioned: ASKERN SPA, in Yorkshire, not far from Doncaster; DINSDALE-ON-TEES, in Durham, not far from Darlington; and GILSLAND SPA, a quiet resort in Cumberland, beautifully situated on the river Irthing, about twenty miles from Carlisle. Gilsland likewise possesses chalybeate waters.

TUNBRIDGE WELLS (about 420 feet), in Kent, was formerly visited chiefly for its chalybeate water, which contains about 0.06 per mille of iron carbonate, but as it is very poor in carbonic acid gas, it cannot be ranked with the chalybeate waters of Spa, in Belgium, Schwalbach, in Germany, etc. The place is now a climatic resort much visited by convalescents and others during the summer months. The soil is porous, and the climate invigorating and fairly dry. There are facilities for hydrotherapy. The mineral water spring and the old-fashioned arcade of shops, termed the 'Pantiles,' are situated in a hollow, but most of the hotels are built on high ground in much more bracing positions, many of them bordering the open common. SOUTHBOROUGH and FRANT, not far from Tunbridge Wells, are quieter summer resorts. CROWBOROUGH, likewise in this neighborhood, is mentioned further on.

There are a good many other nongaseous chalybeate springs in Great Britain. Some of them, such as those at Harrogate, Llandrindod, and Shanklin, have been referred to. TREFRIW, situated in the beautiful Vale of Conway, in North Wales, has iron sulphate waters. The iron sulphate waters of FLITWICK WELL, near Ampt-hill, in Bedfordshire, are sold in bottles.

LEAMINGTON (about 200 feet) is situated close to Warwick, in one of the most historically interesting districts of England. The country around is somewhat level, and the climate is moderately bracing. The mean annual rainfall is about 30 inches. The waters contain small quantities of sodium chlorid, with sodium, magnesium, and calcium sulphates, and generally exercise an aperient influence. The town is healthful, and is often selected for permanent residence by retired professional men. The facility with which visits may be

made to Warwick, Kenilworth Castle, Stratford-on-Avon, etc., is one of the attractions of a stay at Leamington, which is open all the year and is likewise a hunting center.

CHELTENHAM (about 150 feet) is a flat town in the Severn valley, sheltered from east winds by the Cotswold Hills. It possesses waters somewhat similar to those of Leamington, and also nongaseous chalybeate waters, but in recent years has been scarcely used as a spa. It is a healthful town, with a sheltered, though not relaxing, climate, and is frequently chosen as a place of permanent residence by old Indians and retired professional men. The educational facilities are good. The mean temperature for the year¹ is 47.1° F.; for July, 61.3° F.; for January, 36.3° F. The mean annual rainfall is about 30 inches, and there are 189 rainy days.

Most of the inland health resorts of Great Britain that remain to be mentioned do not possess mineral waters. In considering them the resorts in the **southwest of England** will first be taken up, thence working toward the north.

The heights of DARTMOOR and EXMOOR, consisting of undulating moorlands, have cold and bracing climates, and are much exposed to winds. The mean elevation of Dartmoor is about 1500 feet. On Exmoor but limited accommodation can be obtained, but on and around Dartmoor there is hotel accommodation at PRINCETOWN (1400 feet), noted for its large convict prison, and at the lower elevations of MORETON HAMPSTEAD, LIDFORD, CHAGFORD, OKEHAMPTON, etc. According to meteorologic observations at Princetown on Dartmoor,² the mean temperature for the year is 45.6° F.; for July, 58.6° F.; for January, 36.5° F.; and lower still for February and March. The mean annual rainfall is about 72 inches, and there are about 209 rainy days.

On the MENDIP HILLS, NORDRACH-UPON-MENDIP (860 feet), and, more recently, HILL GROVE OVER WELLS (850 feet), private **sanatoriums** for the treatment of **pulmonary tuberculosis**, have been established. Near CHEDDAR, on the southern declivity of the

¹ "Climates and Baths of Great Britain," 1895, vol. 1, p. 590.

² "Climates and Baths of Great Britain," 1895, vol. 1, p. 77.

Mendips, is **St. Michael's Home**, a sanatorium for **consumptive** poor from London and other cities. Further to the west, near Bridgwater, on the **QUANTOCK HILLS**, between Exmoor and the Mendips, is the **Little Timbercombe Sanatorium** (about 750 feet).

CLIFTON, although a suburb of the large city of Bristol, must, with the **CLIFTON AND DURDHAM DOWNS** (from 230 to 310 feet), be considered an important climatic health resort, especially for spring and autumn. The country is beautiful and healthful, and the climate is moderately bracing. The 'Hot-well' spring (73° F.) was formerly in great repute.

MALVERN, in Worcestershire, is one of the most important inland climatic resorts of Great Britain. **GREAT MALVERN** (520 feet) lies on the eastern declivity of the Malvern Hills, below the Worcester Beacon (1440 feet), their highest point; Malvern Wells and **LITTLE MALVERN** are two and three miles respectively to the south of Great Malvern; while **WEST MALVERN** is situated at a rather higher level on the opposite (western) declivity of the range. **ST. ANNE'S WELL** and the other Malvern wells yield a very pure water, formerly believed to possess special medicinal virtues. Malvern has many 'hydropathics,' and is one of the chief English resorts for a course in hydrotherapy. Droitwich brine baths can likewise be obtained. Great Malvern and its vicinity are much frequented by invalids who require a somewhat bracing dry inland climate. The place is open during the summer, and also during spring and autumn and even in winter. There are excellent educational facilities at Malvern.

Among the hills near **MARLBOROUGH** and **NEWBURY** are some healthful sites that might be suitable for sanatoriums.

The **NEW FOREST**, in Hampshire, is still a beautiful and well-wooded country, but is relaxing to some persons. It is often suitable for a sojourn between May and October, although the hotel accommodation, except at **LYNDHURST**, is not superior. Near **RINGWOOD**, in a sheltered portion of the western part of the New Forest, about ten miles to the north of Bournemouth, is the **Linford Sanatorium** for the treatment of **pulmonary tuberculosis**.

