A practical dissertation on the waters of Leamington-Spa; including the history of the springs, a new analysis of their gaseous and solid contents, the rules for drinking the waters, bathing, diet of the patients, and other regimen / [Charles Loudon].

RADFORD LIBRARY,

Saint Mary's Hospital, Manchester.

No. ~~53 4 32~~

*This Book to be returned in*_____ *days.*

*Fine for overtime*_____ *per day.*

Note.—No book can be renewed if wanted by another reader, nor unless brought to the Library for that purpose.

It is requested that the leaves of books may not be turned down,—that no person will write in them,—and that the greatest possible care may be taken of them.

EXTRACTS FROM THE RULES.

That each Medical Officer shall be allowed not more than two works out of the Library at one time, and not more than two volumes of each work.

That Registered Medical Students shall be allowed to take out books every Tuesday and Saturday, from eleven till one, or at such hours as may be ordered from time to time by the Board.

That each Registered Medical Student shall be allowed to have not more than one book out of the Library at the same time, unless the work consist of two or more volumes, and in no case more than two volumes.

A

PRACTICAL DISSERTATION,

&c.

A

PRACTICAL DISSERTATION

ON THE

WATERS

OF

LEAMINGTON-SPA;

INCLUDING THE

HISTORY OF THE SPRINGS,

A NEW ANALYSIS OF

THEIR GASEOUS AND SOLID CONTENTS,

THE RULES FOR DRINKING THE WATERS,

BATHING,

DIET OF THE PATIENTS, AND OTHER REGIMEN.

By CHARLES LOUDON, M. D. Physician

at Leamington.

Leamington-Spa:

PRINTED BY SHARP & FAIRFAX,

FOR JOHN MERRIDEW, AND SOLD BY HIM AT LEAMINGTON AND WARWICK;
ALSO BY EBERS AT THE ROYAL ASSEMBLY ROOMS AND COUNTY
LIBRARY, BATH STREET, LEAMINGTON; MORRIS'S, HIGH
STREET, LEAMINGTON; AND BY LONGMAN,
ORME, REES, AND BROWNE, LONDON.

1828.

TO

JAMES KENNEDY, ESQ. M. D.

Physician at Ashby-de-la-Zouch, Leicestershire.

MY DEAR SIR,

In offering these pages to the Public, I trust that the *necessity* of a Book of the present nature will be considered as a sufficient excuse for committing them to the Press. The celebrity which Leamington has now obtained as a watering-place, renders it indispensible that the Profession should have some Monograph to refer to, in order to be able to judge of the nature of the Mineral Springs, and of the various ways in which they are used. To supply that desideratum, is the object of this Dissertation.

For the purpose of making the Treatise as complete as the short time I have had to compile it would allow, I have consulted the Works of the different Physicians and Historians who have written on the Leamington Springs, from the earliest times to the commencement of the Town as a place of fashionable resort. These I have collated with the more modern historical and medicinal Treatises on the Waters; and have, as far as was in my power, compared what has been written with what exists at the present moment. On various occasions I have also availed myself of the observation and experience of several intelligent patients and residents. For the sake of the antiquary and succeeding historian, the literature, on each particular subject, has been appended to the Chapter to which it more immediately refers.

To the Works of Drs. Charles Scudamore, M'Kenzie, M'Cabe, Gibney, Falconer, Sir G. S. Gibbes, Saunders, and to several French, German, and Italian Treatises on Mineral Waters, of a similar nature to those of Leamington, I have to acknowledge numerous facts regarding the use of the Springs. In some places I have even employed the expressions of the authors themselves, which, from the nature of my text-book, I am unable to refer to particularly. I trust, however, that this notice will free me from the charge of plagiarism.

As to the Analysis, I have, in a particular way, to express

my warmest obligations to our very esteemed friend, the Regius Professor of Chemistry in our Alma Mater. This I have alluded to in a subsequent part of the Work, as well as to the assistance afforded by a very intelligent practical Chemist who resides in Leamington.

In the composition of the article—Diet, I have chiefly referred to the able Works of Dr. Paris and Dr. James Johnson; although, from the nature of the cases of the greater number of the sick who resort to Leamington, the general plan, with regard to food, differs materially from that recommended by these Physicians.

Throughout the whole of the Chapters my principal aim has been to condense the various facts which I have collected,—to render the Work as practical as possible. As a whole, I trust it will be found to afford a complete Manual of what is necessary to be known concerning the Mineral Waters of Leamington.

Allow me, in conclusion, my Dear Sir, to express how fully I am sensible of the numerous personal favours which you have conferred on me during the long period of our friendship. I trust, however, that the feeling of gratitude which induces this public avowal of them, will not be measured by the small tribute

of this Dedication, or the merits of the public offering through which they are acknowledged.—With my sincerest wishes for your happiness and prosperity,

Believe me

Your sincere Friend,

CHARLES LOUDON.

Bedford-House, Leamington-Spa,
September, 1828.

CONTENTS.

CHAPTER VIII.

CHAPTER IX.

CHAPTER X.

CHAPTER XI.

ERRATUM—Page 8, line 18, for "*there were*" read "*their use.*"

CHAPTER I.

Geology of Leamington—situation of the town—salubrity of its climate—advantages as a watering place—advantages as a town—surrounding interesting objects.

LEAMINGTON-SPA, geologically speaking, is situated on the eastern side of the plain of Warwick, and is surrounded by a country which is flat, fertile, and covered in many places with wood. The soil on the north bank of the Leam—a torpid stream which divides the new from the old town—consists chiefly of red marl, while that on the south is composed of loam; under which are obliquely placed the successive layers of strong gravel, coarse sand, red brownish marl, bluish clay, rag rock, blue clay, and sandstone. It is in the body of the stratum, above the bluish clay, that the fresh water is usually found; and, from under the sandstone, at various depths, according to the particular well and its nearness to the Leam, that the mineral waters are procured. This stratification,

however, varies in different places, as may be seen on the eastern side, where the lias and oolite range exists; on the northern side, where an immense stratum of firm sandstone, in some places forty feet in thickness, has been found a few inches below the surface of the earth; and immediately under the old town, as was ascertained in digging the different wells. The strata, in this last spot, are, in fact, so different in their nature and positions, as to be analogous neither to one another, nor to the layers, found in the adjoining fields.

Leamington is distant two miles from Warwick, three from Guy's Cliff, four from Kenilworth and Stoneleigh Abbey, ten from Stratford-on-Avon and Coventry, and about twenty-two from Birmingham. Relatively to the other watering places, it is thirty-eight miles from Malvern, forty-four from Cheltenham, eighty-three from Matlock, eighty-eight from Bath and Bristol, ninety-seven from Buxton, and about one hundred and fifty-three from Harrowgate. It is three hundred and twenty miles from Edinburgh, two hundred and forty from Dublin, and ninety from London. There are about eleven hundred houses on both sides of the Leam; and a population, during the season, of five thousand five hundred souls.

Situated at a distance from the coast, and in the midst of a level country, the town is neither exposed to those sudden gusts of wind, which are so often attended with

danger to invalids, nor to the frequent rains, which a mountainous neighbourhood so constantly attracts. Besides, being nearly at an equal distance from the East and West Seas, as well as the Channel, the temperature is more mild and equal than at any other watering place in the country ; and the climate more genial than that of towns in the same latitude, lying nearer to the Atlantic and German Oceans. The rich and highly cultivated state of the soil, too, in the immediate neighbourhood, with the numerous scattered woods and rivulets, contributes, in no small degree, to its being one of the most salubrious spots in the kingdom. And this fact is corroborated by the numerous cases of longevity, which the records of the place so amply supply.

But what is of the greatest importance to Leamington, and has raised it from being an obscure hamlet to a town in less than thirty years, are the number, variety, and abundance of its mineral springs. Having eleven different streams, and uniting in a single spot the same waters as those of Harrowgate, Tunbridge, and Cheltenham, the sick are neither necessitated to wander about from place to place, seeking that which is most applicable to the complaint under which they labour, nor obliged to add foreign ingredients, to increase their powers ; for here the variety enables them to begin with the water most likely to remove their disease, to change one spring for another, of greater or less strength, or of a different nature, and

perhaps more applicable to their constitution and ailment; here, moreover, the constant and abundant supply, both for bathing and drinking, neither renders it necessary to adulterate the waters, a process which, both morally and medically, cannot be too severely reprobated, and which is so justly the cause of horror amongst the sick; nor to withhold the use of the springs from the poor.

Independently of these considerations, the town itself has much to recommend it as a watering place. Having been, with the exception of a very few houses, entirely built within the last twenty-five years, the streets are wide and airy, the hotels, lodgings, and baths, fitted up with a luxury, convenience, and comfort, not surpassed in any place in the kingdom; whilst the numerous well-stored shops and public markets, leave nothing wanting, which the necessities or desires of the visitors can require. Nor ought the relation of Leamington to the other large towns to be overlooked; communicating with Coventry in an hour, with Birmingham in less than three, and the Metropolis in ten, a constant correspondence is kept up with these different places, which enables the residents to avail themselves of those advantages which the celerity of the conveyances so conveniently affords.

The size of the place, also, and its scattered buildings, give it still the appearance and all the advantages of the air of a village. Provided with a Theatre; elegant Pump

Rooms; Gardens, abounding in exotic and indigenous plants; Galleries of Pictures; Promenades, tastefully variegated with flowers, and attended with superior bands of music; having numerous well-filled Public Libraries; Reading Rooms, supplied with the best journals in the kingdom, and Assembly Rooms; an excellent Hunt, within a few miles of the place, and Society of the first description. With Roads around the town, proverbial for their goodness, and a variety of enchanting walks, overlooking the most luxuriant rural scenery; and being in the immediate neighbourhood of those highly romantic spots — Warwick Castle, Guy's Cliff, the Ruins of Kenilworth, Stoneleigh Abbey, Blacklow Hill, Stratford-on-Avon, the birth-place of Shakespeare, Coombe Abbey, and other objects, both of historical and antiquarian interest— it has been justly said, that in few places throughout the country, have nature and art combined more together in forming a town, which, for the amusement, comfort, and health of the invalid, can vie with LEAMINGTON SPA*.

* Field's Warwick and Leamington, 1815.
Bisset's Guide to Leamington, 1815.
Moncrieff's Guide to Leamington, 1826.
Medley's Guide to Leamington, 1826.
Smith's Warwickshire Delineated, 1827.
Smith's Guide to Leamington, 1827.
Bisset's Origin, Progress, &c. of Leamington, 1828.

CHAPTER II.

History of the springs—antiquity of Lord Aylesford's well—Discovery of Smith's spring—Mr. Wise's well—Mr. Robbins'—Read's—Royal Baths and Pump Room—Mr. Smart's—Bisset's spring.

Of the eleven springs in use, only one appears to have been known previous to the year 1784, namely, that called the Earl of Aylesford's; which is at present enclosed in a neat oblong building, at the entrance to the Church from Bath Street. This well, however, has been used from time immemorial; and was described by Camden, Speed, Dugdale, and others of the earlier historians. Guidot, a physician of Bath, examined its waters scientifically as early as the year 1688; and several analyses of its contents were given in the following century by different physicians. This spring, which is still called by many the old well, from its antiquity, was simply an open stream until the year 1803, when it was enclosed

by its present structure, at the expence of the noble family to whom it belongs ; and as the waters had been much resorted to by the poor long before it was put into proper repair, the late EARL OF AYLESFORD, on whose manor it is situated, ordered one of the two pipes connected with the fount to be affixed on the outside of the building, allowing the water to be drawn from it gratuitously by the public. This boon continues still to be enjoyed by the inhabitants, and those visitors who may choose to avail themselves of it ; but many who wish the water from this source, prefer drinking it from the second pipe, which is affixed in a small pump room, fronting Bath Street, under the charge of a person appointed to take care of the building.

