Natural mineral waters : their properties and uses.

Contributors

Ingram & Royle (Firm)
Royal College of Surgeons of England

Publication/Creation

London : Ingram & Royle, 1886.

Persistent URL

https://wellcomecollection.org/works/ae85cdxx

Provider

Royal College of Surgeons

License and attribution

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

Unable to display this page

NATURAL MINERAL WATERS:

THEIR

PROPERTIES AND USES.

PREFACE.

—:)o(:—

SEVERAL years have elapsed since the publication of the 7th edition of this pamphlet, and the demand for Natural Mineral Waters having, during that interval, grown enormously, it has become necessary to issue a revised and improved edition, brought up to the level of existing knowledge on this subject. A notable feature in this new edition will be found in the particulars of many excellent natural mineral waters, formerly but little known or used, but recently come into vogue, on account of their special properties and uses.

The prominent characteristic of hydro-therapeutics has been, of recent years, the rapid extension of the use of Natural Mineral Waters by the Faculty in this country. The gradual adoption of this mode of treatment at home, in the initial and even advanced stage of various diseases (many of them somewhat obscure), and in substitution for the journey for the purpose of treatment *in situ*, has had and is still having the effect of assimilating the medical practice of the United Kingdom more closely to that of continental physicians. By the latter these remedial agents have long been held in the highest estimation, and their use largely prescribed, whence it results that the consumption of Natural Mineral Waters, in all parts of the Continent of Europe, is many times greater in proportion than it is in this country.

Our object in compiling and issuing this improved edition of our pamphlet is mainly to promote a more extended knowledge of these valuable natural remedies and their consequent use, by supplying, in an elementary form, useful information as to the chemical composition and the special healing virtues of all the leading Natural Mineral Waters; supplemented by an Appendix, containing, in tabular form, brief notices of these and many other waters, less known, for which a small but increasing demand has arisen in this country. We trust that this general *résumé* will lead all those who are interested in this special subject to consult and study the comprehensive works of the many eminent specialists who have treated thereof, viz., Drs. Sutro, Weber, Althaus, Macpherson, Lee, Braun, Durand-Fardel, Prosser-James, and others—sources to which we have to acknowledge our obligation for much of the information herein contained.

INGRAM & ROYLE,

52, FARRINGDON STREET, E.C.

March, 1886.

NATURAL MINERAL WATERS.

"The subject which I have to bring before you may justly claim to be a very important part of Materia Medica; for it treats of remedies, prepared in the womb of the earth, by the power of nature alone, which are, in many cases of disease, indispensable to effect a cure."—DR. SUTRO.

"Above all things it appears to me necessary to show that the treatment of disease and of morbid constitutional tendencies, by the aid of Natural Mineral Waters, is only a branch of general medicine; that it rests on the same principles; and that it ought to go hand in hand with other measures of sound practice."—DR. HERMANN WEBER.

"Natural Mineral Waters have a special claim upon the attention of the Medical Profession, not only on account of their remarkable physiological and therapeutical properties, but also because they are the only medicines offered to us by nature in a state fit for immediate use."—DR. ALTHAUS.

Natural Mineral Waters, as remedial agents, have always been found superior to, and much more efficacious than, the most ingenious imitations or artificial preparations, formed by synthesis and based on chemical analysis. This is, doubtless, attributable to the fact that they contain elements which escape ordinary analytical methods of examination. For example, the perfection attained of late years by the application of the modern system of Spectrum-Analysis, has led to the discovery of the existence of certain metals, *e.g.*, copper, strontium, lithium, and arsenic—in springs where their presence was previously unsuspected. It is extremely probable, if not beyond all doubt, that many subtle and important mineral constituents of some natural mineral waters still escape detection by the most minute analysis, even under the scrutiny of eminent chemists. This is sufficient explanation of the fact that Natural Mineral Waters very frequently effect a cure in cases of complaints which have proved utterly intractable to treatment by artificially compounded remedies, from which even little or no alleviation has been attained. And it is for this reason that physicians and specialists, both in this country and on the Continent, have, until a comparatively recent

period, been in the habit of prescribing their use *in loco*, at the place itself where the waters spring.