In the **COTSWOLD HILLS**, near Cheltenham, a more bracing region, at an elevation of about 800 feet above sea-level, stands one

of the newly established **sanatoriums** for the treatment of **pulmonary tuberculosis**. Its grounds are well wooded with fir and beech.

Of the places to the south of the Thames and on its banks, which are next to be described, will first be mentioned some of the more low-lying localities, suitable, for various reasons, as **summer resorts**.

Many of the towns and villages on and near the banks of the Thames, between London and Oxford, are frequented during the summer months on account of their beautiful river scenery and for the facilities that abound for leading a pleasant, open-air life, with boating and the like. Among them, proceeding along the river in a downward direction, mention need be made only of HENLEY, famous for its annual regatta, GREAT MARLOW, COOKHAM, TAPLOW, MAIDENHEAD, WINDSOR, DATCHET, EGHAM, STAINES, WEYBRIDGE, THAMES-DITTON and SURBITON, KINGSTON-ON-THAMES, TEDDINGTON, TWICKENHAM, and RICHMOND. Windsor and Richmond combine the attractions of the river for boating with their magnificent parks for walking and riding exercise. Similarly, Datchet, Egham, and Staines are all near Windsor Park and Virginia Water as well as near the river; and Weybridge, with OATLANDS PARK, is close to the beautiful wooded walks of St. George's Hill.¹ The localities mentioned in the foregoing list, after Thames-Ditton and Surbiton, are now practically residential suburbs of London, and the homes of very many whose occupation obliges them to come to town frequently.

To the south of the Thames, in the counties of Kent and Surrey, may be mentioned a number of towns and villages situated chiefly at the foot or on the slopes of hills connected with the NORTH DOWNS; these are: CHISLEHURST, SEVENOAKS, EPSOM, REDHILL, REIGATE, DORKING and BURFORD BRIDGE, GUILDFORD, GODALMING, FARNHAM, and HASLEMERE. These places, many of which are like-

¹ St. George's Hill comprises an extensive area, rising to 520 feet above sea-level, and thickly wooded with pines and other trees. It is private property, but the walks are open to the public. If certain sites could be obtained, it would constitute an almost ideal place for the establishment of sanatoriums for consumptives near London.

wise the homes of persons whose occupations frequently take them to London, possess different degrees of shelter from winds, and lie mainly in valleys or on low ground, although relatively elevated and bracing sites may be found among them. Such are the upper portion of Chislehurst, occupying an open position nearly 340 feet above sea-level, and Sevenoaks and Haslemere, both having an altitude of about 500 feet. They are all suitable for summer resorts, on account of the beautiful and health-giving country amidst which they are situated, and the number and variety of the walks on level or on hilly ground that may be made in the neighborhood.

At nearly all the places mentioned in the preceding paragraphs there is good or tolerable hotel accommodation to be had, and at most of them, as well as in the open country around them, there are private houses, cottages, or lodgings that may be hired for a season. In the more elevated and bracing situations, however, there are as yet but few good hotels. HINDHEAD, near Haslemere, and whose highest point is just over 900 feet, is a noteworthy exception in this respect, for on its broad back, where there are already numerous private residences, hotel accommodation has been provided in an open and very invigorating situation, about 820 feet above sea-level.

In the elevated and stimulating regions of the SOUTH DOWNS there is as yet but little public accommodation for visitors, but between the North Downs and the South Downs, in the vicinity of TUNBRIDGE WELLS and ASHDOWN FOREST, and likewise at CROWBOROUGH COMMON, seven miles from Tunbridge Wells, and nearly 800 feet above sea-level, there are hotels at lofty, bracing situations, as already mentioned under Tunbridge Wells.

Although difficulty may be experienced in securing suitable accommodation, there is certainly no lack of healthful, bracing sites in the counties south of the Thames, among the North Downs and scattered hills, easily reached from London. Among these may be mentioned the following: HOLLINGBOURN HILL (600 feet); the hills near SEVENOAKS, REIGATE, and DORKING, including the neighborhoods of BOX HILL (590 feet), LEITH HILL (965 feet), and HOLMBURY HILL (800 feet), with COLDHARBOUR (about 750 feet) and other places in the Leith Hill district; the EPSOM and BAN-

STEAD DOWNS; the CHOBHAM RIDGES; the HOG'S BACK (350 to 500 feet); HINDHEAD, with good accommodation, already referred to, and BLACKDOWN HILL (about 900 feet), both near Haslemere. On the CROOKSBURY RIDGES, to the south of the Hog's Back, near Farnham, a region abundant in pine trees, the **Crooksbury Sanatorium** (400 feet) for the treatment of **pulmonary tuberculosis** has recently been established; situated in the same neighborhood is the **Whitmead Hill Sanatorium**.

Among suitable localities not yet mentioned in the counties south of the Thames, and where the accommodation varies,—provided in some cases by hotels, in others by houses or cottages that may be hired,—are: ASCOT,¹ in Berkshire, and BAGSHOT, FRIMLEY, and FARNBOROUGH, in the adjoining portion of Surrey; the neighborhood of MERROW, near Guildford; HOLMWOOD, near Dorking; BANSTEAD, near Epsom; OXTED, LIMPSFIELD, and WESTERHAM, between Redhill and Sevenoaks; EAST GRINSTEAD, THREE BRIDGES, CUCKFIELD, HAYWARD'S HEATH, and MAYFIELD, in Sussex; LIPHOOK, SELBORNE, and LISS, in Hampshire.

In Essex, to the northeast of London, are CHINGFORD and other places in the beautiful and healthful neighborhood of EPPING FOREST; this district is generally regarded as a popular holiday pleasure-ground for Londoners rather than as a climatic resort for the summer months.

To the northwest of London, RICKMANSWORTH, CHENIES, and HARROW lie in pleasant country, and are suitable for a sojourn in summer. WATFORD, in Hertfordshire, is a pleasant residence for persons whose business is in London. Close by is BUSHEY, with facilities for pursuing hydrotherapy, as well as golf and lawn-tennis; and between Bushey and Stanmore is BENTLEY PRIORY.

