

**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, etc / [Charles Loudon].**

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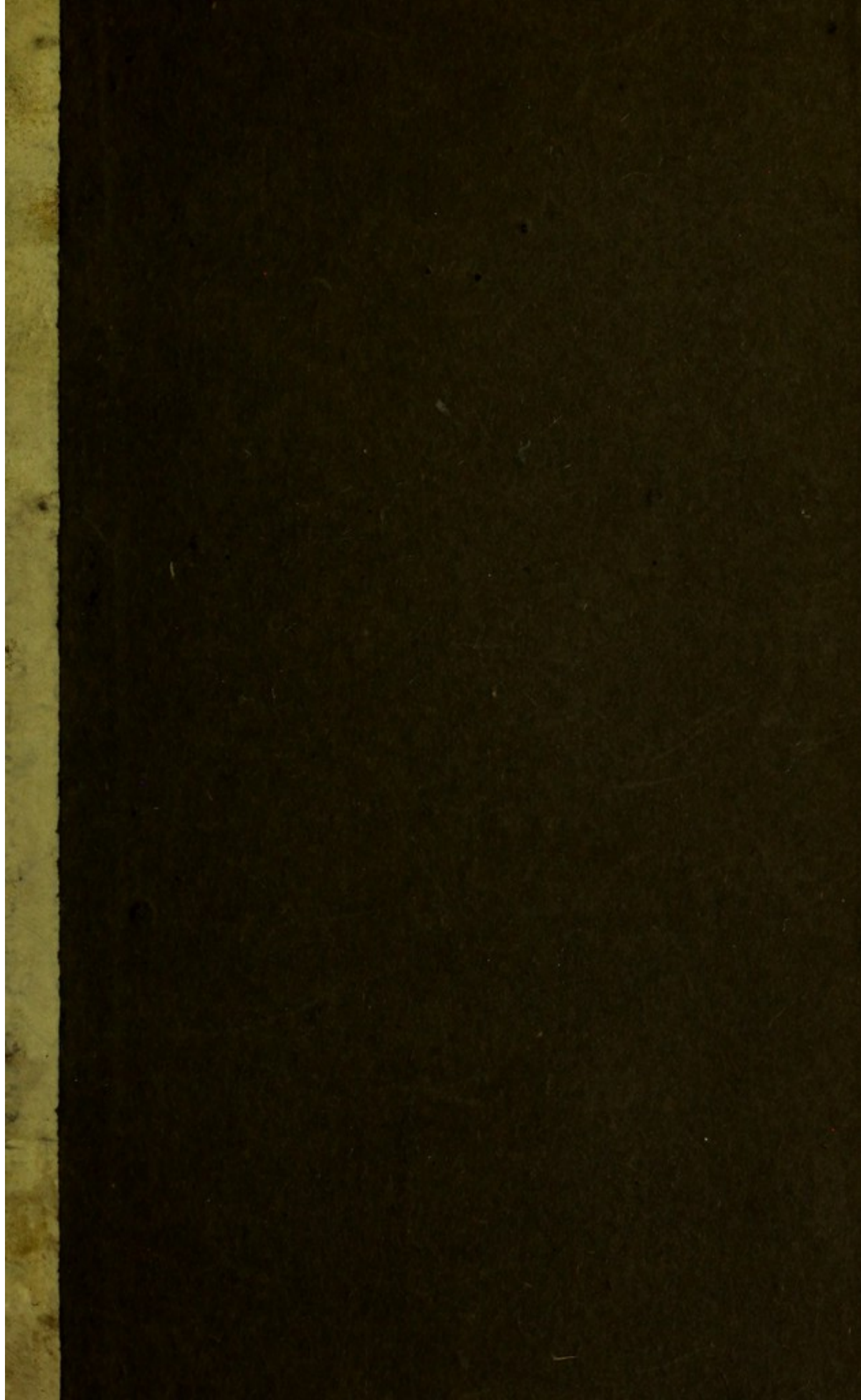