But by the modern system of supplying the natural mineral waters in bottles, filled and hermetically sealed at the springs themselves, with due care and surveillance, all or nearly all these natural waters may be exported, so that their beneficial use, in a course of home treatment, is rendered possible, without any loss of their primary restorative and remedial qualities.

But to this end, it is absolutely essential that the waters should be bottled on the spot, in their natural condition, as they issue from the spring, without any artificial treatment or manipulation of any kind whatever. Everything in the shape of the addition of arbitrary proportions of artificially prepared salts, or of overcharging with carbonic acid gas chemically generated, is therefore to be deprecated and prohibited. It is indisputable, however, that such practices are far from uncommon. They have a tendency to vitiate the valuable properties of the natural water, and to defeat the objects of its use; and the result has no doubt been to cause failure of the anticipated benefits, and to lower the reputation of the water as a remedial agent.

Upon this point reference may be made to the deliberately expressed opinions of some of the highest authorities on hydro-therapeutics. Tichborne and Prosser-James, in their well known work on "The Mineral Waters of Europe," writing on the therapeutics of table-waters, say:—

"It is an error to suppose that the value of a water is in proportion to the amount of gas it contains. A large quantity is expelled from the stomach almost as soon as swallowed, or else is liable to cause distress. Hence waters containing a moderate amount are found more digestible."

On the danger of artificial waters the same authorities remark, *ibid*:—

"When we consider mineral waters from a medical aspect we cannot too strongly condemn an attempt to imitate the natural springs."

Sir Henry Thompson, F.R.C.S., etc., in a clinical lecture on "The Early History of Calculous Disease, and the Treatment best Adapted for its Prevention," delivered at University College Hospital, made the following remarks on the radical difference between natural and artificial mineral waters:—

"At the same time let me caution you against regarding the small doses of mineral waters as having any affinity, either in the matter of quantity, or by manner of administration, with what is understood as homœopathic doses. Thus, for example, you know that you may give A an ounce of salts, or B half an ounce and you purge them; but you may obtain the same effect with one-fifth of those quantities, if you give it as prepared in Nature's laboratory in the form of mineral water. It is a curious fact, which I give as an ultimate one, and without speculating here on the cause of the difference . . . . . You will, therefore, readily understand how essential it is

to our object to employ the natural mineral waters ; since what are called artificial waters,' however admirably prepared, are simply pharmaceutical products, and are destitute of the very quality which distinguishes the remedy they are designed to imitate . . . . . So that there is something, which I do not pretend to explain, and certainly shall not speculate about here, which distinguishes the action of Natural Mineral Waters from the action of salts which are produced pharmaceutically."

Further Medical testimony against the use of Artificial Mineral Water is given in the following extracts :—

"I cannot blame in too strong terms the use of Artificial Mineral Waters. They never replace those of the natural springs. To give the name of Vichy waters to a mere solution of bi-carbonate of soda is as absurd as to give the name of wine to a mixture of cream of tartar, alcohol, and mineral salts, which this liquid is proved to be when analysed. Go to the natural springs ; nature is far better than the laboratory."—*Dr. Bousdon.*

" Artificial Mineral Waters of the best fabrication are, in a medical and chemical point of view, only a poor counterfeit of the real waters whose name they usurp. They are doubly pernicious, as they do not attain the physician's aim, and cast a certain discredit on the genuine production."—*Dr. Constantin James.*

" Having heard so much of Mineral Waters, you will ask perhaps—does not the name indicate that certain mineral substances are dissolved in the springs ? And if so, why could we not, with the knowledge of their composition, combine the same substances in the same proportions, and expect similar results ? I answer, if only soluble remedies were contained in them, you might certainly easily imitate them, but although these waters appear perfectly clear and transparent, every one of them contains substances insoluble in common or distilled water."—*Dr Sigismund Sutro.*