On the western declivity of the southern part of the CHILTERN HILLS there is a small **sanatorium**, at an altitude of 380 feet, for the open-air treatment of **pulmonary tuberculosis**. It is situated near the village of Hailey, not far from Goring-on-Thames and Wallingford, and its grounds have an elevation of from 300 to 400 feet above sea-level.

¹ In a pine wood near Ascot a new **sanatorium** for the treatment of **pulmonary tuberculosis** is in course of erection.

At DELAMERE FOREST, to the east of Chester, a sanatorium for the open-air treatment is to be erected, in connection with the **Liverpool Hospital for Consumption**.

Near NAYLAND, in Suffolk, in a good situation, is the new **East Anglian Sanatorium** for consumptives.

ILKLEY WELLS, in Yorkshire, thirteen miles from Leeds, came into favor as a health resort as a result of the introduction of hydrotherapy by Dr. Macleod at the establishment of BEN RHYDDING, 500 feet above sea-level, about one mile distant. The numerous 'hydropathics' at Ilkley were established later. Situated in the beautiful valley of the Wharfe, these resorts, with their bracing climate and opportunities for pleasant walks and numerous interesting excursions, have become very popular.

The LAKE DISTRICT in the northwest of England, occupying portions of the counties of Cumberland, Westmoreland, and Lancaster, may be compared to the Lake District of Killarney in Ireland. Both are mountainous regions, situated near the western coast, and therefore possess unusually rainy climates, and in both fatigued and overworked persons may spend a delightful holiday, combining the pursuit of health with that of pleasure. Although situated amidst mountains, the resorts in these districts are not possessed of great elevation and are somewhat sedative; but they offer great attractions in the way of beautiful scenery, interesting walks, climbing, boating, fishing, and the like. Among the resorts of the English Lake District may be mentioned KESWICK, GRASMERE, AMBLESIDE, BOWNESS, WINDERMERE, CONISTON, ULLESWATER, and, in the peninsula of Furness, FURNESS ABBEY and the 'hydropathic' of CONISHEAD PRIORY.

WALES

There are a good many inland resorts in Wales suitable for spring, summer, and autumn. Llandrindod, Llangammarch, and Llanwrtyd in central Wales have already been mentioned among the spas. Of the remaining resorts,—those that afford opportunity for exercise in pleasant country, with good air and mental recreation,—the following are among the more bracing: LLANBERIS, PENY-GWRYD, CAPEL-CURIG, and BEDDGELERT, in the Snowdon district;

the LAKE VYRNWY HOTEL (about 1000 feet), on the banks of the large reservoir that supplies Liverpool with water; and the ELAN VALLEY HOTEL, near the reservoir that supplies Birmingham with water. Less bracing resorts are: LLANRWST, TREFRIW, already mentioned, and BETTWS-Y-COED, in the beautiful Vale of Conway; FESTINIOG, between Bettws-y-Coed and Cardigan Bay; LLANGOLLEN, on the Dee, a popular fishing resort and center for excursions; and DOLGELLY, at the north of Cader Idris.

SCOTLAND

Of the more southern localities in Scotland, PEBBLES and INNERLEITHEN, in the county of Peebles, on the Tweed, are pleasantly situated about six miles from each other. The former has a well-known 'hydropathic,' and the latter has weak muriated waters.

Further north, between the Firth of Clyde on the west and the Firths of Forth and Tay on the east, are Inversnaid, The Trossachs, Callender, Bridge of Allan, Bridge of Earn, and Crieff. INVERNSNAID is one of the most beautiful spots on Loch Lomond, the largest lake in Scotland. THE TROSSACHS is the name given to the wooded country to the east of Loch Katrine, which is quite as beautiful as Loch Lomond; it furnishes satisfactory hotel accommodation. CALLENDER ranks rather as a great tourists' center than as a summer resort. BRIDGE OF ALLAN, thirteen miles to the southeast of Callender, is a low-lying place—about 40 feet above sea-level—on the Allan, at the southwestern foot of the Ochil Hills; it is three miles to the north of Stirling, with which it is connected by railway and tram. Its weak muriated waters, containing sodium and calcium chlorids, are said to have an aperient action. It has a relatively mild climate, and has been compared to Cheltenham, in England. At both of these places the mineral waters are used much less frequently than in former years. Bridge of Allan and DUNBLANE, two miles distant, have facilities for hydrotherapy. On the southern declivity of the OCHIL HILLS, amidst well-wooded surroundings, about 800 feet above sea-level, and four miles from Kinross, a private sanatorium for the treatment of **pulmonary tuberculosis** is being erected. BRIDGE OF EARN (about 30 feet), situated on the Earn, in a picturesque country four miles

from Perth, has the muriated 'Pitkeathly' waters. CRIEFF lies on the declivity of the Grampians, between the Highlands and Lowlands, amidst well-wooded surroundings, about ten miles to the west of Perth. It has a well-known 'hydropathic.'

Most of the resorts in the '**Highlands**' lie at a considerable relative elevation above sea-level, near 'Scotch moors,' and have a decidedly invigorating climate. PITLOCHRIE, in Perthshire, one of the most highly esteemed summer resorts of Scotland, is situated on the Tummel, at an altitude of more than 300 feet above sea-level. On a slope above the village is a 'hydropathic,' in a more open and bracing situation. In the valley on the other side of the pass of Killiecrankie is BLAIR-ATHOLL, furnishing satisfactory accommodation. TUMMEL BRIDGE, between Loch Tummel and Loch Rannoch, fourteen miles from Pitlochrie, also offers good accommodation. Near KIRKMICHAEL (700 feet), in a moorland district about twelve miles from Pitlochrie, is one of the modern **sanatoriums** for the treatment of **pulmonary tuberculosis**. BRAEMAR, or more correctly CASTLETON OF BRAEMAR, in Aberdeenshire, lies on the Dee, at an elevation of 1100 feet above sea-level, in a broad valley surrounded by mountains. It is one of the most bracing inland summer resorts of Great Britain. The mean temperature for the year is 43.2° F.; for January, 34° F.; for July, 54.9° F. The mean annual rainfall is 35.96 inches. The meteorologic records show only 1187 hours of bright sunshine on the average in the year. BALLATER, to the east of Braemar, seventeen and one-half miles lower down the Dee, is a summer resort at a lower elevation—750 feet. Balmoral Castle lies between Ballater and Braemar. Nordrach-on-Dee, a **sanatorium** for the open-air treatment of **tuberculosis**, is situated amidst pines, on the gravel soil of the Middle DEESIDE, near the railway station of Banchory. On the Deeside, nearer to Aberdeen, is the 'Deeside Hydropathic,' already mentioned. KINGUSSIE, in INVERNESS, and GRANTOWN-ON-SPEY, in Elgin, in the region of the Spey Valley, and CARRBRIDGE, in Inverness, in a side valley of the Spey, are all popular summer resorts. Here may also be mentioned FORRES, further north, close to the coast of Elgin, famous, from an antiquarian point of view,