The second spring was discovered in 1784, and the well opened in the year 1786, by a Mr. Abbotts, at the suggestion and under the patronage of the late Dr. Kerr, of Northampton. It is situated on the south side of the Bath Hotel, in Bath Street, and from being the place where regular baths were first erected in Leamington is, from the present proprietor's name, called SMITH'S ORIGINAL BATHS. This spring was the only one which existed in the place for several years ; for in sinking it the water of the Old Well fell several feet below its former level, and, from neglect, was almost inaccessible for use until the beginning of the present century, when the Rev. Mr. WALHOUSE, one of the earliest patrons of Leamington, settled in the

place. It is, in fact, to the exertions of this gentleman that the community is indebted, for rescuing the OLD WELL from oblivion, and for the handsome building which at present surrounds it.

The success of Mr. Abbotts' well, and the gradual increase of the town, gave rise to another undertaking of a similar nature; accordingly, WISE'S WELL, at the corner of Bath Street and the Royal Parade, was sunk in 1790, and an analysis of its contents, as well as of the two preceding springs, made by Dr. Lambe, of London, at that time a resident physician in Warwick. This scientific examination of the waters, which was published in 1797, assisted much in making Leamington known to the medical profession and public in general. Still the reputation of the springs had extended little farther than the adjoining counties; and as the accommodations which the place afforded at that time, in a great measure confined there were even to a very few individuals, the preceding wells were found sufficient to supply all the demands for bathing and drinking.

The fourth well which was sunk in the place is that of Mr. ROBBINS, at the south-west corner of the bridge over the Leam. This did not occur, however, until fourteen years after the opening of the third well, or till about the year 1804. Various circumstances contributed to cause this well to be opened at that time. The analysis of Dr.

Lambe having been re-published in different scientific journals, necessarily afforded a criterion for physicians, who lived at a distance, to judge of the medicinal properties of the springs; and as several individuals connected with some of the most distinguished families in the country had, about the commencement of the present century, derived very decided benefit from the use of the waters, the fame of the place became gradually extended, and hence an increased afflux of visitors was more and more apparent every year. To meet the wants of the additional number of sick, who had been attracted chiefly by these two causes, Mr. Robbins' Spring was opened: and, in order to render his well in every way worthy of public patronage, a small pump-room and several excellent baths were built immediately afterwards, close to the spring. This naturally led to a corresponding change in the accommodations at Smith's and Wise's Wells. So that from drinking the waters as they arose from the surface of the earth, and from the rude contrivances that had been erected for bathing, when Leamington began first to rise into notice, the different proprietors, by attaching pump-rooms to the springs, and adding suitable dressing-rooms to the baths, provided every facility for using the waters, which the increased respectability of the visitors demanded. To meet the general wants of those who resorted to the town, the hotels were, at this period, also enlarged; and several houses erected, in every way fitted to receive families of the first rank.

The discovery of sulphurcous and saline waters in the same spot, which took place on digging Read's well, in the Royal Parade, in the year 1806, added much to the value of the town as a watering-place. Numerous cases of skin diseases being cured by the application of the sulphur water, necessarily induced a new class of patients to direct their attention to the well which contained the hepatic gas; and hence there was an additional number of invalids annually. The town now began to be a resort of the gay, as well as the sick, and the numerous attractive scenes in the neighbourhood contributed much to increase its fame in every part of the kingdom. Families of the first rank and fashion spent their summer months in Leamington; and the place, which, but a few years previously, consisted of a small number of insignificant thatched houses, assumed more and more the appearance of a modern town; and, by the rapidity of its advancement, appeared likely soon to rank amongst the most celebrated watering-places of the country; an anticipation which has since been completely realized.

Hitherto the mineral waters had been sought for only on the south side of the Leam, in the Old Town; but as some enterprising individuals in the year 1808 had founded the New Town, on the north side of the river, it was resolved to build a Pump Room, which would afford the united advantages of drinking the waters and of a fashionable

promenade. The plan was carried into execution in the year 1813, at an expence of nearly £25,000; and here, as in the former place, two different kinds of water were found to exist. To distinguish this proprietary from the others, the name of the Royal Baths and Pump Room was affixed to it; and in order that those who resorted to the waters might also avail themselves of walking in the open air when the weather permitted it, a piece of ground was tastefully laid out on the north-west side of the building, which at present, during the season, is much frequented in the mornings and evenings.

But the celebrity of Leamington was greatly increased by the discovery of a chalybeate spring, in the year 1819. This well is situated on the west side of Clemens-street, at a short distance from the corner of the Royal Parade, and is usually known by the name of the Imperial Fount, or Smart's Well. Besides the spring which contains the iron, in this establishment there are also a pure saline and a sulphureous spring, both of which arise from strata below the ferruginous source. Thus there are in Leamington eleven different wells of mineral water: one of which is impregnated with iron; three with hepatic gas, or, as it is more frequently called, sulphuretted hydrogen; and the remaining seven are nearly pure saline. Besides these, there exist in the fields around the town several other open mineral springs; none of which, however, have been

analysed. They are all similar in their properties to those already described, with the exception of Bissett's Well, at the north-east corner of the Leam bridge, which is of a sulphureo-chalybeate nature, without being, like the others, combined with any of the neutral salts. It has not hitherto been employed medicinally*.

* Camden's Britannia, 1586.
Speed's Theatre of Great Britain, 1596.
Dugdale's Antiquities of Warwickshire, 1655.
Guidot, Liber de Thermis Britannicis. Londini, 1691.
Fuller's Worthies of Great Britain.
Blome's Britannia, 1673, p 232.
Dugdale's Antiquities, by Thomas, 1730.

CHAPTER III.

Physical properties of the waters—probable causes of the saline impregnation — of the gaseous — no peculiar antiseptic properties—sulphureous impregnation—wells contain no manganese—modern chemical analyses.

The sensible properties of the waters are the following. When drawn from the pumps, they are sparkling and transparent, and make a slight buzzing noise from the escape of their gaseous contents. The odour of the purely saline water, when newly taken from the fount, is slightly pungent; that of the sulphureous, somewhat like rotten eggs; and the chalybeate, inky. Their taste is either simply saline, sulphureo-saline, or saline-chalybeate, according to the ingredients of the spring. In winter the temperature is generally 44° of Fahrenheit's scale, and in summer about 10 degrees higher: thereby showing that they are under atmospheric influence. Exposed to the air, they continue for a short time to give out bubbles

of gas, and soon become vapid. From their saline ingredients, however, they are less liable to freeze than simple water; and several of them, for the same reason, preserve their properties for years. All of them have a trace of iron in their composition, as well as of sulphur; the former being pointed out by the ochre deposited in the reservoirs underneath the pipes from whence they are drawn; the latter indicated, even in the purest saline, by the smell they emit before the fall of rain.

In what particular way the mineral waters of Leamington acquire their impregnations, is by no means known. Various borings in the fields around the town distinctly prove that the sources of the wells are confined to the strata underneath the houses, and at a very short distance around them—perhaps not more than a quarter of a mile. The difference between the temperature of summer and winter, may be owing to the water descending from the surface to the deeper parts of the earth before it reaches the spot where the saline impregnations are acquired; and this opinion seems strengthened by the well-known fact, that the level of the mineral springs is higher than the level of the water contained in the wells employed for domestic uses. It has also been thought probable, that there exist, underneath the town of Leamington, beds of salt, or brine pits, such as those at Northwich, in Cheshire, and Droitwich, in Worcestershire; and that in passing over these deposits, the fresh water, in descending from the

surface, acquires at least a part of its saline ingredients ; during which time it becomes cooled to the temperature which has been already noticed: but the existence of these saline beds, or brine pits, is, however, purely hypothetical.

That the mineral waters acquire their solid contents before they become charged with the gaseous, is inferred from the small quantity and few kinds of aerial substances which are usually found in common springs. To explain the mode in which the Leamington wells acquire their gaseous contents, it has been supposed that there exists also, near the salt beds, a layer, or number of layers, of vegetable matter, from whence the gases are extricated by the fluid which has been already considered, as charged with the saline particles, and that through these layers it passes ; here it extricates and carries along with it its gaseous contents ; and, advancing nearer the surface, again meets with a stratum of pyrites or sulphuret of iron, which is combined with the silica, and which, in digging Mr. Smart's well, has been found to exist under the town. On meeting with this substance, the hydrogen unites with the sulphur, and forms the hepatic gas, and the bi-silicate of iron is taken up in solution. These opinions, however, being unsusceptible of demonstration, must necessarily be considered as mere suppositions ; and indeed, are of little or no importance in a practical point of view.

The Springs of Leamington, notwithstanding the mu-

riate of soda, or common salt, which they contain, have no power of preventing the decomposition of animal substances, as was stated by Dugdale, and is still believed by many. Equally unfounded is the common opinion, which was once prevalent, that they acted specifically in curing canine madness. They contain no manganese, as was at one time believed; neither do they contain any uncombined sulphur. Whatever of the latter substance has been found in the waters, is conjoined with hydrogen gas, forming hepatic air.

Since the waters were examined at the close of the last century, various analyses have been made by different physicians; the results of which were published at different times. As none of them have included all the wells, and are, in various ways, very defective, it occurred that a new analysis, containing all the springs, and all the gaseous and solid contents, could not fail to be satisfactory to the profession and public at large. The following table presents a synoptical view of the aerial and saline substances found in an imperial pint of each of the wells. With regard to its accuracy, it requires only to be mentioned that, the solid contents have been analysed by Professor Thomas Thomson, whose chemical talents, it is presumed, are too well known to require any eulogy here. As to the gaseous substances, they have been ascertained with the greatest care, by the Author, in conjunction with Mr. Gossage, Chemist, of Leamington.

Of the open wells, in the surrounding fields, no notice is taken. From their exact similarity to those already in use, and the inexhaustible supply of the mineral fluid of the various springs to which the Pump Rooms and Baths are attached, it is not probable that any of the former will ever be employed medicinally. Bisset's well may at some distant period be enclosed, although, from the nature of the water, and various local reasons, which it is unnecessary to enter into in a work of the present nature, such an occurrence is not likely.*

* Short's Treatise on Mineral Waters, 1740.
Rutty's Methodical Synopsis; London, 1757.
Russell on Sea Water and Salt Springs, 1765.
Lambe, in Manchester Philosophical Memoirs, Vol. 5.
Middleton's Chemical Analysis: Warwick, 1814.
Winthrop, in Field's Warwick, 1815.
Scudamore's Medical and Chemical Report: London, 1820.
Weatherhead's Analysis: London, 1820.

CONTENTS OF AN IMPERIAL PINT OF EACH OF THE LEAMINGTON MINERAL WATERS.