" When Bacon expressed surprise that ' no man hath sought to make an imitation by art of natural baths and medicinal fountains,' he was not aware that such imitations had already been made. Herodotus, indeed, a successor of Galen, had declared that the copies were not equal to the originals. We have already seen that, as regards baths, everything had been done that Bacon could have wished ; and it is the same with medicinal fountains, of which imitations have now for a long time past been prepared. These are truly called imitations, for they are seldom exact enough to rank even as accurate copies. And this is not surprising, while the exact chemical constitution of mineral waters is by no means positively determined. Whether the presence of minute quantities of a great many salts is of any real importance ; whether nature's polypharmacy is more valuable than man's, or not, it is very difficult to add these fractional quantities accurately to artificial waters ; and the organic matters, such as *baregine*, present in some, cannot be imitated at all. As these artificial waters are but imperfect copies, perhaps it would be better if the actual contents of the bottles were specified on the outside, instead of the name of the spring they imitate."—*Dr. Macpherson.*

Our last quotation will be from the writings of Dr. Durand-Fardel, of Paris, one of the most eminent hydrologists, if not the most eminent, of the day :—

" There is all the difference in the effect of carbonic acid gas upon the stomach, according as it emanates from a liquid, artificially rendered gaseous, or from a naturally gaseous liquid. I have known too many cases in which the stomach has been injured by the habitual and too prolonged imbibition of artificial gaseous waters to doubt that every other specialist has had the same experience.....It may be accepted, as a general rule, that the less effervescent a bicarbonated water is, the more beneficial is its use, and the longer can its use be continued with impunity. The reason is that the gas which the water contains is retained therein, and only escapes gradually, instead of being disengaged and disappearing at once, as it does from artificially aerated waters. But the very opposite principle has met with general acceptance. The more effervescing a water is, the more loudly is its merit proclaimed. It is precisely this error which has brought into vogue some artificial waters, which have passed as natural mineral waters, to the serious detriment of the stomachs of those who use them freely, as in England.

" M. Chatin, in a communication to the Paris Academy of Medicine (31st January, 1882), categorically declared that the introduction of the gas by artificial pressure only

served to endow artificial waters with all the disadvantages, and none of the good qualities, of those which they pretend to replace. In short, the difference between artificial and natural aerated waters may be defined by one word—the former are but the vehicles, the latter truly *generators* of the carbonic acid gas.

"In my opinion the Vals Vivaraises waters, Nos. 1 and No. 3, may be regarded as typical digestive and table waters, combining all the qualities essential to secure favourable conditions and beneficial results."

Similar testimony is rendered by Dr. Barthez, Physician to the Military Hospital at Vichy, and author of several valuable treatises on the uses of Natural Mineral Waters.

The foregoing extracts demonstrate the absolute necessity of avoiding the use of artificial mineral waters, and of obtaining and using only natural mineral waters, pure as they issue from the spring, and entirely free from artificial chemical treatment and manipulation of any kind whatsoever, if the beneficial action sought is to be attained. It is for that reason, and to secure the attainment of all the advantages that accrue from the use of any mineral water in its pure and unadulterated natural state, that our firm make it their chief object, by special arrangements, to obtain and supply the principal Natural Mineral Waters directly from the Springs, being there bottled and hermetically sealed, under strict supervision, just as they issue from the parent source. This method can alone guarantee the perfect preservation of all the subtle and active properties imparted to such waters by Nature. We may add that we shall be glad to receive samples of any new variety of Natural Mineral Waters, for introduction to the faculty and the public, on account of general excellence or special properties.

The various natural Mineral Waters may be classified as follows ; and full details, regarding each, will be found in the subsequent series of notices, arranged in alphabetical order.

BITTER WATERS.

Æsculap, Birmensdorf, Friedrichshall, Hunyadi-János, Hunyadi-Lászlò, Leamington Spa, Ofen (Rakoczy), Püllna, Royal Hungarian, Rubinat, Saidschütz, Seidlitz, Victoria-Ofener, &c.