for the 'Sweno's stone.' Like Nairn, on the coast of the Moray Firth, Forres has a relatively low average rainfall—about 24 inches in the year. At CLUNY HILL, a mile off, stands the 'Cluny Hill Hydropathic,' in grounds of its own.

INLAND RESORTS OF IRELAND

LISDOONVARNA, in County Clare, not far from the coast, stands among heathy hills at an elevation of about 430 feet above sea-level. Its climate is bracing, being influenced by breezes from the Atlantic; the place is best known for its cold sulphur and weak chalybeate waters. The season lasts from June to October. It is probably the most popular spa in Ireland.

LUCAN (about 100 feet), in County Kildare, is pleasantly situated in the valley of the river Liffey, eight miles to the west of Dublin, and possesses cold hydrogen sulphid waters and satisfactory accommodation. LEIXLIP SPA, two miles west of Lucan, has a weakly mineralized spring (64° F.), at one time very popular with the people of Dublin.

MALLOW, in County Cork, is situated in a beautiful valley on the Blackwater, and has a mild climate. Its simple subthermal waters (70° to 72° F.) were formerly in great repute.

CASTLECONNELL, in County Limerick, lies on the banks of the Shannon, near some rapids. The mineral waters, probably weak chalybeate, were once in great favor. BALLYNAHINCH, in County Down, seventeen miles from Belfast, possesses sulphur waters that have a certain local reputation. The cold sulphur springs of SWANLINBAR, in County Cavan, were formerly popular.

In surveying the coast resorts, reference has been made to several places not far from the coast, including DUNDRUM, near Dublin, ENNISKERRY and WOODENBRIDGE, in County Wicklow, BLARNEY, near Cork, and the Lake District of Killarney.

CHAPTER X

TOWNS OF EUROPE

General Consideration of the Larger Towns of Europe. The British Islands. The Scandinavian Capitals. Russia. Holland and Belgium. The German and Austro-Hungarian Empires. Switzerland. France. The Iberian Peninsula. Italy. Athens. Constantinople. General Consideration of the Smaller Towns of Europe.

GENERAL CONSIDERATION OF THE LARGER TOWNS OF EUROPE

There are a great number of persons suffering from the effects of mental overwork, worry, social fatigue, or a too sedentary mode of life who require nothing more than a holiday, with change of surroundings, mental recreation, and more exercise in the open air. These cases will be referred to in greater detail in Part III of this work. For many such holiday seekers part of the time may be spent with advantage in some large town, where objects of historic interest, picture galleries, and social distractions, according to individual tastes, exercise a more or less beneficial effect on the mind, and thus indirectly on the body; provided that sight-seeing is not carried to the point of fatigue, and that care is taken to avoid the chilling that may be caused by entering cold churches and museums after becoming heated from walking in the sun. Much time should be spent in the open air, and during warm weather the visits to museums and picture galleries should be interspersed with judiciously arranged excursions into the surrounding country. The selection of the towns to be visited must depend on the season of the year, individual tastes and interests, and like considerations. The more northern towns are to be preferred during the warmer months, especially during spring and autumn, and the more southern and warmer towns are more suitable during the colder months of the year. Foreign countries are often to be preferred over the patient's

own land, as affording greater change. When a pleasure journey is to be combined with a visit to some special health resort, proximity to the resort in question will often determine the choice of the large towns to be visited.

Many **aged persons** and others of **weak constitution** are benefited if part of the colder months can be spent in a warmer and brighter climate, where there is enough diversion for the mind, and where more time can be spent in the open air than is possible in colder climates. Thus the large towns in the south of Europe, such as Rome, Naples, Athens, and Constantinople, may often be visited during the winter.

It will be seen, from what has been said here, that some of the large towns of Europe and of the United States¹ deserve mention in the present work, although, of course, any discussion as to their relative historic, artistic, or social attractions is impossible and unnecessary.

THE BRITISH ISLANDS

LONDON, the largest city in the world (the latitude of St. Paul's Cathedral is 51° 30' north), shows excellent health statistics that give it a special claim to be noticed in this connection. In spite of its well-known black fogs and the fact that many of its poorer districts are greatly overcrowded,² it has the lowest death-rate of all the great capitals of the world. Naturally, various quarters differ somewhat from one another in their sanitary conditions, those of the less crowded and wealthier districts, where visitors mostly reside, being the best. London has been much beautified, and many of its thoroughfares have been broadened and improved by the alterations that have been in progress continuously for many years. During

¹ The large towns of the United States will be considered in Book II, in connection with American health resorts.

² The connection between the prevalence of pulmonary tuberculosis, on the one hand, and overcrowding and insufficient food, on the other, is well illustrated in regard to the various districts of London by Sir Hugh Beevor's oration on the "Declension of Phthisis" (Hunterian Society, 1899); in regard to Paris, by Dr. E. P. Léon-Petit ("Le Phthisique et son Traitement Hygiénique," Paris, 1895); and in regard to Manchester, by Dr. A. Ransome ("Researches on Tuberculosis," 1898, p. 11). See also Sir H. Weber in "Tuberculosis," London, vol. 1, p. 52.

this period the hotel accommodation also has been greatly enlarged and bettered. The public parks in the midst of London rival those of all other cities. The borders of some of the parks are fairly sheltered from certain winds by lofty buildings adjoining them. This circumstance may be taken advantage of in selecting suitable promenades for invalids and delicate children. Thus, when the east wind blows, the 'Queen's Walk' may be chosen, which leads along the east of Green Park, from Piccadilly to the 'Mall.' When the wind comes from the north or northwest, shelter may be obtained in : (1) The 'Mall' ; (2) the path in Green Park, running parallel to Piccadilly, between Walsingham House and Hyde Park corner ; and (3) to some extent also the walk along the northern edge of Hyde Park and Kensington Gardens, from the Marble Arch toward Bayswater. Similarly, if protection were needed against southerly winds, the 'Birdcage Walk,' to the south of St. James' Park, might be selected.