SPRINGS.	GASES, IN CUBIC INCHES.				SALTS, IN GRAINS.						Total of the Salts in Grains
	Oxygen	Azote	Carbonic Acid	Sulphuretted Hydrogen	Sulphate of Soda	Chloride of Sodium	Chloride of Calcium	Chloride of Magnesium	Silica	Peroxide of Iron	
Lord Aylesford's	.075	.537	2.103	none	40.398	40.770	20.561	3.266	none	a trace	105.095
Mr. Smith's	.045	.658	2.503	none	40.234	47.865	19.772	2.121	none	a trace	109.992
Mr. Wise's	.088	.488	2.180	none	39.457	26.610	18.737	22.592	none	a trace	107.396
Mr. Robbins'	.075	.558	2.356	none	28.619	35.350	23.511	8.468	none	a trace	95.948
Mr. Reid's — Sulphureous .	.025	.425	3.156	1.144	28.065	25.605	15.777	9.695	none	a trace	79.142
Mr. Reid's — Saline	.025	.565	2.162	none	30.610	42.922	17.987	10.813	0.972	0.265	103.575
Imperial Fount — Chalybeate ..	.075	.645	3.294	none	34.294	55.271	25.059	3.927	8.580	8.580	135.711
Imperial Fount — Saline	.098	.763	3.156	none	34.435	14.534	17.570	26.050	none	a trace	92.589
Imperial Fount — Sulphureous .	.012	.612	3.531	1.142	31.112	7.301	39.305	19.494	3.620	0.530	101.362
Royal Pump Room — Sulphureous .	.064	.498	3.156	1·140	5.546	5.144	3.365	1.156	none	a trace	15.211
Royal Pump Room — Saline	.066	.588	2.950	none	32.744	67.782	20.902	12.363	1.045	0.956	135.792

CHAPTER IV.

Analysis—Manner in which the gaseous contents were ascertained—Lord Aylesford's well—Smith's spring—Smith's salts—Wise's well—Reid's saline and sulphureous waters—Pump-room saline and sulphureous springs—Smart's saline, sulphureous, and chalybeate wells.

ALTHOUGH the preceding table is sufficient to give a general idea of the composition of the springs, and of their medicinal properties; still, for the sake of the scientific reader, it is necessary to particularize the various processes whereby the proportions of each of the ingredients were ascertained. These details necessarily divide themselves into those which were employed for the gaseous, and those which were used to discover the solid contents.

To ascertain the carbonic acid gas, the mineral fluid was received into a vessel containing lime water, and the

precipitate collected, washed, and dried. The weight being ascertained, a known portion was introduced into a bent graduated tube, and decomposed by liquid muriatic acid. The volume of the carbonic acid thus liberated, indicated the quantity contained in the water.

The sulphureous water was received into a vessel containing a solution of the sulphate of copper. The sulphuret of copper produced, being collected, washed, dried, and its weight ascertained, it furnished, by referring to a table of chemical equivalents, the weight of sulphuretted hydrogen ; and from this was calculated its volume.

To find the oxygen, an imperial gallon, deprived of the two preceding gases by liquor potassæ and a solution of the sulphate of copper, was taken, and heat applied to the vessel, until air bubbles ceased to pass over. The gases were collected into a graduated tube, and sulphuret of potash introduced into the measure. The quantity of the aerial contents absorbed, indicated the oxygen. The remaining portion, from extinguishing a taper, proved to be azote.—As no other processes were employed, it will be needless to repeat the preceding under each well. The gaseous contents are all calculated according to the imperial gallon, and, from being of minor importance, are placed after the salts, under the respective springs.

I.

LORD AYLESFORD'S.

Sp. gravity ..... 1·00985

A cubic inch of the water weighs 254·945 grains.

An imperial gallon weighs 70689·7 grains.

1. Precipitated copiously by muriate of barytes;—indicating sulphuric acid.

2. Precipitated copiously by nitrate of silver;—indicating muriatic acid.

3. Precipitated copiously by oxalate of ammonia;—indicating lime.

4. Precipitated by biphosphate of ammonia, after being freed from lime;—indicating magnesia.

500 gr. evaporated to dryness, left a white residue, weighing 5·5 grains;—the salt, dissolved in water, leaving a trace of gypsum.

(1) 500 gr. precipitated by oxalate of ammonia, gave 1·74 gr. of oxalate of lime, dried on the sand bath;—reduced by ignition to 1·04 carbonate of lime = 0·582 gr. lime.

(2) 500 gr. precipitated by nitrate of silver, gave 9·37 chloride of silver dried on the sand bath;—fused, reduced to 9.34 gr. = 2·34 gr. chlorine.

(3) 500 gr. precipitated by muriate of barytes, gave 4 gr. of sulphate of barytes;—reduced by ignition to 3·75 grains = 1·27 gr. sulphuric acid.

(4) 1000 gr. treated with carbonate of ammonia, filtered, evaporated to dryness, and heated to redness, left a white salt, weighing 9·57 grains.

Being treated with carbonate of soda, a white precipitate fell, weighing 0·44 gr. Heated to redness, it was reduced to 0·16 gr.

Hence the constituents, from 1000 gr. of the water, are:

Lime.....	1·164 gr.	= 0·831 calcium
Chlorine	4·680	
Sulphuric acid	2·540	
Magnesia	0·160	= 0·096 magnesium
Sodium	3·671	
	12·215	

True constituents:—

Sulphate of soda	4·572 grains
Chloride of sodium	4·614
Chloride of calcium	2·327
Chloride of magnesium	0·384
	11·897

Thus the Saline constituents of an imperial gallon are:—

Sulphate of soda	323·19 grains
Chloride of sodium	326·16
Chloride of calcium	164·49
Chloride of magnesium	26·93
Total	840·77

And the gaseous—

	CUBIC INCHES.
Oxygen	0·600
Azote	4·296
Carbonic acid	16·830

II

MR. SMITH'S.

Sp. gr. 1.01015

1000 gr. evaporated to dryness, left a white salt, weighing 12.44 gr. Completely soluble in water, except a trace of sulphate of lime.

1000 gr. treated as No. I. gave

Chlorine	4·879
Sulphuric acid	2·529
Lime	1·119
Magnesia	0·100
Soda	4·911
	13·538

These constitute—

Sulphate of soda	4·552
Chloride of sodium	5·415
Chloride of calcium	2·237
Chloride of magnesium	0·240
	12·444

Thus the Saline contents of the imperial gallon are:—

Sulphate of soda	321·87 grains
Chloride of sodium	382·92
Chloride of calcium	158·18
Chloride of magnesium	16·97
	879·94

Gaseous—

	CUBIC INCHES.
Oxygen	0·360
Azote	5·264
Carbonic acid	20·025

SMITH'S SALTS.

In 1000 grs. there are

Chloride of sodium	53·277
Sulphate of soda	36·706
Chloride of magnesium	4·476
Sulphate of lime	0·291
Moisture	5·100
	99·850

III.

MR. WISE'S.

Sp. gr. ..... 1·01017

500 gr. evaporated to dryness, left 7·45 grains.

500 gr. precipitated by nitrate of silver, gave 9·99 gr. chloride of silver = 2·46 gr. chlorine.

500 gr. precipitated by oxalate of ammonia, gave a precipitate, weighing 1·5 gr. Reduced to 0.96 gr. by ignition = 0·53 gr. lime.

500 gr. precipitated by muriate of barytes, gave 3·92 gr. of sulphate of barytes, reduced by ignition, to 3·7 gr. =1·24 gr. sulphuric acid.

1000 gr. freed from lime, (and burned into sulphate) gave 10·9 gr. of sulphate of soda and sulphate of magnesia.

It was dissolved in water, and the magnesia thrown down by carbonate of soda. The magnesia, after strong ignition, weighed 0·94 gr.

1000 grains contain—

Chlorine	4·920 grains	
Lime	1·060 = 0·757	calcium
Sulphuric acid	2·480	
Magnesia	0·940 = 0·564	magnesium
Soda	3·591 = 2·693	sodium
	12·991	

Constituting—

Sulphate of soda	4·464 grains
Chloride of sodium	3·012
Chloride of calcium	2·120
Chloride of magnesium	2·556
	12·152

Saline contents of the imperial gallon :—

Sulphate of soda	315·66 grains
Chloride of sodium	212·88
Chloride of calcium	149·90
Chloride of magnesium	180·74
Total	859·18

Gaseous—

	CUBIC INCHES.
Oxygen	0·704
Azote	3·904
Carbonic acid	17·440

IV.

MR. ROBBINS'.

Sp. gr. ..... 1·00825

500 gr. evaporated, left 4·85 gr. of saline matter, in which muriate of soda and sulphate of lime were distinguishable. The latter remained undissolved when water was added.

500 gr. of the water gave		In 1000 grains
Chlorine	2·029 gr.	..... 4·058
Sulphuric acid	0·901	..... 1·802
Sodium	1·342	..... 2·684
Lime	0·476	..... 0·952
Magnesia	0·120	..... 0·240
	4·868	9·736

Constituting, in 1000 grains—

Sulphate of soda	3·244 grains
Chloride of sodium	4·007
Chloride of calcium	2·665
Chloride of magnesium	0·960
	10·876

The Saline contents of the imperial gallon are:—

Sulphate of soda	228·95 grains
Chloride of sodium	282·80
Chloride of calcium	188·09
Chloride of magnesium	67·75
Total	767·59

Gaseous—

	CUBIC INCHES.
Oxygen	0·600
Azote	4·464
Carbonic acid	18·850

V.

MR. REID'S.

(SULPHUREOUS).

Sp. gravity ..... 1·00736

500 grains evaporated to dryness, left 4·3 gr. of a white matter, soluble in water, except a little sulphate of lime.

500 grains, treated as the preceding, gave,—

Sulphuric acid	0·884	
Chlorine	1·722	
Soda	1·4826	= 1·112 sodium
Lime	0·448	= 0·32 calcium
Magnesia	0·1368	= 0·0821 magnesium

1000 grains, of course, contain—

Sulphuric acid	1·768	
Chlorine	3·444	
Soda	2·965	= 2·224 sodium
Lime	0·896	= 0·640 calcium
Magnesium	0·273	= 0·164 magnesium
	9·346	

Constituting

Sulphate of soda	3·184 grains
Chloride of sodium	2·905
Chloride of calcium	1·790
Chloride of magnesium	1·100
	8·979

The saline contents of the imperial gallon are—

Sulphate of soda	224·52
Chloride of sodium	204·84
Chloride of calcium	126·22
Chloride of magnesium	77.56
Total	633·14

Gaseous—

	CUBIC INCHES.
Oxygen	0·200
Azote	3·400
Carbonic acid	25·250
Sulphuretted hydrogen	9·152

VI.

MR. REID'S.

(SALINE).

Sp. gr. ..... 1·00995

500 grains, evaporated to dryness, left a white salt, weighing 6 grains. This salt being dissolved in water, left a notable quantity of sulphate of lime behind, undissolved.

500 gr. thrown down by nitrate of silver, gave 10·44 gr. chloride of silver, = 2·57 gr. chlorine.

500 gr. thrown down by oxalate of ammonia, gave 1·8 gr. of oxalate of lime, dried on the sand-bath. Reduced, by ignition, to 0·91 gr. carbonate of lime, = 0·509 gr. lime.

500 gr. thrown down by muriate of barytes, gave 2·84 gr. sulphate of barytes, = 0·962 gr. sulphuric acid.

1000 gr. were evaporated to dryness, after the lime had been precipitated by carbonate of ammonia. The dry salt being fused, weighed 9·47 gr.

Being mixed with carbonate of soda, and boiled, a white powder fell, weighing 0·97 gr. It was carbonate of magnesia, but had a reddish colour. Being dissolved in muriatic acid, a flesh-coloured powder remained undissolved, weighing 0·11 gr. It was fused with carbonate of soda, dissolved in muriatic acid, and the dry mass digested in acidulated water, there remained, undissolved, a quantity of silica, which, dried on the sand-bath, weighed 0·08 gr.

The muriatic acid solution being supersaturated with ammonia, and heated, a few flakes of peroxide of iron separated, weighing 0·03 gr. Hence, the flesh-coloured powder consisted of

Silica 8

Peroxide of iron 3

Or,

$6\frac{2}{3}$ atoms ..... silica

1 atom ..... peroxide

The magnesia, thus freed from iron and silica, was exposed to a strong red heat. It weighed ·54 gr. Being re-dissolved in muriatic acid, there remained 0·28 gr. of insoluble white powder, a compound of 6 atoms magnesia and 1 atom silica, and, therefore, composed of 0·25 gr. magnesia, 0·03 gr. silica.