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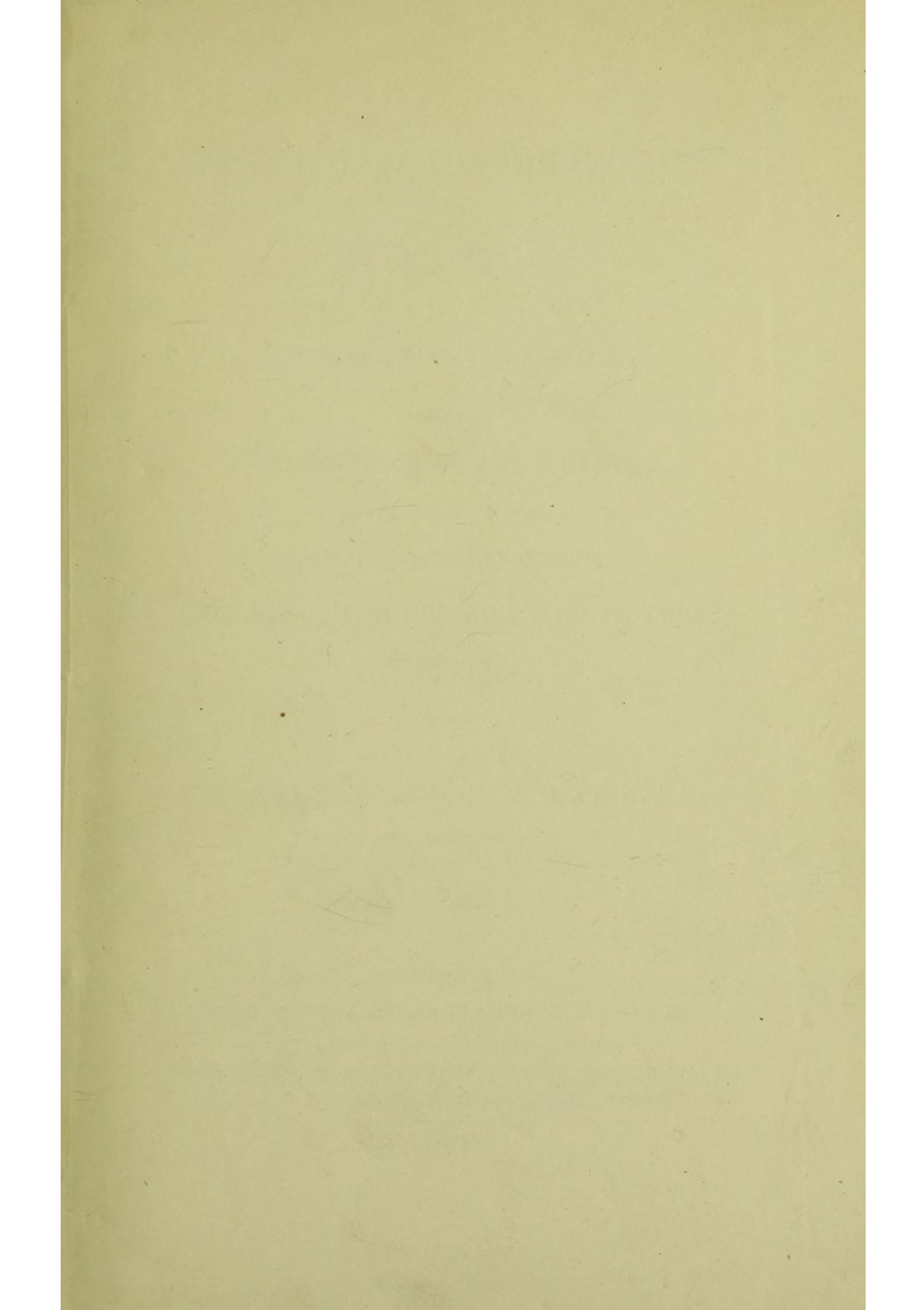
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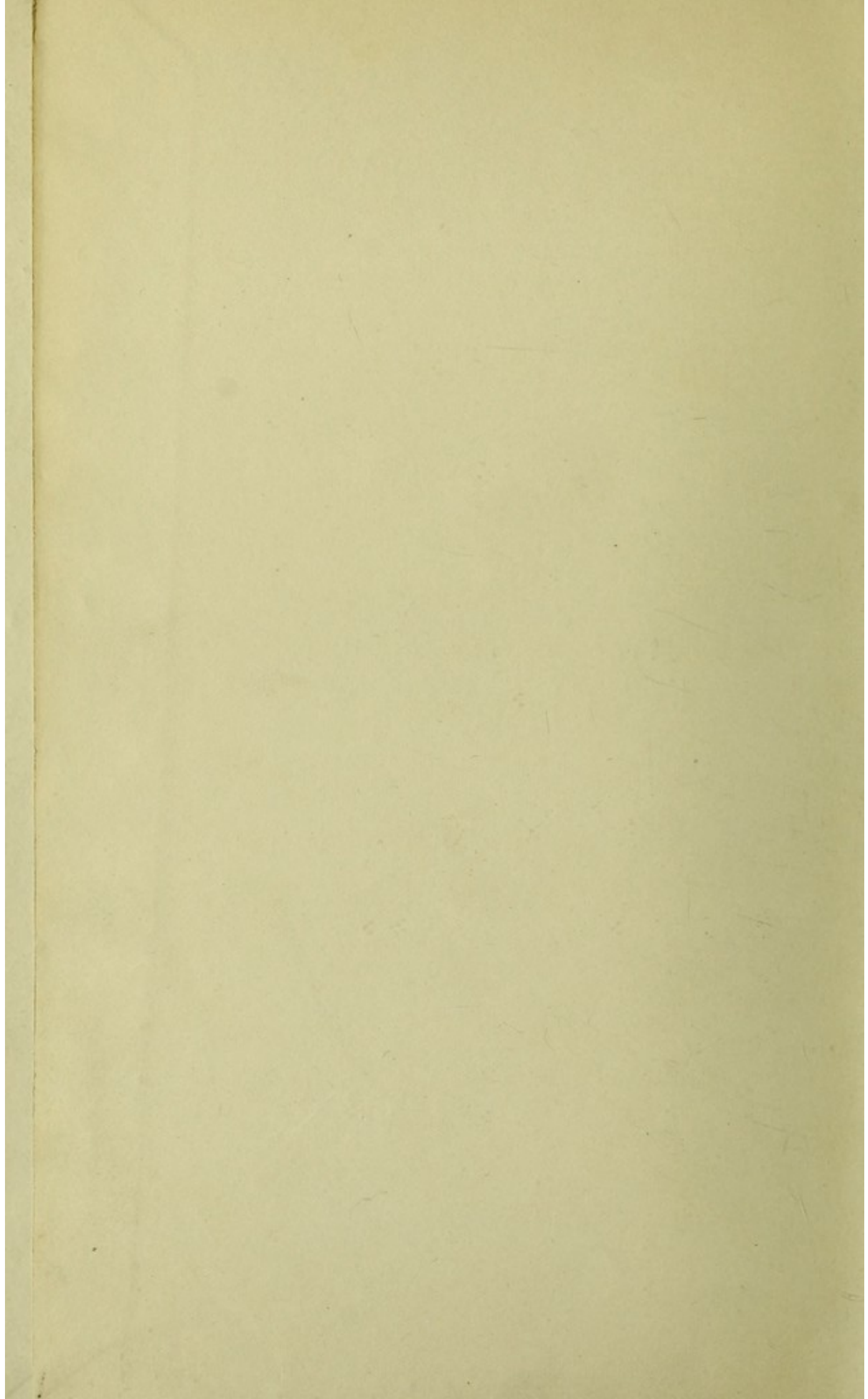