The Meteorological Office gives for London the following figures based on from fifteen to thirty years' observations made at Brixton, its official London station : The mean temperature¹ for the year is 49.9° F.; for January, 38.3° F.; for July, 63° F. The mean rainfall is 24.84 inches in the year, with 169 rainy days. There are 1240 hours of bright sunshine in the year (28 per cent. of the possible amount).

The districts of Kilburn and St. John's Wood have a reputation for dampness, owing to their clayey soil. Kensington, Brompton, Chelsea, Ealing, Battersea, Fulham, and Croydon have milder and more sedative climates than the districts to the north of Hyde Park and between Oxford Street and Regents Park, and than the Belsize and Finchley districts, Highbury, and parts of the north-east of London. Most of London proper is from 20 to 100 feet above sea-level. Among the more elevated suburbs having a fresher climate than central London may be mentioned : HAMPSTEAD HEATH (about 430 feet), HIGHGATE (about 410 feet), and MUSWELL HILL, SHOOTERS HILL (about 400 feet), PUTNEY HILL, and WIMBLEDON COMMON (about 180 feet), UPPER SYDENHAM and UPPER NORWOOD,

¹ The mean temperatures are taken from the simple arithmetical means of the maximum and minimum temperatures recorded each day.

and the neighborhood of the CRYSTAL PALACE (about 370 feet), and, somewhat further off, the upper parts of CHISLEHURST (reaching 330 feet) on the southeast and of HARROW-ON-THE-HILL (reaching 340 feet) on the northwest; also SOUTHGATE, BARNET, TOTTERIDGE, FINCHLEY, and HENDON on the north. The numerous railroads radiating from London put Londoners within easy reach of a number of seaside health resorts, and within fifty miles there are many healthful inland places that have previously been referred to.

EDINBURGH (latitude $55^{\circ} 57'$ north) has historic attractions almost equal to those of London, while its smaller size and great picturesqueness render it more pleasing to some persons. The town is built on several hills, and the altitude of different portions varies considerably. The castle is 430 feet above sea-level, and Arthur's Seat, a hill adjoining the town, reaches 820 feet. The mean annual temperature is 46° F. The annual rainfall is greater, and the annual amount of bright sunshine ($1175\frac{1}{2}$ hours) is slightly lower, than at London. The climate is bracing, and is influenced by its proximity to the sea. PORTOBELLO, with good sea-bathing, is practically a seaside suburb of the capital.

GLASGOW stands nearly in the same latitude as Edinburgh, though on the opposite side of the strip of country between the Firth of Forth and Firth of Clyde. Viewed as a health resort, its most important characteristic is the great facility for beautiful and interesting excursions into the surrounding country, including those to the seaside resorts on the Firth of Clyde. The mean temperature for the year is 46.8° F.; for January, 38° F.; for July, 57.7° F. The mean annual rainfall is 39.61 inches. There are 1096 hours of bright sunshine in the year—that is, about 25 per cent. of the possible amount.

DUBLIN, the capital of Ireland, owing to its position on the coast, has a more equable climate than London, although the mean annual temperature is only very slightly lower. It is in latitude $53^{\circ} 22'$ north. The mean annual temperature is 49.5° F. The mean temperature for January is 41.2° F.; for July, 60° F. The amount of bright sunshine in the year (1514 hours) reaches 34 per cent. of the possible, and is considerably greater than that at London, Edinburgh, or Glasgow. The neighborhood of Dub-

lin is the driest part of Ireland.¹ Its annual rainfall averages 27.5 inches, while that of Cork is about 40 inches, that of Valencia 55.8 inches, some parts of the southwest reaching from 70 to 80 inches. There are several sea-bathing resorts close to the city.

THE SCANDINAVIAN CAPITALS

The Scandinavian capitals, COPENHAGEN, STOCKHOLM, and CHRISTIANIA, are considerably colder than London. Copenhagen, slightly more than two degrees of latitude north of Dublin, has a lower mean annual temperature (45.4° F.), with much greater difference between the mean monthly temperatures, so that the mean temperature for July at Copenhagen (62.1° F.) is greater by about two degrees of Fahrenheit than that at Dublin (60° F.). Christiania (latitude $59^{\circ} 54'$ north), the most northern of the three capitals, and Stockholm have lower mean annual temperatures (about 41.5° F.) and colder winters than Copenhagen, but the July climates of all three places are warm, and their mean temperatures for this month (61.4° to 62.8° F.) hardly differ more than a degree from each other. Their annual rainfalls range from 16.4 inches for Stockholm to 22.7 inches for Christiania.

RUSSIA

ST. PETERSBURG and MOSCOW, as the chief cities of the vast Russian empire, have much more than their works of art to attract visitors. St. Petersburg is situated at the mouth of the Neva, at the head of the gulf of Finland, at almost the same latitude (59° to $58'$ north) as Christiania. Its climate is very variable. The winters are exceedingly cold and the summers warm, and although the mean annual temperature is only about 38.6° F., the mean July temperature is as high as 64° F. The daily variations of temperature are sometimes very great—so much as 35° F. St. Petersburg has an unusually high death-rate. Moscow lies far inland, on several hills, with elevations of from 500 to 850 feet above sea-level. It is at almost the same latitude— $55^{\circ} 45'$ north—as Edinburgh and Glas-

¹ See Dr. D. E. Flinn's "Irish Health Resorts and Watering-places," second edition, 1895.

gow. Its climate is cold, dry, and healthful, and very 'continental' in type, with a range of nearly 53° F. between the mean monthly temperatures for January (14° F.) and July (66.5° F.). The mean annual temperature is 40.1° F. The mean annual rainfall is about 21 inches, falling chiefly in the summer months.