So that the—

Silica, altogether, was	0.11 grains
Magnesia	0·51
Peroxide of iron	0·03
	0·65

Hence, 1000 grains contain—

Chlorine	5·140 grains	
Lime	1·018 = 0·727	calcium
Sulphuric acid	1·924	
Magnesia	0·510 = 0·306	magnesium
Silica	0·110	
Peroxide of iron	0·030	
Soda (inferred)	1·539 + 1·942	sodium

Constituting—

Sulphate of soda	3·463 grains
Chloride of sodium	4·856
Chloride of calcium	2·035
Chloride of magnesium	1·224
Silicate of iron	0·140

The saline contents of the imperial gallon are—

Sulphate of soda	244·88 grains
Chloride of sodium	343·38
Chloride of calcium	143·90
Chloride of magnesium	86·55
Silica	7·78
Peroxide of iron	2·12
Total	828·61

Gaseous—

	CUBIC INCHES.
Oxygen	0·200
Azote	4·520
Carbonic acid	17·300

VII.

IMPERIAL FOUNT.

(CHALYBEATE).

Sp. gr. ..... 1·01114

500 gr. evaporated to dryness, left 7. 89 gr. of a white salt, all soluble in water, except a little sulphate of lime.

500 gr. of the water, treated as the others, gave—

Chlorine	2.978 grains
Sulphuric acid	1·077
Lime	0.709
Magnesia (slightly tinged with Iron)	0·092
Sodium	1·896
Silica and peroxide of iron	0·970
	7·722

The silica and peroxide of iron were composed of 0·480 gr. silica, and 0·480 peroxide of iron. Hence, 1000 gr. of the water contain—

Chlorine	5·956
Sulphuric acid ..	2·154
Lime	1·418 = 1·012 calcium
Magnesia	0·185 = 0·111 magnesium
Sodium	3·792
Silica	0·970
Peroxide of iron	0·970
	15·445

Constituting—

Sulphate of soda	3·877 grains
Chloride of sodium	6·250
Chloride of calcium	2·833
Chloride of magnesium	0·444
Silica	0·970
Peroxide of iron	0·970
	15·344

The saline contents of an imperial gallon are—

Sulphate of soda	274·35 grains
Chloride of sodium	442·17
Chloride of calcium	200·47
Chloride of magnesium	31·42
Silica	68·64
Peroxide of iron	68·64
Total ..	1085·69

Gaseous—

	CUBIC INCHES.
Oxygen	0·600
Azote	5·160
Carbonic acid	26·350

In this and the last, the iron is kept in solution by the silica, with which it is in combination. This combination has never before been found in any mineral spring in this country. It constitutes a new species of mineral water.

VIII.

IMPERIAL FOUNT.

(SALINE).

Sp. gr. ..... 1·00855

500 gr. evaporated to dryness, left 5·1 gr. of a white salt, a portion of which (sulphate of lime), did not dissolve in water.

500 gr. thrown down by nitrate of silver, gave 9·34 gr. chloride of silver, = 2·303 gr. chlorine.

500 gr. thrown down by muriate of barytes, gave 2·78 gr. sulphate of barytes, = 1·084 gr. sulphuric acid.

500 gr. thrown down by oxalate of ammonia, gave 1·62 grains oxalate of lime, = 0·89 gr. carbonate of lime = 0·498 gr. lime.

1000 gr. were treated with carbonate of ammonia, and then evaporated to dryness, after a portion of sulphuric

acid had been added. The mixture of sulphate of soda and sulphate of magnesia, weighed 9·57 gr.

The magnesia having been thrown down by the carbonate of soda, and exposed to a red heat, weighed 1·23 grains.

1000 gr. of the water contain—

Chlorine	4·606 grains		
Sulphuric acid	2·168		
Lime	0·996	= 0·711	calcium
Magnesia	1·230	= 0·738	magnesium
Soda	2·613		
	11·613		

Constituting—

Sulphate of soda	3·902 grains
Chloride of sodium	1·647
Chloride of calcium	1·991
Chloride of magnesium	2·952
	10·492

The Saline contents of the imperial gallon are:—

Sulphate of soda	275·48 grains
Chloride of sodium	116·27
Chloride of calcium	140·56
Chloride of magnesium	208·40
Total	740·71

Gaseous—

	CUBIC INCHES.
Oxygen	0·784
Azote	6·104
Carbonic acid	25·250

IX.

IMPERIAL FOUNT.

(SULPHUREOUS).

Sp. gr. ..... 1·00900

500 grains evaporated, left 5·5 gr. of dry salt.

500 gr. of the water gave—

Sulphuric acid	0·979 grains
Lime	1·113
Chlorine	1·896
Silica	0·205
Peroxide of iron	0·030
Magnesia	0·460
Soda	1·004

1000 grains, contain—

Sulphuric acid	1·958 grains
Lime	2·226 = 1·59 calcium
Chlorine	3·792
Silica	0·410
Peroxide of iron	0·060
Magnesia	0·920 = 0·552 magnesium
Sodium	2·008
	11·374

Constituting—

Sulphate of soda	3·524 grains
Chloride of sodi um	0·827
Chloride of calcium	4·452
Chloride of magnesium	2·208
Silica	0·410
Peroxide of iron	0·060
	11·481

Saline contents of an imperial gallon :—

Sulphate of soda	248·90 grains
Chloride of sodium	58·41
Chloride of calcium	314·44
Chloride of magnesium	155·95
Silica	28·96
Peroxide of iron	4·24
Total	810·90

Gaseous—

	CUBIC INCHES.
Oxygen	·960
Azote	4·896
Carbonic acid	28·250
Sulphuretted hydrogen	9·136

In this water, as in No. **6** and **7**, the iron is held in solution, by being combined with silica.

X.

PUMP ROOM.

(SULPHUREOUS).

Sp. gr. ..... 1·00144

1000 grains, evaporated to dryness, left 1·96 gr. of white salt.

1000 grains of the water contained—

Sulphuric acid	0·352 grains
Chlorine	0·688
Calcium	0·130
Magnesium	0·033
Sodium	0·446
	1·649

Constituting—

Sulphate of soda	0·633 grains
Chloride of sodium	0·587
Chloride of calcium	0·384
Chloride of magnesium	0·132
	1·736

The saline contents of the imperial gallon are—

Sulphate of soda	44·37grains
Chloride of sodium	41·15
Chloride of calcium	26·92
Chloride of magnesium	9·25
Total	121·69

Gaseous—

	CUBIC INCHES.
Oxygen	0·512
Azote	3·984
Carbonic acid	25·250
Sulphuretted hydrogen	9·120

XI.

PUMP ROOM.

(SALINE).

Sp. gr. ..... 1·01223

500 gr. evaporated to dryness, left a white salt, weighing 7·67 gr.

500 gr. treated as before, gave

Chlorine	3·578 grains
Sulphuric acid	1·027
Lime	0·590
Magnesia	0·291
Silica	0·059
Peroxide of iron	0·065
Sodium	1·893
	7·503

Hence, 1000 grains would have yielded—

Chlorine	7·156 grains
Sulphuric acid	2·054
Lime	1·180 = 0·843 calcium
Magnesia	0·582 = 0·349 magnesium
Silica	0·118
Peroxide of iron	0·130
Sodium	3·786
	15·006

Constituting---

Sulphate of soda	3·697 grains
Chloride of sodium	7·653
Chloride of calcium	2·360
Chloride of magnesium	1·396
Silica	0·118
Peroxide of iron	0·108
	15·332

Hence the saline contents of an imperial gallon, are—

Sulphate of soda	261·95 grains
Chloride of sodium	542·26
Chloride of calcium	167·22
Chloride of magnesium	98·91
Silica	8·36
Peroxide of iron	7·65
Total	1086·35

Gaseous—

	CUBIC INCHES.
Oxygen	0·528
Azote	4·704
Carbonic acid	23·600

In this water, also, the iron is kept in solution, by being united to silica. It is likely that the true quantity of peroxide of iron, in the 1000 grains of water, is 0·132 gr. On that supposition, every atom of it will be united with two atoms of silica, constituting bisilicate of iron.

CHAPTER V.

Proper period of the year for drinking the Waters—most suitable time of the day—preparatory treatment—effects of the internal use of the saline springs—applicable to diseases of the alimentary canal—external complaints—constitutional disorders—no specific action in white swellings—no peculiar antilithic properties—consequences of being improperly used.

The Waters of Leamington may be taken internally with perfect safety in every season of the year. The most proper period for using them, however, is from the beginning of May till the latter end of October. This period, which is usually called the Season, is chosen by the physician not from any difference in the composition of the springs during that particular time, but on account of the numerous advantages which the weather affords during summer and autumn. It is then that early rising can be put in prac-

tice with safety to the invalid ; it is then that exercise, which makes the waters sit lightly on the stomach, and which quickens their absorption, may be used with the most decided effects ; it is then, also, that the mornings are most inviting and uninterruptedly good, which allows the plan of treatment laid down to be pursued with a greater chance of success.

The best time of the day for drinking the waters is before breakfast ; their impregnation being strongest about the time of sun-rise. Invalids, however, are not always able to adopt the plan of early rising. Many delicate females, in particular, are much affected by the chills of the morning, while others have acquired the habit of keeping their chambers till a later period of the day ; and to attack this habit suddenly, would, in numerous instances, be fraught with very disagreeable consequences. Patients, with constitutions so formed frequently have the water conveyed to them in such a vessel as a Florence flask ; and in order that the fixed air, and the other gases may not escape, the bottle, previous to conveying it home, is completely filled, leaving only sufficient room for the introduction of the stopper. If necessary to increase the temperature of the mineral water, a thermometer is also introduced through the cork of the bottle, and, by means of artificial heat, the liquid raised to the warmth that is required. Still, when it can be done with safety, it is preferable to drink the water at the fountain ; and if there be

nothing particular to prevent it, the time may be changed to noon. As there are, however, three different kinds of water, namely, Saline, Sulphureous, and Chalybeate, it will be necessary to treat of each separately ; and first of the Saline, which is the most simple and the most frequently used.

OF THE SALINE.

Previous to entering on a course of the Saline water, no patient should omit those preparatory steps which are necessary to observe, to give the greatest chance of success to the employment of the springs. These consist, in most cases, of using aperient medicines, occasionally local and general bleeding, and attending to certain rules, which, from the peculiar nature of each case, it is impossible to detail. From the neglect of such precautions, and the over anxiety of the patient to commence the waters without due consideration, disappointments frequently occur, which are but too frequently attributed, without justice, to the constitution of the invalid disagreeing with the spring that is used, or to the water employed, being improper for the disease.

The preparatory steps being premised, a common pint of the water may be taken ; one half in the morning, about seven o'clock, on an empty stomach ; the other in about twenty minutes afterwards ; walking exercise being used between the first and second part of the dose, and after both have been taken. For children of twelve years

of age, one-half of this quantity will be sufficient ; for those of six, one-fourth. Under the age of six, they should scarcely ever be employed.

The effects of the waters, when taken internally, in aperient doses, are of three kinds. Either they produce an increased action of the kidneys, or bring on nausea, sickness, head-ache, flushings of the face, distention of the stomach, determination to the head, and other disagreeable symptoms ; or, finally and most frequently, they act on the bowels without inducing any of these signs. In the first case, they require only to be increased in the dose, to produce the aperient effect ; while, in the second case, their use is not prohibited by the unfavourable effects arising from their employment, unless the remedies resorted to for removing them should prove ineffectual. The second class of symptoms frequently supervene from a deranged state of the alimentary canal ; and by a little attention to the digestive organs, and to the dissipation of the gases, may be avoided. When they pass off by the kidneys, their use may always be regarded as pretty safe, and their action as salutary.