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A  
PRACTICAL DISSERTATION

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,

&c. &c.

By CHARLES LOUDON, M. D. PHYSICIAN

AT LEAMINGTON.

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1831.



PRAGMATICAL DISSERTATION

OF THE

WATERS

OF

WATFORD

IN THE COUNTY OF MIDDLESEX

BY

JOHN WATKINS, ESQ.

A NEW EDITION

WITH ADDITIONAL CONTENTS

THE RULES FOR DRINKING THE WATERS

BATHING

AND THE EFFECTS OF THEM

IN THE TREATMENT OF THE FEVER

AND OF THE SMALL POX

AND OF THE SCARLET FEVER

AND OF THE MEASLES

AND OF THE DISTILLERS' COLIC

AND OF THE RHEUMATISM

AND OF THE GOUT

AND OF THE CALCULI

AND OF THE STONES

AND OF THE GRAVEL

AND OF THE HEMORRHOIDS

TO

**JAMES KENNEDY, ESQ. M. D.**

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

---

**MY DEAR SIR,**

In offering these pages to the Profession, 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 Practitioner, who resides at a distance, 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 rendering 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, subjecting their remarks, however, to every necessary scrutiny. For the sake of the antiquary and succeeding historian who may wish to acquire more minute information, the literature, on each particular subject, has been appended to the Chapter to which it more immediately refers.