These waters owe their medicinal activity chiefly to the saline ingredients, which are either the sulphate of soda or the sulphate of magnesia ; but the chlorides which are usually present in them contribute much to their medicinal efficacy. Those Springs in which the sulphate of magnesia predominates are called "bitter." In full doses, these waters are mild cathartics—in small repeated doses, they act as refrigerants and alteratives ; and they are valuable in all hepatic dropsical complaints, hæmorrhoids, &c.

ALKALINE WATERS.

Bethesda, Bussang, Condillac, Contrexéville, Evian, Giesshübler, Marienbad, Pougues, Royat, St. Galmier, St. Galmier-Noël, Saratoga,

Soulzmatt, Tarasp, &c. There are subordinate distinctions to be drawn, even in these, according to chemical composition. Other principal Alkaline Springs are classified as follows :—

Alkaline Acidulated Springs: —Apollinaris, Bilin, Fachingen, Geilnau, Neuenahr, Vals, Vals-Vivaraises, and Vichy (all the springs in various degrees), &c.

Alkaline Muriated Acidulated Springs:—Ems, Luhatschowitz, Roisdorf, Salzbrunn, and Selters (Ober), &c.

Alkaline Chalybeate Acidulated Springs:—Franzensbad, Schwalheim, &c.

The Alkaline Waters are the most considerable class of Natural Mineral Waters, both in point of numbers, and in their extensive uses, in most forms of diseases affecting the digestive organs, and to combat the evil effects arising from abnormal and excessive acid secretions. They are especially prescribed for gout, rheumatism, calculus, catarrh of the stomach, affections of the kidneys, etc., as well as for pulmonary affections and many other forms of disease, as mentioned in the respective notices of the various springs.

FERRUGINOUS OR CHALYBEATE WATERS.

Driburg, Griesbach, Orezza, Pyrmont, St. Moritz, Schwalbach, Spa, Vichy-Lardy, Vichy-Mesdames, etc. These waters are of two kinds, viz., carbonated and sulphated. The carbonated ferruginous waters contain the sub-carbonate of protoxide of iron ; the sulphated, sulphate of protoxide of iron. They are stimulant, tonic, and astringent. The acidulated carbonated chalybeates are most easily digestible by the stomach, by reason of the excess of carbonic acid which they contain. The use of this class of natural mineral waters has, from remote periods, been found very efficacious in those states of debility denominated anemia, or more properly hyphemia. In these constitutional states the blood is defective, both in quality and quantity ; the skin appears pale and almost exsanguineous ; and the cellular tissue is œdematous. Patients in this condition of the system are affected with great weakness, entire loss of appetite, and palpitations ; and in females, menstruation is frequently defective and abnormal. Under the influence of these waters, the appetite is stimulated, digestion is facilitated and promoted, the skin reassumes its natural tint, the cheeks become florid, the temperature of the body is elevated, the uterine discharge is enhanced, and the pulse becomes fuller and stronger. The value of this class of Natural Mineral Water, as a perfectly safe, reliable, and natural remedial agent, can scarcely be over-estimated.

SULPHUROUS WATERS.

Aix-la-Chapelle, Barèges, Bonnes, Cauterets, Challes, Enghien, Harrogate, Miers, Weilbach, etc. These waters are impregnated with sulphuretted hydrogen ; and are especially useful in the treatment of scrofulous diseases, syphilitic eruptions, and all chronic cutaneous affections. Perhaps the most remarkable water of this kind, differentiated by special constituents, is the St. Boës, a sulphonaphthalic, arseniated and iodurettted water, of unique chemical constitution.

SALINE OR BRINE WATERS.

Adelheidsquelle, Carlsbad, Homburg, Kreuznach, Marienbad, Woodhall, etc. These waters contain a large quantity of chloride of sodium. Taken in considerable doses, they are emetic and purgative, and they are celebrated for their efficacy in scrofulous complaints, glandular enlargements, etc.

SPECIAL WATERS.