When the waters sit easily and lightly on the stomach, and subsequently an increased flow of spirits and appetite follow, a favourable result may generally be anticipated. When the aperient effects are experienced in a few hours, without tormina or relaxation of the bowels, or that

general lassitude of the system which arises from the frequent use of the drastic purges, or even from the milder aperients, such as manna, cassia, or senna, they may be considered as agreeing with the constitution, and their continuance will most likely be ultimately productive of the happiest effects. The number of times they require to be taken must necessarily depend on the disease, the kind of water employed, the constitutional predisposition of the invalid, and other circumstances. In general, twice or thrice a week will suffice, and a month should be allowed for trial.

The Saline springs being much used as aperient medicines, a large proportion of the patients who visit Leamington, resort to the waters for diseases of the alimentary canal. These vary, of course, according to the texture and part of the digestive tube in which the affection is principally situated. In most cases, they have their seat in the stomach, and are marked by the usual symptoms of dyspepsia, namely, white or furred tongue, flatulence, acidity, pain and swelling at the pit of the stomach, nausea, bitter taste of the mouth in the mornings, depraved appetite, pain in the head, and lassitude of the whole system. When the seat of the ailment is nearer the lower part of the digestive tube, there are more commonly found, colic, chronic spasm of the muscular coat of the bowels, torpidity of the intestines, diarrhoea from saburra, and hemorrhoidal affections.

But it is not only as internal medicines that the saline waters are employed. Ample experience has long established their value in various external diseases. In chronic inflammation of the eye they are daily had recourse to, and when it is considered that the saline particles act as gentle stimulants, the *modus operandi* of the water on the investing membrane of that organ is capable of a very easy explanation. For ulcerous affections, dipping linen in the water, and repeatedly changing it, has been found to be of very decided advantage even in the most inveterate forms of these troublesome ailments. The same mode of application has also in skin complaints been used with the happiest effects; although, as will be afterwards seen, the sulphureous waters claim a superiority over the saline and chalybeate springs, in every species of cutaneous disease.

The saline waters of Leamington are also entitled to great regard, as alterative agents, by which is meant, a class of substances that possess the power of gradually improving the condition of the system, without affecting the patient very sensibly at the time they are taken. The minute division of the ingredients affording a very easy entrance for the particles into the vascular system, necessarily renders their influence very extensive over every tissue of which the animal frame is composed; and that this absorbent action does take place there can be little doubt, from the diuretic power which they possess. It is

thus, chiefly, that the saline waters are so much celebrated for those disorders, which, in their first and most inflammatory state, affect the whole system; and which, afterwards, leave a weakness and loss of motion, with transient pains and other adynamic symptoms in the limbs. In these affections, however, of which gout and rheumatism may be adduced as examples, no patient should venture on the internal use of the class of remedies under consideration, until every discernible sign of the active state of the gouty and rheumatic diathesis shall have completely subsided. Nor should a slight exacerbation of the disease, more especially of the gout, induce the patient to abandon the use of the water. Such a consequence is an occasional occurrence, and it has, with some propriety, been referred to the stimulating properties of the muriates. It will be prudent, therefore, to suspend the use of the springs during the attack, and to resume them at some after period, when these symptoms have passed away.

To this power of progressively amending the state of the constitution, may also be referred that invigoration of the whole frame which, by perseverance for a considerable time, invariably proves beneficial in the diseases depending on general cachexy. Such are the varieties of struma, under which are included scrofulous swellings of the neck, tumefaction of the abdomen, from an enlarged state of the mesenteric glands, and other morbid affections of the lymphatic and glandular system. With regard to any

specific action in the saline springs, in curing the first stage of white swelling of the knee joint, or in curing the different states of spine disease, it may be safely asseverated, that internally, beyond the alterative power alluded to, and the sympathetic effect which is produced on every local disease by means of a regular state of the stomach and bowels, the waters do not possess any medicinal virtue of such a character.

The antilithic effects of the saline springs have been much extolled, by certain writers on this particular kind of water. That they, however, exert a specific effect in dissolving calculi or gravel, may be safely denied. Whatever benefit has been derived from mineral springs, in such cases, may, with more propriety, be referred to the healthy change induced in the functions of the alimentary canal,—a derangement of which is so conducive to the formation of calculi,—than to any attenuating power which the springs possess.

Mild as the saline waters usually are, an indiscriminate use of them, like the abuse of every other medicine, proves very hurtful to the constitution. When repeated too often, a febrile state is induced by the application of the saline particles to the mucous membrane of the intestine, which, by withdrawing at the same time a quantity of fluid from the general circulating mass, is followed by a diminution of the vital functions, an effect

which, it is evident, in enfeebled constitutions, it is of the greatest importance to avoid. Not less frequently do the harassing and painful symptoms of hemorrhoids follow the immoderate use of the waters. When employed in drastic doses, diarrhœas, of the most troublesome nature, frequently supervene; more especially in habits of a peculiarly irritable nature.

CHAPTER VI.

Sulphureous springs—dose of the sulphureous water—effects—Rules to be observed—preparatory treatment—alternations with the Saline and Chalybeate Springs—duration of a course—diseases to which applied—when improper.

The sulphureous waters are taken in the same doses, in the same divided portions, and at the same hour of the morning, as the saline. But as their taste to many individuals is very disagreeable, a small quantity of peppermint, or cinnamon water, or occasionally a piece of brown-burnt bread, or some carminative cake, is generally used with them. This, however, is scarcely necessary for more than a few days. In less than a week the palate usually becomes so reconciled to their use, that invalids are perfectly able to drink them without loathing or disgust.

When the sulphureous waters are likely to be serviceable, they excite, immediately after they are taken, no very particular sensation of any kind. On the other hand, when they sit unpleasantly on the stomach, occasion head-ache, dryness of the tongue and fauces; or sickness, and do not pass off by perspiration, or excite some of the excretions, their operation may be looked upon as unfavourable; and they ought, after the auxiliary means have been fairly tried, to be discontinued.

In the preceding Chapter on the saline water, the mode in which the unfavourable symptoms, which occasionally arise immediately after drinking the water from the fount, may be avoided by the application of heat to expel the gases, has been alluded to. This process, which ought to be as seldom employed for the saline and chalybeate waters as possible, should scarcely ever be used for the sulphureous. The weak combination of the sulphuretted hydrogen gas with the water, renders the former substance so susceptible of separation from the latter, by the application of a temperature of 212°, that, so far as the sulphureous impregnation is concerned, the mineral water is rendered quite inert by the process. When the waters containing the hepatic gas are found too strong, the plan of taking a portion of the saline water, raised to the boiling point, and afterwards reducing it to a temperature fit for drinking, by means of the sulphureous water as it is drawn from the pump, will be found to be

the best process for retaining that part of the gaseous impregnation on which the virtues of these particular springs chiefly depend.

In almost every case for which the sulphureous wells are resorted to, the preparatory plan, pointed out for the saline water, is necessary. In order, also, to produce the full effect, it will be proper, in numerous complaints, to assist the waters by some medicine calculated to act as an adjuvant during the whole period of the course. Not unfrequently it happens, with regard to the sulphureous waters, as well as the others, that, instead of the aperient effect which they are all primarily calculated to produce, there is, simply, a fluid discharge from the intestines; which, by being deceitful to the patient himself, at the same time leaves the cause of the disease lurking in the constitution. If the object be to evacuate completely the contents of the alimentary canal, recourse is frequently had to a quantity of the prepared salts.* But, valuable as these are as laxatives to obtain a free expulsion of the contents of the bowels, some more active aperient medicine must be substituted. Nor should it be forgotten, that in every ailment there is usually more than one indication to fulfil, towards effecting the recovery of the patient; and hence in a variety

* The salts, however, dissolved in water, are an excellent substitute for the springs. They are prepared at Mr. Smith's Establishment, in Bath Street, and sold by him, and at the different Chemists in Leamington; and in London, at Messrs. Barclay and Son's, Fleet-Market.

of cases arises the advantage of combining a suitable auxiliary treatment alongst with the water, by means of which the disease may be cut short in a much less period of time than if the mineral fluid was simply employed.

It frequently happens also, that invalids, instead of confining themselves to the sulphureous spring, change it for another of a different description, or alternate it with a saline and the chalybeate well, either at the interval of weeks or daily. The great advantage of this must be self-evident; and thus it is that the town of Leamington claims a decided superiority over the greater part of the watering-places throughout the country. Those acquainted with natural medicines, of the description now under consideration, are aware that mineral springs are grouped into four great classes, namely, the acidulous, saline, sulphureous, and chalybeate. It has been already seen that the last three of the four exist in Leamington, and in such abundance as to leave no dread of a scarcity, either for the purposes of drinking or bathing. As for the acidulous class, of which Seltzer, in the neighbourhood of Frankfort, in Germany, may be adduced as an example, no spring of that description exists in any part of the three kingdoms: consequently, Leamington possesses all the kinds of mineral waters which are found either in Great Britain or Ireland.—No rule, however, can be laid down when the patient should commence alternating the springs; or whether the chalybeate should be substituted first of all

for the sulphureous, or follow the saline. The choice of a spring and the combination of one well with, or the substitution of one well for another, must necessarily vary in every individual case, and be entirely left to the judgment of the practitioner.

The duration of a course of the sulphureous waters is, generally speaking, not so short as that of the saline. In cases of lepra, alphos, psoriasis, and other cutaneous complaints, for which they are in fact more particularly applicable, it is advisable to continue their use for a period, from one to four, or even six months; and where there is a tendency to a periodical return of a skin disease, an annual visit to the springs is of the most incalculable benefit. Much advantage is also derived from the sulphureous waters in the complaints which are termed scorbutic; and when it is considered that, by means of the neutral salts, a moderate determination to the bowels is excited, at the same time as an alterative action is kept up on the skin, by the sulphureous principle, their use in these troublesome and obstinate diseases, more especially when the internal use of the water is combined with the warm bath, may be safely calculated on to be of the greatest service. In skin diseases, in fact, they should seldom be taken internally, without, at the same time, using with them a series of warm baths.

The union of the salts with the sulphuretted hydrogen,

has led also to the use of the water in a variety of ailments depending on a saburral state of the mucous membrane of the alimentary canal, for which the pure saline springs are prescribed. For the same reason, and from the alterative action of the sulphur, the sulphureous springs have acquired a very great celebrity in derangements of the liver and spleen, more especially in the hepatic disorders, consecutive to a life of high indulgence, or after a long residence in a warm climate. Indeed it may safely be said, that nearly one-third of the patients who resort to Leamington for the recovery of their health, are induced to visit the springs for one or other of the complaints which are the result of the causes just pointed out. It is not, however, to these diseases merely that the sulphureous waters have been found to be beneficial. From the great improvement observed in the general health and spirits of many individuals with local complaints, recourse has been had to the springs in disorders which may be considered as purely constitutional, and with the greatest relief. On account of this circumstance they have been advantageously drank during the convalescence from measles and small-pox, and in the debility which follows a long course of mercury and violent salivation. For the same cause they have been used with the most decided effects in hypochondriasis, and the visceral torpor, brought on by a sedentary life.

The sulphureous waters are contra-indicated in acne

rosacea and punctata. When employed as purgatives, they are also, in large doses, improper in old people with leuco-phlegmatic habits; for, as in the previous kind of water, by diminishing the quantity of fluids from the circulating mass, emaciation, low spirits, general debility and dropsy, may succeed. In very large doses they produce emesis similarly to the saline and the chalybeate.

CHAPTER VI.