To the Works of Sir Charles Scudamore, Sir G. S. Gibbes, Drs. M'Kenzie, M'Cabe, Gibney, Falconer, 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 general 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, and to Dr. Daubeny, Professor of Chemistry in the University of Oxford. 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 lately resided in Leamington.

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 all that 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 slender 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,**

**3, Clarendon Place, Clarendon Square,**

**Leamington-Spa, Jan. 1831.**

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## CHAPTER I.

*Situation of Leamington—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.*

LEAMINGTON-SPA lies on the north and south sides of the river Leam, at the distance of 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 the other inland watering places, it is thirty-eight miles from Malvern, forty-four from Cheltenham, eighty-three from Matlock, eighty-eight from Bath, ninety-seven from Buxton, and about one hundred and fifty-three from Harrowgate. It is ninety miles from London, two hundred and forty from Dublin, and three hundred and twenty from Edinburgh. There are about twelve

hundred houses on both sides of the Leam ; and a population, during the season, of six thousand souls. The town is known solely for the fashion and rank who resort to it for amusement and society, and for the numerous advantages it possesses as a place for the recovery of health—more especially for its mineral waters.

Of the eleven medicinal springs at present in use, only one appears to have been known previous to the year 1784, namely, that called the **EARL OF AYLESFORD'S** ; which is now 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. The boon thus granted 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, with the lord of the manor, 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 their use even to a very few individuals, the preceding wells were found sufficient to supply all the demands both 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 superior 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 mineral fluid as it 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 and number 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 sulphureous 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 various 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 Bisset'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 II.

*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 sulphuretted hydrogen ; the former being pointed out by the ochreous deposit 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. As to the depth that the mineral fluid is found, that varies in every spring. The water of the Old Well once flowed from a fissure in the rock, quite at the surface of the earth. While in the South Parade, it has been found at a distance of more than 100 feet below the houses. The difference between the temperature of summer and winter, may be owing to the fresh 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 some of the mineral springs is higher than the level of the river and 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, if not the whole, 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 marine vegetable matter, from whence the iodine, brome, and gases are extricated by the fluid which has been already considered, as charged with the saline particles. In advancing nearer the surface, the fluid thus impregnated, meets with a stratum of porous iron-stone, which is combined with the silica, and which, in digging Mr. Smart's well, has been found to exist under the town; and hence the ferruginous bi-silicate. These opinions, however, much as they are strengthened by a series of synthetical experiments, lately published by M. Vogel, being unsuscep-

tible of demonstration, must necessarily be considered as mere suppositions ; and indeed, are of little or no importance in a practical point of view. It is even probable, that from the time the first impregnation is acquired, until the water reaches the surface again, several chemical changes take place which do not admit of demonstration.

The springs of Leamington, notwithstanding the muriate 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 sub-

stances 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. The discovery of iodine and brome is due to Dr. Daubeny, Professor of Chemistry, in the University of Oxford. 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.

Vogel Annales de Chimie, tome 40, p. 433.

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

| SPRINGS.                     | GASES, IN CUBIC INCHES. |       |                  |                              | SALTS, IN GRAINS.      |                          |                           |                             |        |                        | Iodine<br>and<br>Brome | Total<br>of the<br>Salts in<br>Grains |
|------------------------------|-------------------------|-------|------------------|------------------------------|------------------------|--------------------------|---------------------------|-----------------------------|--------|------------------------|------------------------|---------------------------------------|
|                              | Oxygen                  | Azote | Carbonic<br>Acid | Sulphur-<br>ated<br>Hydrogen | Sulphate<br>of<br>Soda | Chloride<br>of<br>Sodium | Chloride<br>of<br>Calcium | Chloride<br>of<br>Magnesium | Silica | Peroxide<br>of<br>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                                |
| { Saline . . . . .           | .025                    | .565  | 2.162            | none                         | 30.610                 | 42.922                   | 17.987                    | 10.813                      | 0.972  | 0.265                  |                        | 103.575                               |
| IMPERIAL { Chalybeate        | .075                    | .645  | 3.294            | none                         | 34.294                 | 55.271                   | 25.059                    | 3.927                       | 8.580  | 8.580                  |                        | 135.711                               |
| { Saline . . . . .           | .098                    | .763  | 3.156            | none                         | 34.435                 | 14.534                   | 17.570                    | 26.050                      | none   | a trace                |                        | 92.589                                |
| FOUNT { Sulphureous          | .012                    | .612  | 3.531            | 1.142                        | 31.112                 | 7.301                    | 39.305                    | 19.494                      | 3.620  | 0.530                  |                        | 101.362                               |
| ROYAL { Sulphureous          | .064                    | .498  | 3.156            | 1.140                        | 5.546                  | 5.144                    | 3.365                     | 1.156                       | none   | a trace                |                        | 15.211                                |
| PUMP ROOM { Saline . . . . . | .066                    | .588  | 2.950            | none                         | 32.744                 | 67.782                   | 20.902                    | 12.363                      | 1.045  | 0.956                  |                        | 135.792                               |