Certain chemical constituents, of comparatively rare occurrence (so far as their presence can be detected by ordinary analytical methods) render particular waters especially noteworthy, although, by reason of their general composition and properties they may properly belong to one or other of the foregoing classes of Natural Mineral Waters. Such elements are lithia, arsenic, iodine, bromine, etc. And we may cite as examples—besides the St. Boës waters already noticed—such remarkable waters as those of La Bourboule (alkaline arseniated); the Royat St. Mart, St. Victor and Cæsar springs, which contain arseniate of soda, chloride of lithium, sodic iodide and bromide, etc,; Buffalo Lithia, containing the bicarbonates of lithia and baryta, with traces of iodine; Vals-Vivaraises (No. 3), containing lithia, arseniate of soda, and alkaline iodides; Vichy-Larbaud, with perceptible traces of lithia, iodine and bromine, and arseniates.

TABLE WATERS.

These waters have been called "indifferent"—which as Tichborne and Prosser-James remark should rather be "indeterminate"—waters. They are mostly alkaline and gaseous, but in general much less highly mineralised than what may be called the natural mineral waters proper. They are taken *ad lib.*, at mealtimes and between meals, either alone or mixed with wine or spirits. The introduction of these waters for table-use, as a constant beverage, pure or mixed, has been extremely successful, and met with a remarkable expansion and development in this country, following, though afar off, the continental practice. We give brief notices of the principal waters of this class, because their regular use, far from being neutral in the therapeutic point of view, will be found to exercise a most beneficial action, by stimulating and maintaining in perfect order the assimilative and secretory functions. They are especially valuable for persons of weak and imperfect digestion; they cleanse the system, by the urinary organs, and thus tend to ward off and prevent the ailments against which, when developed, the more highly mineralised waters afford a more active remedial agent.

The following remarks, by Dr. Macpherson, give a brief epitome of the general application and use of the natural mineral waters, of various kinds:—

"Thus the digestive and urinary organs are specially affected by Alkaline Waters; the liver and alimentary canal by Saline Waters. The skin and (according to continental authorities) the mucous respiratory membrane are much influenced by Sulphur Waters; while a special action on the blood has always been attributed to Ferruginous Springs."

TEMPERATURE.

The action of many mineral waters is aided by the addition of a little warm milk or water, the former being used to mix with the alkaline and the latter with the saline waters. As regards the temperature of natural mineral waters as they flow from their respective sources, there is a great difference. As, for example, the waters of St. Moritz, Tarasp, Luhatschowitz, Salzbrunn, Bruckenau, Schwalbach, Homburg, Geilnau, and Fachingen graduate from 42° to 50° (Fahrenheit); Driburg and Kissingen 51°; Spa and Franzensbad 52°, Marienbad 53°, and Bilin 53°4; Pyrmont and Kreuznach 54°5; Saidschütz 60°, Selters 62°, Vichy-Celestins 67°, Lippspringe 70°, Soden 75°, Teplitz 80°, Ems 85°, Schlangenbad 87°, Bonnes 91°5, Wildbad 96°3, while Vichy-Grande-Grille, Wiesbaden, Gastein, Barèges, Carlsbad, Aix-la-Chapelle, Cauterets, Bagnères de Bigorre, Bagnères de Luchon, Plombières, and Borcette, are all Hot Springs.

DOSES.

Although we have indicated—as approximately as can be ascertained from medical works on the subject—the quantities usually taken of the respective waters, we would remark that it is always advisable for the patient to consult his medical attendant on this point, as his condition may be such as to render caution necessary, and excessive doses, or a too prolonged course, might prove not only imprudent but positively prejudicial. In fact, at the various Spas, and Thermal Establishments, the nature and extent of the treatment is generally regulated by properly qualified specialists, who are almost invariably consulted by invalids before a course of the waters is commenced. Much inconvenience and suffering have frequently been experienced by patients who have been so ill-advised and imprudent as to dispense with medical advice and supervision.