Chalybeate spring—necessity of auxiliary medicine—dose—effects of the water—complaints for which it is used—improper in certain diseases—reasons assigned for the operation of mineral waters.

Although, generally speaking, before commencing the saline and sulphureous waters, it is advisable, in the greater number of cases, that the bowels should be regulated by some suitable medicine, this preparatory step is more particularly called for previous to a course of the chalybeate water. The astringent effect which the iron spring possesses, is apt, now and then, to produce a much less aperient action on the bowels, than the composition of the spring would lead to infer; and hence, for the same reason, it is necessary to continue some aperient medicine during the whole course of the water, unless, however,

the peculiar constitution of the individual, or the ailment, should specially contra-indicate this part of the treatment.

The dose here differs, in some degree, from that of the preceding kinds of water. The iron being a diffusible stimulus, it becomes necessary to repeat oftener, the quantity of the fluid taken in order to render its effects permanent on the constitution. Thus, in addition to the first half-pint, about seven in the morning, and the second half-pint, which is taken in about half an hour afterwards, when the sulphureous and saline waters are drank, a third half-pint of the chalybeate is usually drank about an hour before dinner. This latter portion, besides the slight excitability it produces, assists also in increasing the appetite; and, for that purpose, is most advantageously taken about an hour before the principal repast.

The effects here, as in using the other springs, are twofold, namely; those which arise immediately after the dose has been taken, and those which supervene after the water has been drank for a certain period of time. The first class vary in different individuals.—In the greater part of invalids the waters sit easy on the stomach, and produce a slight aperient action, without pain or griping; leaving the patient, in fact, more alert and vigorous during the remaining part of the day, than previous to taking the dose. In other cases their action is altogether diuretic, and then they only require the ordinary dose to be increased to produce

the usual evacuation. While, in a third class of patients, they are followed by vertigo, pain across the forehead, shiverings, sickness, flatus, distension of the abdomen, and the like. These last symptoms, however, by no means contra-indicate their use. The same process may be had recourse to, as with regard to the preceding waters; but here again it will become a question with the practitioner, how far the loss of the gases, by the application of the heat, may affect the waters in a medicinal point of view. At all events, the temperature should never be raised above 140 degrees; as, at nearly that degree of warmth, the iron is decomposed, and the metallic portion of the salt falls to the bottom of the vessel. As other auxiliary means, to prevent sickness and render the water palatable, besides those alluded to in the preceding Chapter, some patients add to each portion of the dose, a teaspoon-full of the tincture of cardamoms and capsicum, or a small quantity of brandy; but, in general, a purgative dose of medicine will so alter the tone of the digestive tube, as to enable the patient to proceed with the waters without the slightest inconvenience.

The chalybeate spring, as might naturally be expected, is resorted to for some of the most important and difficult diseases to treat, that come under the attention of the medical practitioner. In general it is indicated where a diffusible stimulus is necessary, and hence it is employed in weak, lax, and pale habits; in the cachexiae, which

are accompanied by a feeble habit of body ; in chlorosis dysmenorrhœa, amenorrhœa and a variety of ailments dependent on a deranged state of the uterine organs. These complaints, in fact, are usually complicated with an atonic state of the digestive tube, and from the combination of the salts and iron, the chalybeate spring seems well calculated to effect a return of the natural action of the viscus, from whence the ailments proceed.

The chalybeate spring requires a considerable time for trial. A month may be laid down as the minimum period. When the water acts favourably on the constitution, the patient's appetite becomes daily increased, the strength and flesh improve, the spirits are more buoyant, and there is a greater disposition to exertion both of body and mind, it may be considered as agreeing with the invalid. The chalybeate well is unquestionably to be avoided in cases of schirrus, in pulmonary and abdominal affections, with vessels of an easy excitability, more especially if accompanied with symptoms of hectic fever. There can be no doubt *a priori*, too, that the heating qualities of the spring will exert a prejudicial effect in a plethoric habit of body, particularly when there is a tendency to the sanguineous diathesis ; and hence, in apoplectic subjects, those with periodical vertigo, head-aches, flushings of the face, constitutional predisposition to effusion of blood into the texture of the lungs, hemorrhage from the bowels, and the like, this particular kind of water should

form no part of the treatment. In asthmas, coughs, and consumptions, it is decidedly an injurious remedy.

In reviewing the contents of this and the two preceding kinds of water, it will be perceived that, in a common pint of the mineral fluid, there is contained, of solid substances, a variety of salts, the amount of the weight of which is not more than from a drachm and a half to two drachms. These salts, however, being incapable of themselves, or mixed in a small portion of water, to produce the effects which result from the use of the mineral springs, various other reasons have been given to explain their operation.

There can be no doubt that the minute division of the ingredients, independent of the mechanical facility which is thereby afforded for absorption, powerfully aids their action as therapeutical agents. Besides, if any of the simple salts, such as those of Epsom or Rochelle, are dissolved in a given quantity of water, the same result will not, in every case, be so certainly obtained by mixing them in half a pint of fluid, as in twice that quantity. A want of knowledge of this very simple pharmaceutical fact has frequently given rise to unexpected disappointments in the use of many medicines ; for, however paradoxical this proposition may appear, its truth is founded on the daily experience of every practitioner ; and, in fact, is received as a general axiom in the treatment of disease.

But it is not to simple dilution and the smallness of the quantity of the saline substances in the springs, that the effects of the waters are to be attributed. If two or three remedies of a similar nature to each other, and having the same medicinal properties, are conjoined, the effect which the combination will produce will be much greater than either of them singly, although the quantity of the individual medicine employed be even more than the whole put together. Nor is this all that is obtained from a mixture of a variety of salts; for, when water has completely saturated itself with any one saline substance, the solution may still be made to take up another salt of a different nature; and the energy of the whole thereby become much enhanced. Thus we can, from the action of mineral waters, convince ourselves of two distinct facts of the utmost importance in the treatment of disease, and are taught another useful and important lesson from imitating those simple processes which nature points out in her operations.

The quantity of iron contained in the waters is another cause assigned for explaining their medicinal action. How far this may be capable of effecting a change in the animal economy, has, indeed, been questioned, and the minute portion contained in the wells, adduced as a proof of its being incapable of producing any effect on the living fibre. If, however, small as it is, it be capable of affecting the sense of taste, by a momentary application, it will be too much to deduce the conclusion that it cannot produce a

change in the function of such a sensible organ as the stomach, endowed as that viscus is with so many delicate nerves, and possessing such a powerful sensibility and influence on every part of the body; more particularly when applied for a considerable time to its empty surface in the morning. If it be admitted, as already alluded to, that the different salts co-operate in producing a certain effect, it will not, perhaps, be disputed, that they may also assist in promoting the medicinal effect of the iron. We know, also, that the effects of certain substances are much increased, and the end for which they are used more certainly obtained, by combining them with certain other substances totally different in their nature; it is thus that the stomach, in cases of gout, becomes more susceptible of the action of colchicum by the administration of magnesia, and thus, probably, that the iron in the Leamington waters becomes more active, as a tonic, by being united with certain neutral salts.

But another class of agents, which are perhaps not less important, are the different gases. Besides a powerful activity which they exert on the stomach and alimentary canal, and subsequently on the brain through the nerves, they in some manner, which is not clearly understood, give an accession of power and celerity of operation to the waters. Dr. Paris has referred this effect to the stimulus of simple distention; but, from the well-known fact that there is, in almost every spring, a quantity of atmospheric

air, which is nearly inert on the gastric and cerebral organs, the action may, with greater propriety, be attributed to a vital than to either a chemical or mechanical cause. Nor will the conclusion appear less just, when the energetic powers of the gases in the springs on the animal economy are duly considered. The carbonic acid, from its refrigeratory nature, prevents the stomach from rejecting the saline substances ; while a similar effect arises from the atmospheric air, diffused throughout the fluid. In no combination of sulphur, either, is the medicinal power of that substance so active, as in conjunction with hydrogen. Thus it is from the peculiarity of the foreign contents, the proportion and variety of the ingredients, the iron and the gaseous substances, combined with the particular circumstances under which the mineral fluid is exhibited, that the mineral waters exercise such a salutary influence in removing the various ailments for which they are prescribed.

CHAPTER VIII.

Cold bath—preparatory treatment — temperature—diseases for which it is applicable—when contra-indicated —precautions—effects—shower bath.

In employing the waters impregnated with the salts and hepatic gas, for the purpose of bathing, the same rules which are necessary to be observed in using simple water, are nearly applicable to those surcharged with these ingredients. But, as the saline particles are considered to act mechanically in exciting the cutaneous surface, and consequently to produce a slight irritability of the skin, it will be prudent for the patient, before commencing the use of the cold bath, to have his constitution prepared by a suitable treatment, in order to avoid that feverish state of body which a saturated bath, in an enfeebled constitution, is so calculated to produce. The usual plan, when the

internal use of the wells is conjoined with the bath, is to begin the course with an aperient pill, and continue drinking the waters for two consecutive days, previous to commencing the immersion.

The cold bath may be used at any temperature, from that above the freezing point to 66 deg. of Fahrenheit's thermometer. Sixty degrees, however, is the most usual; being the average warmth of the water on the sea shore of this country, in autumn, and of those springs which are not exposed to the rays of the sun. But as this bath is frequently taken as nature has provided it, it will, of course, vary with the state of the atmosphere, the season of the year, and the impregnation of the water employed. The natural temperature of the Leamington springs being, as already stated, from 44° to 54°, a cold bath of the impregnated water will scarcely be advisable for persons of a very feeble habit of body. For such, the warmth of the liquid should be raised to the proper temperature which the individual case may demand.

The cold bath is used with advantage by invalids whose system requires to be braced, by those in whom the circulation is languid, and by such as have the general powers of the body weak; hence it is employed in ricketty and scrofulous habits, in melancholic and nervous temperaments, in epilepsy, St. Vitus' dance, and many anomalous hysterical affections. As a tonic it is an

excellent remedy in bracing thesystem of children, although scarcely to be admitted under the age of seven. Old people, and those whose corporeal energies have been seriously injured by disease, whether brought on by intemperance, long residence in a warm climate, or by idiopathic constitutional attacks, ought not to commence with its use until the tepid bath has been employed, and gradually lowered to the cold range. It is decidedly an improper application in cases of local plethora,—such as determinations of blood to the head; in hectic and acute fevers, asthma, pleurisies, inflammations of the lungs, acute inflammatory complaints; consumptions, diarrhœas, and dysenteries.—In the latter class of diseases, the repulsion of the blood from the cutaneous capillaries to the great cavities of the body, may produce most serious consequences, by the rupture of some of the smaller blood-vessels.

Simple as this mode of bathing is usually considered, there are certain circumstances connected with it which require proper attention. It should neither be employed with an empty nor very full stomach, nor in the morning immediately after rising, at least not until some gentle exercise has been taken. Neither should it be used when the body is overheated, perspiring freely, affected with chilliness, nor in states of lassitude after exertion, nor even after any violent mental emotion. To prevent head-aches, the head should be immersed at the same time as the body, although it is by no means necessary to plunge it previously

to the limbs or other parts. When prepared to enter the bath, not a moment should be lost by the patient; the practice of waiting until the body cools being attended with considerable danger. The colder the water, the less time should it be applied; and the more exercise, when in the bath, the better. When the bath is used at sixty-six degrees, the individual may remain in it from a few seconds to thirty minutes, according to circumstances. The number of days and weeks, and at what interval, will necessarily depend on the effects produced, and on the constitution and ailment of the person using the bath. After bathing, the skin is to be dried, rubbed with coarse well-aired towels, and covered with a warm flannel gown. A little broth may be taken with advantage, while dressing in the anti-room. If the weather permits of exercise in the open air, walking about will assist materially in producing the desired effect on the constitution. After this, and all other kinds of baths, currents of air are studiously to be avoided, thin shoes laid aside, and a sufficient quantity of clothes put on to protect the body against any inclemency of the weather.