Of the former, about 0.08 ; the Brome much less.

## CHAPTER III.

*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, an imperial gallon of the mineral fluid was received into a vessel containing

lime water, and the precipitate collected, washed, and dried. The weight of the powder being ascertained, it 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  |
|                      | <hr/>  |
|                      | 13.538 |

These constitute—

|                             |        |
|-----------------------------|--------|
| Sulphate of soda .....      | 4.552  |
| Chloride of sodium .....    | 5.415  |
| Chloride of calcium .....   | 2.237  |
| Chloride of magnesium ..... | 0.240  |
|                             | <hr/>  |
|                             | 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         |
|                             | <hr/>         |
|                             | 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  |
|                             | <hr/>  |
|                             | 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. Thus

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    |
|                      | <hr/>                   |
|                      | 12·991                  |

Constituting—

|                             |              |
|-----------------------------|--------------|
| Sulphate of soda .....      | 4·464 grains |
| Chloride of sodium .....    | 3·012        |
| Chloride of calcium .....   | 2·120        |
| Chloride of magnesium ..... | 2·556        |
|                             | <hr/>        |
|                             | 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        |
|                             | <hr/>         |
| 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          |
| <hr/>                         | <hr/>          |
| 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        |
| <hr/>                       | <hr/>        |
|                             | 10.876       |

The Saline contents of an imperial gallon are ;—

|                             |               |
|-----------------------------|---------------|
| Sulphate of soda .....      | 228.95 grains |
| Chloride of sodium .....    | 282.80        |
| Chloride of calcium .....   | 188.09        |
| Chloride of magnesium ..... | 67.75         |
| <hr/>                       | <hr/>         |
| 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 |
|                | <hr/> |                   |
|                | 9.346 |                   |

## Constituting

|                             |              |
|-----------------------------|--------------|
| Sulphate of soda .....      | 3·184 grains |
| Chloride of sodium .....    | 2·905        |
| Chloride of calcium .....   | 1·790        |
| Chloride of magnesium ..... | 1·100        |
|                             | <hr/>        |
|                             | 8·979        |

## The saline contents of an imperial gallon are—

|                             |        |
|-----------------------------|--------|
| Sulphate of soda .....      | 224·52 |
| Chloride of sodium .....    | 204·84 |
| Chloride of calcium .....   | 126·22 |
| Chloride of magnesium ..... | 77·56  |
|                             | <hr/>  |
| Total                       | 633·14 |

## Gaseous—

|                            |               |
|----------------------------|---------------|
|                            | CUBIC INCHES. |
| Oxygen .....               | 0·200         |
| Azote .....                | 3·400         |
| Carbonic acid .....        | 25·250        |
| Sulphuretted hydrogen..... | 9·152         |
|                            | <hr/>         |

## 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  $\cdot 54$  gr. Being re-dissolved in muriatic acid, there remained  $0\cdot 28$  gr. of insoluble white powder, a compound of 6 atoms magnesia and 1 atom silica, and, therefore, composed of  $0\cdot 25$  gr. magnesia,  $0\cdot 03$  gr. silica.