We may conclude by remarking that the Natural Mineral Waters, referred to in this pamphlet, may be summarised under three heads, firstly, the "indeterminate" or "indifferent waters" for table use, as a beverage—offering the great and inestimable advantage of a pure potable water, free from taint and impurity, wholesome and slightly medicinal, in a beneficial and preservative way. Of these the German Waters, Selters, Johannis-brunnen, and Sauerbrunnen, and the French Waters, St. Galmier, and Eau de César, may be regarded as the best types. Secondly, what may be called the medicinal natural mineral waters, of which the various Vichy Springs may be regarded as most thoroughly typical, of the alkaline class; Æsculap, Hunyadi-László, and Victoria-Ofener, of the bitter aperient class; Vichy-Mesdames, Spa and Orezza, of the ferruginous or chalybeate class; Challes and Harrogate, of the sulphurous class; and Carlsbad and Kreuznach, of the saline or brine class. Thirdly, Special Waters, such as St. Boës, La Bourboule, Royat, Buffalo Lithia, Vals Vivaraises, and Vichy-Larbaud—already mentioned.

We cannot do better, in reference to the typical distinctions above indicated, than submit the subjoined extracts from the already quoted

work of Tichborne and Prosser James, on "The Mineral Waters of Europe," bearing upon Table and Alkaline Waters.

Seltzer.—"The most important of table waters."—"Advertisements may have done a great deal, quality has done something, but *no water* has been able to displace Seltzer water, as regards its hold on the public mind, and its position as a natural table water. It is the one which has been the type of artificial table waters."—"In table waters the presence of rather large quantities of chloride of sodium is no detriment, provided the sulphates of magnesia and soda are low. *The Seltzer spring contains nearly 200 grains of chloride of sodium, but very little sulphate of sodium, and no sulphate of magnesium.*"—"It is, perhaps, not too much to say that the most celebrated waters, perhaps in the world, are those obtained at the small post-town called Selters."—"Seltzer claims the first place as the general favourite."—"It is both antacid and saline."—"All who require a gaseous, feebly alkaline and saline water, with a tendency to relax rather than constipate, may try Seltzer."—"Its saline constituents give it a refreshing quality which assists in allaying thirst."—"It promotes the secretions of the skin and kidneys."

Vichy—"We wish to make a few remarks upon the bottling of these waters. We do not wish to insinuate that other waters are not bottled equally well, but the Vichy springs being under Government supervision, we have an insight into the matter which is not afforded by the general run of information given in other cases. The question of bottling is one of great importance in connection with the importation of mineral waters, and when we observe that very few will stand any considerable time without giving *sediment*, we see the desirability of dwelling a little time upon this subject. . . . . As regards the Vichy waters, the corking is done by machinery, and good corks are specially selected. There is an excellent system pursued in connection with them which should be carried out with all the others. Each bottle is secured with a tin capsule bearing the date of the year when it was bottled. Now, having regard to the change that might take place in mineral waters, after keeping for some years, we cannot commend this practice too highly."

"Vichy is the sovereign of alkaline spas."—"Vichy retains its pre-eminence as the strongest alkaline spa. The number and varying qualities of its springs enable those skilled in their use to rely entirely upon them, when mineral waters of a powerful alkaline nature are required."

Natural Mineral Waters: their Properties and Uses.

ÆSCULAP.

HUNGARIAN NATURAL MINERAL WATER.

Analysis calculated in Grains per Gallon.

Sulphate Magnesium	1750·3
„ Sodium	1340·7
Ammonia (free)	0·3
Sulphate Potassium	3·5
„ Calcium	185·6
Chloride of Sodium	301·3
Bicarbonates	140·3
Carbonate Calcium	1·9
„ Magnesia	12·0
„ Iron	3·5
Alumina	5·6
Nitrates (minute trace)	—
Silica	1·6
Bromide Magnesium	—
Chloride „	—
Carbonate Strontium	—
Total	3746·6

The skeleton analysis gives, in each half-pint or 10 ounces, solids 235; viz.:—Purgatives 195; Antacids 15; Salines 20. The above analysis was made by Pro. C. R. Tichborne, F.C.S., L.L.D., President of the Pharmaceutical Society of Ireland, and appeared in "The Mineral Waters of Europe," 1883, where Æsculap is placed at the head of Class I. of strong Purgatives.