The effects of the cold bath are of three different kinds: the first, which are immediate, and are more or less the same in every individual, are marked by a sensation of cold, paleness, and constriction of the skin, increased respiration, sobbing, elevation of the bulbs of the hair of the skin, denominated *cutis anserina*, slight shivering,

debility of the muscular system, a sense of oppression across the chest, with diminished force and velocity of the pulse. By remaining a short time immersed, these symptoms are succeeded by a glow of the skin, particularly in the healthy, which makes the individual to feel as if the water around him were increased in temperature. By and by there comes on a second slight shivering, which is commonly considered as the sign for retiring from the water. These, conjoined, form the first set of symptoms.

Two other distinct sets of symptoms follow those which have been enumerated. The first of them constitutes what is called the re-action, and is regarded as the sign of the water proving serviceable. It commences by a glow and faint redness of the skin, slight perspiration, energy of body and buoyancy of mind, increased action of the heart and arteries, a general feeling of refreshment and comfort, and ultimately a return of all the deranged functions. When, however, the blood does not return to the cutaneous surface,—when there is a great defect of nervous energy, pointed out by permanent chills and shiverings, sobbings, cold hands and feet, paleness of the skin, constant chattering, and dull oppressive pain of the loins, the greatest caution should be exercised in repeating the cold bath. Instead, however, of abandoning it when these unfavourable signs come on, which, united, form the third class of symptoms, it will frequently happen that a change of the hour of the day at which the immersion is made, will

obviate the disagreeable consequences; and, as an auxiliary for exciting the vital energy, a cordial may be taken on retiring from the water.

Should these means fail in bringing on the glow of the skin, the shower bath may be substituted. This particular mode of applying the mineral water, from the shock it gives to the frame, the short period it requires to be applied, the detergent property it possesses in common with the baths of immersion,—claims, perhaps, a more frequent application than the common baths. Invalids who are much reduced, may receive only a single shower, which may even at first be either warm or tepid, and gradually reduced in temperature, and increased in duration, as the patient gains strength. For delicate persons, a quantity of warm water, or a piece of heated flannel, should be put under their feet, to prevent the disagreeable sensation which always arises from the contact of the soles with the cold marble, or wood, of which the bottom of the bath is composed.

CHAPTER IX.

Warm bath—temperature—number of times to be used—applicable to certain diseases—preparatory measures—precautions with regard to the sulphureous and chalybeate waters—proper time of the day for the warm bath—duration of each immersion—improper under certain circumstances—tepid bath—douche.

The heat of the warm bath should seldom exceed ninety-eight degrees, which is about the natural temperature of the internal parts of the human body; and when a course of warm bathing is necessary, the warmth of the liquid should, at first, never be raised higher. No one, at the commencement, ought to remain immersed in the water for more than half an hour. It may be used once or twice a week when a course of the waters internally is conjoined, and three or four times when the drinking is

suspended. As a general rule, however, the waters should not be drank on the days of bathing; although, in particular cases, they should be taken about an hour after retiring from the bath.

This bath is principally of service in the diseases of children; of those who have lived for a long time in a warm climate; complaints of old people; palsies; cold œdematous swellings of the feet; melancholic disorders; affections of the urinary organs; concretions obstructed in the kidnies, ureters, and gall-ducts; and in scrofulous swellings of the neck. When carried to an hundred degrees, it is of the highest benefit in spasmodic complaints, tormina of the bowels, skin diseases, and other chronic cases which require profuse perspiration.

As the warm bath possesses a stimulating as well as relaxing influence, which is probably increased by the various salts held in solution, its use generally determines a reddening of the cutaneous surface; hence arise flushings of the face, an increased secretion from the lungs, forehead, and skin in general, with drowsiness, occasional head-aches, and velocity of the pulse. These last symptoms most frequently come on, and are severest, in individuals with full plethoric habits and a determination of blood to the head. Patients so attacked, should have their bowels unloaded before repeating the use of the warm bath. If the afflux of blood be to the head, it may also be proper to open the

jugular vein, or temporal artery, apply leeches to the temples, or a cupping-glass to the nape of the neck. When any other viscus is the seat of the inflammation, bleeding from the arm, or locally, will, in general, be found preferable.

In using the sulphureous water for the purpose of bathing, the same caution, with regard to the mode of heating the liquid, as when the waters are taken internally, is necessary. From the tendency of the hepatic gas to separate itself, it will be proper to take care that the mineral fluid is not heated to the boiling point, and afterwards cooled down to the temperature of immersion. If that plan be adopted, the sulphuretted hydrogen gas must be completely dissipated. It will, therefore, be better not to heat the sulphureous water at all, but to boil a quantity of the saline water, and afterwards cool it gradually with that which contains the hepatic gas, till the whole shall have been reduced to the temperature that is necessary for the removal of the complaint. A similar precaution is necessary in using the chalybeate water; the component parts of the metallic salt being separated at the temperature of 140° deg., the oxide of iron falls to the bottom of the vessel in which it is heated, and, instead of a bath impregnated with iron, the patient will be using one which is purely saline.

The proper time for entering the warm bath is from

two to three hours before dinner ; unless the object be to produce a copious perspiration. The evening then is the best time, and the end will be more certainly obtained by walking home, and before being well covered up in bed, drinking copiously of some warm diluting fluid, such as barley-water, water-gruel, and the like.

The heat of this bath should never be regulated by the sensations of the individual, or of the assistants, but, in every case, by means of the thermometer. If the stay in the water be prolonged beyond ten minutes, it may frequently be advisable to increase the temperature a few degrees. It is impossible, however, to fix any general rule for the exact period for the patients to be immersed. Some complaints require only from three to five minutes, others half an hour ; while, in another class of diseases, it may be necessary to remain even upwards of an hour at each immersion. In every case, however, the feelings of the patient must, in some degree, be consulted ; for, whenever lassitude and a degree of faintness come on, the invalid ought certainly to retire from the water.

It is improper to use the warm bath when the stomach is full, or when the process of digestion is at its heighth. After leaving the water, the skin should be immediately dried, for from the evaporation of the moisture on the surface, a chilliness is produced, which it is of importance to avoid. It is needless to add that currents of cold air are more dan-

gerous to the invalid after a warm bath, than they are at any other time, and consequently must be carefully avoided.

As a modification of the warm bath, when it is an object to avoid the excitement that results from the application of a high temperature to the skin, recourse is frequently had to the use of water, heated from sixty-six degrees to about the warmth of ninety of Fahrenheit's scale, which, in fact, constitutes the tepid bath. As this particular range neither produces the perspiration which follows the application of water raised to the temperature of 98 degrees, nor the powerful re-action of the cold bath, it will, in numerous cases, be used with the greatest safety, as a preparatory means to enable the system to bear the extremes of hot and cold bathing.

The tepid bath may be used with advantage in weak and sensitive habits, and in affections of the lungs, or other complaints, which are accompanied with hectic fever. It will be employed with the best effects in many cases of rheumatism and in skin diseases, especially those complicated with a brawny scurf. The invalid may remain in it each time, from a quarter to half an hour, and continue it for a much longer period than either the cold or warm bath. It will be most advantageously employed about noon, at the temperature of eighty-eight degrees, and the immersions continued on alternate days.

Instead of the application of the water to the surface of the body generally, either in its tepid state or at the temperature of the warm bath, it occasionally occurs that, by impelling a current of the fluid at a high temperature on the diseased part, the impetus of the water, combined with the heat of the fluid and the stimulant property of the salts, will produce a much more powerful effect than the sympathetic action of the water alone. This process, known by the name of dry-pumping, is most frequently used for indolent tumours, sprains, and contractions of the limbs, chronic rheumatism, and skin diseases confined to a certain spot; and is very frequently combined with the auxiliary remedies of pressure, friction, and champooing. If the stream directed be continued, its force must necessarily be modified according to the pain of the part, and its nearness to any organ of vital importance. The usual number is from 30 to 200 strokes at a time; but if the jet is constant, it is thrown on the diseased part from five minutes to an hour and a half, or two hours, daily. As the greater part of the complaints, however, for which douches are so frequently applied, require months before any perceptible change is observed, it becomes necessary to avert patients of the tediousness of their cure, to prevent an unnecessary trial, and perhaps a disappointment.

In conclusion, with regard to the baths of immersion, as in old and very much debilitated people the descent

into the water is a matter of much difficulty, there is, at several of the establishments, a chair affixed in some of the bathing-rooms, with machinery so attached to it, that the patient can be lowered into the water and raised out of the bath with the greatest facility. It is scarcely necessary to add, that for the paralytic, and those who have been afflicted with gout and rheumatism so severely as to deprive them temporally of the use of their limbs, they should avail themselves of this ingenious contrivance, so much calculated for their safety, convenience, and comfort.

CHAPTER X.

Necessity of paying attention to diet—rules to be observed at breakfast—luncheons—dinner—wines—tea—supper.

In order that the springs may have every chance of being efficacious, it cannot be too strongly enforced on the minds of invalids, that the utmost caution is necessary in respect to the quantity and quality of food and drink which they may use during a course of the waters. And as too great a quantity of fluid taken into the stomach, will tend to weaken that organ, by over distention, and to retard the digestive process by too much dilution, it will be necessary to diminish the liquids which are used at the ordinary meals, in order that the powers of the viscus may be drawn on as sparingly as possible, either mechanically, chemically, or vitally.

Tea and coffee should not be taken at breakfast immediately after drinking from the chalybeate spring, for, small as the quantity of iron may appear in the table, the virtues of the water depend, in some measure, on its presence, and, consequently, any chance of producing a chemical change in the stomach should be avoided. Chocolate or cocoa is preferable, and by persons whose stomachs cannot bear any of these, milk and water, heated to the ordinary temperature of tea, bread and milk, or other light spoon-meats, must be substituted. The bread used should, be at least forty-eight hours old, and if toasted not eaten while warm; but biscuits made of flour and water simply, are better; and if either of them be covered with butter, the quantity must be very small. Rolls, muffins, and slices of newly-baked bread, always digest badly in weak habits. The propriety of taking broiled mutton, or veal chops, or butchers' meat of any kind, will depend on the powers of digestibility and ailment of the invalid, On no account, however, should the stomach be gorged, however urgent the feeling of hunger may be; and if any unpleasant sensation of mind or body arises, during or after the digestion of this or any other meal, from what has been taken, it will be necessary to diminish or increase the quantity of food and drink, or one or other of the parts of which the meal is composed, change the quality, change the hour at which it is taken, or the number of refreshments daily.

Luncheons are mostly hurtful, and are even unnecessary, if dinner be taken before four in the afternoon, which certainly, for the invalid, is more proper than at a later hour of the day. If circumstances, however, should require the patient to dine at a late hour in the evening, a slice of cold meat and a biscuit should be taken between one and two o'clock. Soda-water and toast and water are the best beverages in the forenoon, and are to be preferred to ginger and spruce beers, which being liable to ferment, are improper. When no inflammatory action is going on, a tea-spoon-full or two of brandy and water may, in most cases, be allowed safely; but the result of using this, or indeed any other ardent spirit, must, in a great measure, justify the forbearance or continuance of such a practice.