WARSAW, the principal town of Poland, ranks third in population among the cities of Russia. It lies on the Vistula, in latitude $52^{\circ} 13'$ north, at an elevation of 390 feet above sea-level, and is surrounded by the plain of this part of Europe. The mean temperature for the year is about 45.3° F.; for January, about 26° F.; for July, about 66.7° F. The mean annual rainfall is $22\frac{1}{2}$ inches. It possesses fine parks and gardens and handsome thoroughfares, but, considering its large size, offers little in the way of galleries, museums, and grand buildings to attract visitors.

BELGIUM AND HOLLAND

BRUSSELS, ANTWERP, and AMSTERDAM are most suitable for visitors in spring and autumn, when the weather is not too hot. THE HAGUE, the seat of the court of the Netherlands, may, owing to its beautiful parks and its close connection with the seaside summer resort of Scheveningen, almost itself be regarded as a health resort.

THE GERMAN AND AUSTRO-HUNGARIAN EMPIRES

The climates of the following group of the great cities of the German and Austro-Hungarian Empires, including, from north to south, Hamburg (latitude $53^{\circ} 33'$ north), Berlin, Hanover, Leipzig, Breslau, Dresden, Frankfort on the Main, Prague, Darmstadt, Nürnberg, Stuttgart, Strassburg, Vienna, Munich, Buda-Pest (latitude $47^{\circ} 29'$ north), will be briefly considered. All have continental climates, with hot summers, cold winters, and a good deal of wind, the disagreeable easterly and northeasterly winds making themselves felt chiefly in spring. The mean annual temperatures vary from 45° to 50° F.; the mean temperatures for January, from 27.3° to about 34° F.; the mean temperatures for July, from about 62.8° to about 71° F. MUNICH, the most elevated of these places (1735 feet), has the lowest mean annual temperature (45° F.) and the lowest mean

January temperature (27.3° F.). HAMBURG, in the northwest, and nearest the sea, has the least difference between the mean monthly temperatures (January, 33.1° ; July, 63.4° F.); and BUDA-PEST, the most southerly and easterly, has the highest mean annual temperature,— 50° F.,—with the highest July temperature and the greatest range between the mean monthly temperatures (January, 28.6° ; July, 70.6° F.). The mean annual rainfalls probably vary between 18 and 30 inches. None of these towns is well sheltered from winds. STUTTGART, which lies in a pleasant valley, the slopes of which are covered with woods and vines, is probably the best protected. Nearly all have important historic and literary associations, and possess great attractions in the way of picture galleries, museums, interesting buildings, opera-houses, universities, libraries, and the like, and some of them, such as Stuttgart, Dresden, and Vienna, are well known for the beauty of the hilly country in their neighborhood.

SWITZERLAND

In Switzerland some of the larger towns, such as GENEVA, BASEL, LUCERN, ZÜRICH, and BERN, have already been alluded to. As places of residence for families, Swiss cities mostly afford the advantage of excellent facilities for the education of children.

FRANCE

PARIS (latitude $48^{\circ} 50'$ north), with its museums, galleries, parks, fashionable shops, and life of gaiety, has irresistible attractions for many persons as a resort affording change of surroundings and mental recreation. Some spend a portion of almost every holiday at Paris, their main object being either to restore their health or merely to enjoy themselves. The mean annual temperature (51.4° F.) is the same as that of New York, and very slightly higher than that of London, but the range of the monthly means (about 30° F.) is greater than that of London (about 24° F.) and less than that of New York (about 43° F.). The mean temperature for January is 36° F.; for July, 66° F.; for April, 50° F.; for October, 52° F. The mean annual rainfall is about 19.7 inches, with 140 rainy days. Paris is, on the whole, a healthful city.

though the mortality in the poorer quarters from phthisis, etc., is rather high. Many of the suburbs are very pleasant and contain many pretty villas. Among places somewhat further from Paris are ST. GERMAIN-EN-LAYE (thirteen miles), with its famous castle and Gallo-Roman museum, and FONTAINEBLEAU (37 miles), formerly the favorite residence of the French kings. These have the advantage of the pure air and shady walks of their magnificent forests, and may sometimes be recommended for a stay during late spring, summer, and autumn. The spring at these places is felt earlier than in London.

LYONS (latitude $45^{\circ} 45'$ north), the second city of France, in spite of the fact that it is a manufacturing center, has a very handsome and imposing aspect, and can claim the advantage of being within easy reach of many beautiful spots in the French Alps and the French Jura. It lies 218 miles by railway to the southeast of Paris, and at a somewhat higher elevation above sea-level—about 640 feet to the 100 feet of the Seine region at Paris. The mean annual temperature is about 53° F., and the range between the mean monthly temperatures is about 35° F.

THE IBERIAN PENINSULA

LISBON, OPORTO, CADIZ, and BARCELONA, in the Iberian Peninsula, have already been mentioned.

MADRID, the capital of Spain, is situated in latitude $40^{\circ} 24'$ north, and at an elevation of 2140 feet above sea-level, on a small plateau in the middle of a dry, sandy, treeless plain, almost in the center of Spain. It has a dry, 'inland,' extremely variable climate, exceedingly hot in summer and very cold in winter. The mean annual temperature is about 56° F. The absolute annual range of temperature is about 95° F., and a sudden variation of from 40° to 50° F. may occur at any time of the year. The annual rainfall is about $15\frac{1}{2}$ inches in about 94 days, chiefly in autumn and spring. The sky is clear during two-thirds of the year. Spring and autumn are the most suitable seasons for a visit to Madrid.

SEVILLE (latitude $37^{\circ} 24'$ north), the capital of the province of Seville, is situated on the bank of the river Guadalquivir, in the middle of a large, fertile plain, slightly above sea-level. Its warm

and sunny winter climate, its picturesqueness, and its art treasures make it a suitable winter resort for many persons of weak constitution. In summer the heat is quite severe. The mean annual temperature is 68° F.; the mean January temperature, about 52.2° F. The mean annual rainfall, about 29 inches, in 34 days.