So that the—

|                               |             |
|-------------------------------|-------------|
| Silica, altogether, was ..... | 0.11 grains |
| Magnesia .....                | 0.51        |
| Peroxide of iron .....        | 0.03        |
|                               | <hr/>       |
|                               | 0.65        |

Hence, 1000 grains contain—

|                      |                                     |
|----------------------|-------------------------------------|
| Chlorine .....       | 5.140 grains                        |
| Lime .....           | $1\cdot 018 = 0\cdot 727$ calcium   |
| Sulphuric acid ....  | 1.924                               |
| Magnesia .....       | $0\cdot 510 = 0\cdot 306$ magnesium |
| Silica .....         | 0.110                               |
| Peroxide of iron ..  | 0.030                               |
| Soda (inferred) .... | $1\cdot 539 = 1\cdot 942$ 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 .....                 | <hr/> 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        |
|                                      | <hr/> 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                   |  |
|                   | <hr/>                   |  |
|                   | 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        |
|                             | <hr/>        |
|                             | 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         |
|                             | <hr/>         |
| 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 grains 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                   |
|                  | <hr/>                   |
|                  | 11·613                  |

Constituting—

|                                 |              |
|---------------------------------|--------------|
| Sulphate of soda . . . . .      | 3·902 grains |
| Chloride of sodium . . . . .    | 1·647        |
| Chloride of calcium . . . . .   | 1·991        |
| Chloride of magnesium . . . . . | 2·952        |
|                                 | <hr/>        |
|                                 | 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        |
|                                 | <hr/>         |
| Total                           | 740·71        |

## Gaseous—

CUBIC INCHES.

|                     |        |
|---------------------|--------|
| Oxygen .....        | 0.784  |
| Azote .....         | 6.104  |
| Carbonic acid ..... | 25.250 |

## IX.

## IMPERIAL FOUNT.

(SULPHUREOUS.)

Sp. gr. .... 1.00900 grains

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                   |
|                   | <hr/>                   |
|                   | 11.374                  |

## Constituting

|                             |              |
|-----------------------------|--------------|
| Sulphate of soda .....      | 3·524 grains |
| Chloride of sodium .....    | 0·827        |
| Chloride of calcium .....   | 4·452        |
| Chloride of magnesium ..... | 2·208        |
| Silica .....                | 0·410        |
| Peroxide of iron .....      | 0·060        |
|                             | <hr/>        |
|                             | 11·481       |

## Saline contents of an imperial gallon :—

|                             |        |
|-----------------------------|--------|
| Sulphate of soda .....      | 248·90 |
| Chloride of sodium .....    | 58·41  |
| Chloride of calcium .....   | 314·44 |
| Chloride of magnesium ..... | 155·95 |
| Silica .....                | 28·96  |
| Peroxide of iron .....      | 4·24   |
|                             | <hr/>  |
| 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        |
|                | <hr/>        |
|                | 1.649        |

Constituting—

|                       |              |
|-----------------------|--------------|
| Sulphate of soda      | 0.633 grains |
| Chloride of sodium    | 0.587        |
| Chloride of calcium   | 0.384        |
| Chloride of magnesium | 0.132        |
|                       | <hr/>        |
|                       | 1.736        |

The saline contents of the imperial gallon are:—

|                       |              |
|-----------------------|--------------|
| Sulphate of soda      | 44.37 grains |
| Chloride of sodium    | 41.15        |
| Chloride of calcium   | 26.92        |
| Chloride of magnesium | 9.25         |
|                       | <hr/>        |
| 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        |
|                        | <hr/>        |
|                        | 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                   |
|                       | <hr/>                   |
|                       | 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        |
|                             | <hr/>        |
|                             | 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          |
|                             | <hr/>         |
| Total                       | 1086·85       |

## 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 grains. On that supposition, every atom of it will be united with two atoms of silica, constituting bisilicate of iron.

## CHAPTER IV.

*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—exter-  
nal complaints—constitutional disorders—no specific  
action in white swellings—no peculiar antilithic pro-  
perties—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. These months, usually called the Season, are 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, ought to be 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 often 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 about seven o'clock in the morning, 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 immediate effects of the saline 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 Leanington, 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, diarrhœa 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 V.

Sulphureous springs—dose of the sulphureous water—effects—rules to be observed—preparatory treatment—alterations 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 is many individuals is very disagreeable, a small quantity of pepper-mint, 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 feeling or disgust.

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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  $212^{\circ}$ , 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 along 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, alphas, 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 distension ; 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 VII.

*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's dance, and many anomalous hysterical affections. As a tonic, it is an

excellent remedy in bracing the system 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 VIII.