Of all the meals, that of dinner is the one where there is the greatest disposition to indulgence, and consequently it is the one where the patient ought to summon up the greatest resolution against the immoderate and morbid craving for food. A little beef-tea or broth, when not very rich, may be allowed; but the temperature should neither be so cold as to produce the slightest degree of shivering, nor so warm as to cause any particular sensation of heat when taken into the stomach, and besides not above a few hours old. At this as well as at all other meals, the bread eaten should be stale, and if biscuits are used, those as mentioned for breakfast, made of flour and water simply, are to be

preferred. Fish is to be taken with the greatest circumspection, and in most cases none at all. When allowed, the white species, and the thick parts of them, are the most wholesome; and they are more digestible when they are boiled than prepared in any other way. No sauce is better than a little plain butter, but, from its oily nature, it is apt, even in weak stomachs, to become rancid.

Whatever animal food is permitted should be fresh and tender in its texture, well chewed, and conjoined with a very small portion of fat. Sufficient time should be allowed when at table to masticate slowly, and no violent exercise suffered until the digestion has in a great degree been finished. With regard to the facility of digestion, the tender parts of chickens, mutton, young game, roast beef, and lamb, are much more easily acted on by the gastric juice, than veal, ducks, goose, salted meats, pork, stews, and ragouts; the order of their digestibility being as they are enumerated. The skin and tendinous parts of meat are very unwholesome; and the adjuncts of onions, pickles, and the like, however inviting they may be to the palate, almost always produce such a train of disagreeable symptoms, during the preparatory process of nutrition, as to prohibit them at this or any other time. In some very weak people, however, a little of the more common vegetables agree with their habits; but if at all indulged in,

it ought to be with the precaution of choosing those which are ripe, tender, and sweet.

The invalid would do well to avoid the greater part of the pastry stuffs and puddings which generally follow the more essential parts of the dinner repast, under which are included, particularly, those mixed up with eggs, currants, and raisins. The simpler dishes, such as those composed of bread, rice, tapioca, and some of the lighter farinaceous substances, are not so frequently followed by the disagreeable effects which follow from the digestion of dishes mixed up with dried fruits. But if the patient should feel that his stomach is worse after the use of them, or of any other pudding, they must, like every offending substance, be proscribed from the list of comestibles. Apples, pears, apricots, peaches, plums, currants, gooseberries, cherries, oranges, lemons, melons, mulberries, strawberries, and raspberries; pine-apples, cocoa-nuts, walnuts, chesnuts and filberts, raisins and almonds, as well as very new and very old cheese, ale, beer, porter, and new wines, are to be excluded. If there be much irritation in the stomach, pure water, or toast and water, will be by far the best beverage. A table-spoonful of brandy in half-a-pint of water may be substituted, as the patient becomes better; and, in proportion as the ailment ceases, wine may be substituted for both; commencing with only two glasses. Sherry, Lachryma Christi, and

madeira, are to be preferred to port, hock, or champagne, from the ascescency of the latter; and it is better to take them after than during the time of the meal. These rules, let it be remarked, apply only to the invalid, and more particularly to that class of patients denominated dyspeptic. And, as the hilarity of company keeps up the spirits of the desponding, and, consequently, tends to excite the appetite, by removing the influence of the mind off the stomach, the custom of dining in cheerful society, which by observing the established rules usually followed necessarily prevents that improper and unwholesome custom of quick eating, has a twofold beneficial influence on the habits of the invalid.

The waters having left the stomach long before the following meal, both tea and coffee may be allowed with safety; Bohea and the Turkish species being preferred. One or two slices of plain well-toasted bread, with the smallest possible quantity of butter on the surface will suffice to be taken with it. Pastries and the like, enticing as they are, do more harm in clogging the stomach than the simplicity of their composition would lead to infer, and hence, a small biscuit or two may supply their place.

Suppers of all kinds should, if possible, be abandoned. When the privation of them produces loss of

sleep or other disagreeable feelings, a small biscuit and a slice of meat, with a table-spoonful of brandy in a glass of water made palatable by some kinds of spice and hot water, may be necessary in some habits; but the quantity of food, before retiring to bed, should be small. No oysters, lobsters, or shell-fish, should be allowed.

CHAPTER XI.

Conclusion—peculiarity of individual cases—waters inapplicable to every ailment—mental occupation—exercise—vicissitudes of temperature—clothing—general observations.

The rules contained in the preceding Chapters, both with regard to the use of the Leamington waters and the diet to be observed during a course of them, are only general; and, although adapted to the greater number of the sick who frequent watering-places, are still inapplicable to many. The variety of the streams, the peculiar constitution, hereditary predisposition, habits, age, and sex of the invalid, are matters of the utmost importance for consideration in the treatment of every complaint. Each case, therefore, strictly speaking, demands the advice of some professional person, whose knowledge of the

ingredients of each spring will enable him to point out that which is most applicable to the disease, the most appropriate modes of using it, and the other auxiliary rules which may be necessary to observe during the period of its employment.

It must be confessed, that of all others, the physician who has attended the patient from the beginning of the complaint, is the most proper for this purpose. Acquainted with the properties of the waters, the functions of the body, both in health and sickness, his knowledge of the constitution and idiosyncrasy of the person who has been under his care, of the history of the disease, and of the various changes which have occurred from its commencement, will enable him to judge more accurately of the plan which should be adopted, than a person who sees the invalid only once, and at a particular period of the ailment. Isolated cases may, however, demand the attention of some person qualified to watch the changes which may take place. Those, therefore, who require any assistance during a course of the springs, would do well to bring with them a written statement of the nature of the case from their medical attendant, and more particularly of the different remedies that have been employed, as such a statement, from a professional source, may more materially facilitate the cure of their complaint than they might, at first sight, be inclined to suppose.

Beneficial, however, as the springs of Leamington have proved, they are neither held up as a panacea for all the ailments which afflict mankind, nor is it maintained that a course of them should not be accompanied with other suitable medicines. So much may the contrary be affirmed, that the combined and separate use of the waters is not only, in some cases, unnecessary, but even highly prejudicial. Some diseases require their external use almost exclusively; such as affections of the skin, and in the various ways that have been pointed out; others require them principally as internal medicines, for example in bowel complaints, and in smaller and greater doses, and for periods of time which those who are ignorant of the laws of economy and of the disease they labour under, are totally incapable of judging of; while, in a third class, they ought to be avoided altogether.

In paying attention to the diet and use of the waters, invalids, who are able to walk in the open air, should avail themselves of every other circumstance which may assist in improving the general health. The lighter kinds of intellectual amusement, usually found in reading-rooms, will materially assist in dispelling the ennui of idle hours; the gaiety of the pump-rooms and promenades, the public amusements, natural curiosities, agreeable views and prospects around the town, will tend much to keep up a constant change of scene, and to break that chain of morbid ideas, which, in a great number of the sick who frequent

watering-places, is too often a powerful concurring cause in keeping up their disease. All conflicting passions, anxiety about business, causes of grief, in short, every source of inquietude and depression should, as much as possible, be avoided, and the attention of the friends of the sick cannot be too strongly called to such auxiliaries. Every thing, on the contrary, which can withdraw the mind of the invalid from former associations, will promote the cure of his complaint; and, as part of the treatment, those afflicted with melancholy reflections of the past, and gloomy anticipations of the future, should be kept constantly occupied with the passing novelties, and on no account be suffered to remain without some corporeal or mental employment calculated to dispel their despondency.

Of the importance of both active and passive exercise in the recovery of health, much may be said, and, when moderately and prudently employed, it should form, more or less, part of the occupation of every convalescent, unless where it is specially contra-indicated. Riding, in a carriage will, at first, be found to be most suitable to those whose constitutions are much enfeebled. This may gradually be superseded by foot exercise, and the latter again by that on horseback; while by those whose frame requires general agitation, garden or field exercise is undoubtedly, of all the others, that which ought to be preferred; for, independently of the increased activity of the natural

functions of the viscera, of the thorax, and abdomen, necessarily excited by the various movements of the muscles of the upper and lower extremities, every muscle of the body participates in the general action. It is scarcely necessary to add, that exercise, when carried too far, becomes exertion, and may, of course, by misapplication, be the cause of greater harm than benefit. Every season of the year, and every part of the day, however, are not alike suitable for exercise. Generally speaking, the earlier weeks of spring, and the later weeks of autumn, are less favourable for chronic complaints than the other seasons of the year; and of the other two periods, winter is less so than summer; hence it is that those afflicted with ailments which lie dormant in the constitution for weeks and months, are particularly careful about exposing themselves at these particular seasons, especially when easterly winds prevail; and the propriety of the practice cannot be called in doubt.

Drinking cold fluids, when the body perspires, and chills of the morning and evening, are studiously to be avoided; but care must be taken not to confound those genial breezes, the effects of which are so salutary on the constitution, with the piercing colds of certain winds, which, on the contrary, are so baneful. The damp of foggy mornings, the cold air of nights, and the extreme vicissitudes of temperature, whether they are the result

of natural atmospheric changes, or the consequence of suddenly coming out from hot and crowded rooms, are to be rigidly shunned by the invalid, as the direful effects of a checked perspiration are but too frequently learned when they have laid the foundation of diseases, in many instances, but little under the controul of medicine.

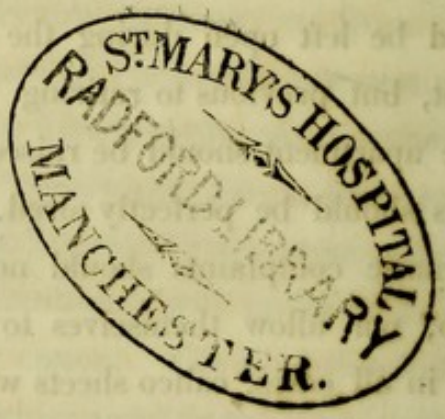
Much may be done by a judicious application of proper clothing. This it is clear must also be adapted to the state of the atmosphere and other causes. Calico in summer, next the skin, will be preferable to linen, as, from the latter retaining the moisture and constantly evaporating, it clogs the cutaneous surface disagreeably, and materially affects the general health. In winter, flannel will be of most service; and during the intermediate months, shirts, made of wool and cotton combined, will be found to be better than either flannel or cotton. The head should be thinly covered, and thin stockings and thin shoes laid aside. If the feet become cold, attention should be paid to bring them to their natural temperature; and, first of all, it should be directed to the state of the digestive organs, a derangement of which is often pointed out by that single symptom alone. Locally, a tepid bath will be used with more advantage than one of cold water or water heated to blood heat. The re-action of the extremities will also be powerfully assisted by drying them well with coarse well-

aired towels, and putting on moderately aired woollen stockings, which are somewhat elastic. Should these means fail in exciting the natural warmth, rubbing them with the flesh-brush may probably answer the object which is wished for, and that may be aided by an additional coverlet thrown over the feet at night.

Invalids should never sleep below the first floor, unless the room be perfectly dry, well-aired, and not exposed to a current of wind. A southern, eastern, or western exposure, is better than a northern. The bed-room window should be left open during the time that the patient is absent, but previous to retiring to sleep, the temperature of the apartment should be raised as high as 50°., and the sheets should be perfectly aired. Persons afflicted with rheumatic complaints should not expose themselves to damp, nor allow themselves to remain in wet clothes, and, in all cases, calico sheets will be found preferable to linen. Violent exertions of the voice, either by singing, speaking loudly, blowing on wind instruments, or the like, are carefully to be abstained from in lung complaints. No long-standing eruption or sores should be suddenly repelled; and, if the feet swell, the horizontal position will be found of the greatest service.

Retiring early to bed and rising early in the morning, temperance and regularity of life, will assist much in con-

solidating the advantages gained by the use of the waters; and, when the disease has been subdued, constant attention should be paid to the state of the stomach, skin, and bowels, and the utmost care taken to avoid the predisposing and exciting causes which may bring on a fresh attack of the complaint.



Leamington-Spa:
Printed by Sharp & Fairfax,
COURIER-OFFICE.