GRANADA, in spite of its great historic and archæologic interest and the picturesqueness of the scenery, is, owing to deficiency of hygienic arrangements, not to be selected for a prolonged stay except, perhaps, at one of the hotels close to the Alhambra.

ITALY

Of all the capitals of the world, ROME, the capital of Italy, is probably the one most frequently used as a winter climatic resort, and is quite unrivaled for its artistic and antiquarian attractions. It lies in latitude $41^{\circ} 53'$ north, on both sides of the Tiber, in the undulating plain of the Campagna, at an elevation of from 50 to 170 feet above sea-level. It is about fifteen miles from both the Mediterranean coast on the west and the nearest elevations of the Apennines on the east. The mean annual temperature is 60° F. The mean temperature for winter is 45.3° F.; for spring, 57.2° F.; for summer, 73.9° F.; for autumn, 61.3° F. The mean annual rainfall is 30.6 inches, occurring chiefly from October to January. The number of rainy days in the year is about 96. The mean relative humidity for the year is 65 per cent.; for the three winter months, 72 per cent. The prevalent wind is the 'tramontana,' from the north, which is bracing, but sometimes very cold. The warm moist 'sirocco' (southeast wind) is rare, but is depressing when it does occur. Some parts of the Pincio are sheltered from the tramontana. For the last two or three years the water-supply has been nearly perfect everywhere, and the hygienic condition of Rome has improved greatly.¹

Dr. Karl Weber, who has for many years practised during winter at Rome, kindly tells us that in the city of Rome itself malaria is practically never contracted, during either winter or summer. On

¹ See Mendini's "Hygienic Guide to Rome," translated by J. J. Eyre, London, 1897.

all sides, however, immediately outside of Rome there is malaria. He has recently treated a family attacked with malaria outside the Porta Pia, where new buildings are being erected. More dangerous parts are the 'Tre Fontane,' about three miles from the Porta San Paolo, and the Valle dell'Inferno, to the north of the Vatican portion of the city. Still more so are OSTIA, fifteen miles, and FIUMICINO, twenty miles, distant.

The best localities for winter residence, says Dr. Weber, are the less densely populated parts within the walls in the northern part of the city, where the houses are less crowded together and cleaner, and where the following hotels are situated: The Grand, Royal, Bristol, Quirinal, and Eden. Situated somewhat lower than these, but still at a certain elevation above the river-level, are some good hotels, as the Hôtel Londres and the Hôtel Europa, in the Piazza di Spagna, and the Hôtel Russie, close to the Piazza del Popolo.

Spring—March, April, and the early part of May—is the pleasantest season of the year for a stay in Rome.

FLORENCE (FIRENZE) is situated in latitude $43^{\circ} 46'$ north, in the broad valley of the Arno, on both banks of the river, at an elevation of about 180 feet above sea-level. The mean temperature for the three winter months is 43° F.; for spring, 56.8° F.; for summer, 74.8° F.; for autumn, 59.4° F. The mean annual relative humidity is 74 per cent. The annual rainfall is about 36 inches. The number of rainy days in the year is about 114. In the city itself snow rarely falls. On the north, east, and south are lesser heights of the Apennines, but the protection from winds is very incomplete, particularly toward the north, from which bitter cold winds blow in winter and early spring. In the middle of summer the heat may be oppressive. The pleasantest times of the year are April and May and from September to November. Fiesole and the beautiful neighboring scenery increase the attractions that art treasures and historic associations have given to Florence. There are many permanent English residents at Florence, probably more than at any other town in Italy.

VENICE and NAPLES have already been described among seaside resorts.

MILAN is situated in latitude $45^{\circ} 26'$ north, in the middle of the fertile plain of Lombardy, at an elevation of about 480 feet above sea-level. In summer it is quite hot, and in winter often too cold for delicate persons. There is no good shelter from winds in any direction. The mean temperature for the year is 55.4° F.; for the three winter months, 35.7° F.; for the three summer months, 73.4° F.; for July, 77° F. The mean annual rainfall is about $39\frac{1}{2}$ inches. There are a good many permanent German-speaking residents, and the hygienic arrangements are good.

GENOA (latitude $44^{\circ} 24'$ north), in the center of the gulf of Genoa, the chief commercial seaport of Italy, may be regarded as separating the Western from the Eastern Riviera. The city has a semicircular arrangement on the ridges of hills above the harbor. It is much exposed to cold winds and sudden changes of weather, and is a rainy place, although it is warmer during winter than Milan. The mean temperature for the year is about 60° F.; for January, 46° F.; for July, 75.4° F. The mean annual rainfall is about 51 inches. Most streets of the older portions of the city are narrow, unhygienic, steep, and dark, the walls of the houses or palaces on either side being often so high and close together that scarcely a glimpse of the sky can be obtained from the pavement. Nevertheless, the picturesqueness of the site, the grand palaces of the old patrician families, and the great historic interest of the place justify the application of its title, 'La Superba.' The better, newer quarters are not too cramped. According to Reimer, the end of spring and the beginning of summer are the best times for a visit. The health resorts of Nervi and Pegli are practically suburbs of Genoa, from which they can quickly be reached by steam tramway.

ATHENS

Athens (latitude $37^{\circ} 58'$ north) is situated on the north side of the gulf of Ægina, at an altitude of about 340 feet, four and a half miles by railway from its port, the Piræus. The Attic plain on which the town lies is partially sheltered by the Hymettus, Pentilikon, and other mountains, but is open toward the south. The mean temperature for the year is 63.1° F.; for winter, 49.1° F.; for Jan-

uary, 46.8° F.; for July, 80.6° F. The mean relative humidity for the year is 62 per cent.; for the winter, 63 per cent. The annual rainfall is about 15 inches, distributed over 73 rainy days, chiefly at the end of autumn and beginning of winter. The summers are almost rainless, and the heat and dust are very trying. The winter climate is dry and bracing, with cool mornings and evenings and hot midday sunshine, but the streets are dusty. Athens may be used as a winter resort in many **gouty** and **rheumatic** cases, but not in pulmonary complaints or in nervous excitable constitutions. The accommodation in the best hotels is good, and the sanitary arrangements are satisfactory.