*Warm bath—temperature—number of times to be used—  
applicable to certain diseases—preparatory measures  
—precautions with regard to the sulphureous and cha-  
lybeate 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 oedematous swellings of the feet ; melancholic disorders ; affections of the urinary organs ; concretions obstructed in the kidneys, 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 height. 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 dangerous 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 thirty to two hundred 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 IX.

*Importance of Leamington as a watering-place—variety of the springs—inapplicable to every ailment—climate—internal comfort of the place—corporeal and mental occupation—fumigating and vapour baths.*

THE importance of Leamington, as a watering place, may be inferred from the extreme rapidity with which it has risen from obscurity to be a town of such considerable magnitude. This has, with some degree of justice, been attributed to the number, variety, and abundance of its mineral streams. Having eleven different wells, and uniting, in a single spot, waters similar to 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. The rules, however, in the pre-

ceding chapters, with regard to the use of the waters, although applicable to the greater number of invalids who frequent Leamington, are like every other class of rules for the recovery of health, to be considered as general, and consequently inapplicable to many individual cases. Not only do the springs require to be modified according to age, constitution, hereditary predisposition, habits and sex, but diminished, increased, and combined according to circumstances, and in some cases they are quite inadmissible. Nor is this all. Without auxiliary medicine, a suitable diet, and other regimen, the object which is wished to be obtained, may be, and is frequently, defeated by doing too little.

Valuable as the waters are, and important as medicine and diet must be allowed to be, there are other circumstances, in every watering-place, which it is both of consequence for the physician to look to, and the invalid to be aware of. The first of these is the climate of the place itself. Leamington, from being situated at a distance from the coast, and in the midst of a level country, is neither exposed to sudden gusts of wind, 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 that of the greater part of the inland watering places 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 highly cultivated state of the soil around the town, entirely free from morasses, with the numerous scattered woods and rivulets, contributes, in no small degree, to its being one of the most salubrious spots in the inland counties.

The internal comfort of the town of Leamington claims also consideration. Having been built, almost entirely, within the last thirty years, the streets are wide and airy ; the hotels, lodgings, and baths fitted up with a luxury and convenience not surpassed any where in the kingdom ; whilst the numerous well-stored shops and public markets leave nothing awanting which the necessities or desires of the visitors require. Nor ought the relation of Leamington to the other large towns to be overlooked. Communicating with Coventry in an hour, with Birmingham in 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 that the celerity of the conveyances so conveniently affords.

But as both corporeal and mental exercise are important adjuvants in the recovery of health, the opportunities of walking and riding, and of keeping up a change of scene before the mind, are also worthy of notice. Standing on two gentle acclivities, with a superstratum of very dry soil, the rain which falls is quickly absorbed, and the promenades become consequently very speedily dry ; while the changes

that have been made, and are daily kept up, by the police of the place, render walking and riding in the streets a matter of very great comfort, even after the most unfavourable weather. 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, supplied with the best journals ; Assembly Rooms ; an excellent Hunt in the place, and Society of the first description ;—with roads on every side proverbial for their goodness ; a variety of enchanting walks in the surrounding fields, overlooking the most luxuriant scenery ; and being in the immediate neighbourhood of those highly romantic spots,—Warwick Castle, Guy's Cliff, the Ruins of Kenilworth, Offchurch, Stoneleigh Abbey, Warwick Priory, Edgehill, Grove Park, Blacklow Hill, Stratford-on-Avon, the birth-place of Shakespeare, Coombe Abbey, and other objects, both of historical and antiquarian interest,—it has justly been 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.

In conclusion, while the alimentary canal is acted on by the waters, the nourishment by the lungs, changed by the locality and variety of the terrestrial radiation ; while the general comfort of the place, facilities for exercise, and

amusement for the mind, are so varied, the means of producing an alterative action on the skin, independently of bathing, have not been lost sight off. No less than eighteen different modes of fumigation may be practised in two different establishments, appropriated for the use of applying simple or impregnated vapour. The advantages of these must be self-evident.\*

\*Pratt's Local and Literary Guide, 1814.

Field's Warwick and Leamington, 1815.

Bisset's Guide to Leamington, 1815.

Moncrieff's Guide to Leamington, 1826.

Medley's Guide to Leamington, 1826.

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