Its Purgatives consist of double salts of the Sulphates of Soda and Magnesia, in combination with Chloride of Sodium and an unusually large proportion of Bicarbonate of Soda (Antacid) which materially influence its action as adjuvants and corrigents. Its purity consists in its entire freedom from organic matter in any form, due to the unique position of the springs in the centre of the water-shed, which secures their complete isolation. Its palatability is self evident, and is fully admitted by the Medical Profession and the General Public.

The Æsculap Estate and Springs are the freehold of an English Company, and situated at Buda Pest, Hungary, where the Water is bottled, under the personal supervision of an English Chemist, thus ensuring uniform strength, as well as scrupulous cleanliness and care in every detail.

Dr. Sidney Ringer in his "Handbook of Therapeutics," 1883, says:—"An excellent way to administer some of these salts (Sulphate of Soda and Magnesia) is in the form of . . . . . Best of all, Æsculap Water, in doses varying from a wine-glassful to half a tumblerful or more."

The Lancet, (September 26th 1886) says:—"This water (Æsculap) contains the sulphates of magnesium and sodium in unusually large quantities, and only a small quantity of calcium salts and chlorine. It is an admirable aperient water—one of the most powerful, indeed, that we have examined, and may be used with perfect confidence. Judging from published analyses the Hungarian waters are the most active aperients of any in use. Many of the most celebrated German saline waters are all but useless in this respect."

ÆSCULAP preserves the health by promoting all the vital functions, and is a positive specific for :—Constipation, alike in persons of full habit, and in those of feeble health : Congestion or inflammation of the organs, where by promoting intestinal secretions and securing the rapid removal of waste products, the circulation is equalised by the better diffusion of the blood : Impaired functional activity, however caused, and whether exhibited in disordered stomach, inducing heartburn, headache, indigestion, flatulency, loss of energy, and want of appetite, &c. ; or in sluggish liver, leading to biliousness, jaundice, gall-stones, &c. ; or in affections of the kidneys, resulting in blood impurity, rheumatism, sciatica, neuralgia, and other morbid states of the nervous system : Formation of uric acid in the blood, manifesting itself either in gout, urinary deposit, gravel, or stone in the bladder : and corpulency, which it removes without lowering the system. Its use cools the blood, and clears the complexion. Its action is quiet and certain, with no griping abdominal pains. It does not induce subsequent constipation. When taken for a few weeks it acts as an intestinal tonic, enabling the patient to forego aperients altogether.

DOSE.—From a wine-glassful to half a tumblerful with an equal quantity of water (preferably hot).

An aperient lemonade is made by adding to half a tumbler of Æsculap the juice of half a lemon and a couple of nobs of sugar ; fill up the tumbler with boiling water.

(Rhenish Prussia.) AIX-LA-CHAPELLE. (Altitude 450 ft.)

Aix-la-Chapelle, or Aachen, fifteen leagues from Cologne, has long been considered the chief sulphur bath of Germany. It is much frequented, especially during the season, which lasts from June to the end of September.

The climate is mild, the mean temperature during the summer months being about 63° F. The water is used for bathing as well as drinking, and is especially useful in rheumatism, cutaneous eruptions, stiff joints, syphilis, and all complaints which are generally benefited by Sulphurous Waters.

DOSE.—One pint bottle to a quart bottle daily.

Analysis according to Baron Liebig in grains per gallon.