The mean annual temperature of Athens is about the same as that of Palermo, but, as Reimer points out, the climate of the former is drier and less equable, with a colder winter and hotter summer, than that of the latter.

CONSTANTINOPLE

Constantinople (latitude 41° 2' north), the capital of Turkey, on the western side of the Bosphorus, has a beautiful situation on gradually rising ground around the harbor of the Golden Horn. The city proper is the portion between the Golden Horn and the sea of Marmora. Scutari, on the opposite (eastern or Asiatic) side of the Bosphorus, is not more than a mile distant. The mean annual temperature is 57.6° F. The mean temperature for February is 41.7° F.; for July, 73.9° F. The annual rainfall is 28.2 inches, distributed over 82 rainy days. The climate is very variable, especially during winter and spring. North winds prevail at all times of the year. When a south wind begins to blow, the thermometer may suddenly rise 18° F. The hygienic arrangements have been much improved.

GENERAL CONSIDERATION OF THE SMALLER TOWNS OF EUROPE

For many persons a judiciously planned and leisurely tour through a series of interesting smaller towns is equally entertaining and less fatiguing than a prolonged visit to some capital city, with its vast museums or picture galleries or its bustling social attractions.

The large European countries are very rich in medium-sized towns suitable for visits of this kind. At some of them magnificent cathedrals, ancient castles, remarkable municipal buildings, or quaint old houses constitute special attractions; as examples of these need be mentioned only, in **England**, Durham, York, Lincoln, Ely, Peterborough, Norwich, Chester, Shrewsbury, Worcester, Gloucester, Exeter, Salisbury, Winchester, Chichester, St. Albans, and Canterbury; in **Belgium**, Ghent, Bruges, Liège, and Louvain; in **France**, Rouen, Amiens, Reims, Angers, Nantes, Tours, Blois, Nancy, Avignon, and Arles—from the last two places the remarkable Roman and medieval remains of that part of France may conveniently be visited; in **Germany**, Cologne, Mainz, Treves, Worms, Speyer, Strassburg, Augsburg, Regensburg (Ratisbon), Nürnberg, Bamberg, Meissen, Münster in Westphalia, Brunswick, Hildesheim, with its medieval art treasures, Bremen, Lübeck, Danzig, and Königsberg. Ancient **university towns** have special charms of their own; as, Oxford and Cambridge in England; St. Andrews, likewise a bracing seaside resort, in Scotland; Leyden in Holland; Montpellier, formerly of world-wide repute as a climatic health resort, in France. Physicians who need a respite from practice but yet wish and feel able to do a moderate amount of work, as in reading, writing, or clinical or laboratory study, amid restful surroundings, may well visit one of the smaller university towns of Germany, the Austro-Hungarian Empire, or Switzerland; for example, Heidelberg, Göttingen, or Zürich.

A good many towns, although possessing ancient castles, magnificent churches, art galleries, or various objects of architectural, historic, or antiquarian interest, are equally or still better known for their picturesqueness and beautiful scenery and for the numerous excursions that can be made into the surrounding country. Among places of this class in **England** are Bristol, with the adjacent Clifton, and Warwick, with the adjoining health resort of Leamington. In **France** there are Dinan, in a pleasant district of Normandy; Tours and other places, with their romantic associations, amidst the beautiful scenery of the Loire; St. Germain-en-Laye and Fontainebleau, with their beautiful forests; Clermont-Ferrand, at the foot of the Auvergne Mountains; Besançon, in the outskirts of the

Jura; and Grenoble, with its charming subalpine surroundings. In **Germany** may be mentioned Heidelberg, Bonn, Aschaffenburg, Carlsruhe, Freiburg-im-Breisgau, Constance, Cassel, Eisenach, Gotha, and Weimar. In the **Austro-Hungarian Empire** Innsbruck, Salzburg, and Gratz, situated in the mountainous districts, included under the heading 'Eastern Alps,' deserve special notice as combining historic or artistic interest with great beauty of scenery, good hygienic arrangements, and excellent accommodation. Among places in healthful neighborhoods, with fine scenery, but attracting visitors chiefly on other accounts, must be placed **BAYREUTH**, with Wagner's opera-house, and **OBER-AMMERGAU**, with its passion plays, in **Bavaria**; and **LOURDES**, with its reputation for miraculous cures, in a beautiful Pyrenean valley in the southwest of **France**.

All these places offer visitors comfortable and generally fairly sanitary hotel accommodation. Some of them, such as Bonn, Cassel, and Freiburg-im-Breisgau, are occasionally chosen as places of permanent residence by English families on account of their healthy and pleasant situation, good sanitary arrangements, moderate cost of living, and the facilities they afford for the education of children. Some of them deserve to be classed as health resorts, and have already been mentioned as such in an earlier portion of the book.

A question that frequently arises in the case of men who are retiring from active work, such as officers in the army and the navy, government officials, professional men, and others, especially in regard to men returning to England from the colonies, is what place is most suited to them for permanent residence. The choice is often limited for financial reasons, and at times the special opportunities afforded by certain places for the education of children may determine it. In the neighborhood of London, among the localities previously mentioned, Dulwich, Sydenham Hill, Upper Norwood, the country near Croydon, Wimbledon Common, Chislehurst, Reigate, Redhill, Guildford, Sevenoaks, Ealing, Twickenham, Teddington, Surbiton, Richmond, Hampstead, Highgate, Watford, and Harrow are favorite localities. The relative advantages and disadvantages of these places have already been considered to some

extent. Many old Indians choose Canterbury, Cheltenham, Bath, or Leamington. On the Continent, the beautiful little towns and villages on the Rhine between Bonn and Bingen are frequently chosen by German families, and sometimes by the English. Such towns as Bonn, Cassel, Marburg, Heidelberg, Freiburg-im-Breisgau, Gratz, Geneva, Lausanne, and Zürich are often selected for the educational facilities they afford. Sometimes, especially in the case of delicate persons of wealth, international summer and winter resorts, such as Wiesbaden and Baden-Baden, are chosen for permanent residence, on account of their climates, the great beauty of their sites and surroundings, the social attractions, and the medical advice that is to be obtained there.

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