		Kaiserquelle.
1. SOLIDS.	Chloride of Sodium	202·71 grains.
	Bromide of ,,	0·28 ,,
	Iodide of ,,	0·04 ,,
	Sulphuret of ,,	0·73 ,,
	Carbonate of Soda	49·96 ,,
	Sulphate of ,,	21·71 ,,
	,, of Potash	11·86 ,,
	Carbonate of Lime	12·17 ,,
	,, of Magnesia	3·95 ,,
	,, of Strontia	0·02 ,,
	,, of Lithia	0·02 ,,
	,, of Protoxide of Iron	0·73 ,,
	Silica	5·08 ,,
	Organic Matter	5·77 ,,
		315·03 grains.
2. GASES.	Nitrogen	9·00 per cent.
	Carbonic Acid Gas	89·40 ,,
	Carburetted Hydrogen	0·37 ,,
	Oxygen	1·23 ,,
		100·00 per cent.

(Aude, France.) ALET. (Altitude 650 ft.)

ALKALINE BICARBONATED WATER.

The analysis of the mineral waters of Alet, made a long time ago by O. Henry, has more recently been the subject of very interesting investigations by M. Commaille, which were continued a few years ago by M. Filhol. The following are the results obtained by the last-named eminent and skilled chemist, from his examination of the two principal waters of these springs, namely the *Source des Bains*, and the *Source Nouvelle*, or *Source du Rocher*. He found their mean temperature to be almost identical, namely, 29°5 C. (85° F.) for the former, and 29° C. for the latter spring.

Constituents in grains per gallon.

	Source des Bains. grains.	Source Nouvelle. grains.
Bicarbonate of Lime	18·914	15·442
„ of Magnesia	7·567	7·364
„ of Ammonia	0·427	0·378
„ of Protoxide of Iron	0.350	0·560
„ of „ Manganese	0·091	0·077
„ of Lithia	Trace	Trace
Chloride of Sodium	2·961	2·373
Iodides	Trace	Trace
Sulphate of Lime	2·044	1·785
Nitrate of Potash	0·154	0·133
Silicate of „	0·504	0·490
„ of Lime	1·785	1·141
Phosphate of Lime	1·463	1·295
Arsenic	0·007	0·007
Copper	—	Trace
Organic Substances	Trace	Trace
Total Solid Constituents	36·267	31·045
Carbonic Acid (free)	4·123	4·452

The sodio-bicarbonated water of Alet is bottled and exported without undergoing any deterioration; it preserves all its curative properties for many years. It may be used as a table-water, and drunk at meals, either alone or mixed with wine, which it in no way alters. Exceedingly light, limpid, and of a most agreeable flavour, it agrees with everybody, even the most susceptible, and is easily digested by the most delicate stomachs.

Special uses.—The effects of the Alet water are especially remarkable in the undermentioned cases:—In all stages of convalescence after serious illness, particularly fever and miscarriage; in nausea, attended with vomiting, and in gastric diseases and intestinal affections, its use, more or less prolonged, will effect a cure even in the most obstinate cases.

This water is especially recommended by ALL THE LEADING PHYSICIAN ACCOUCHEURS OF PARIS DURING ALL STAGES OF PREGNANCY.

(Isère, France.) ALLEVARD. (Altitude 1473 ft.)

EFFERVESCING SULPHUROUS WATER.—Temperature 16° C. (61° Fahr.)

The following analysis of the Allevard waters is by M. Dupasquieu:—

Gaseous Constituents per gallon.

Sulphuretted Hydrogen (free)	1732·5 grains.
Carbonic Acid Gas (free)	6790·0 „
Nitrogen	2870·0 „
	11392·5 grains.

Solid Constituents per gallon.

Carbonate of Lime	21·35	grains.
„ of Magnesia	0·70	„
Chloride of Sodium	35·21	„
„ of Magnesium	4·27	„
Sulphate of Lime	20·86	„
„ of Magnesia	36·61	„
„ of Soda	36·75	„
Silicic Acid	0·35	„
Iodine	0·42	„
	156·52	grains.

The high temperature of the gaseous iodo-sulphuretted water of Allevard renders it extremely suitable for exportation. It may be efficaciously used at home, for the treatment of the various diseases for which it is advantageously used at the watering-place itself.

The Thermal Establishment at Allevard is well adapted for the various applications, methods, and appliances peculiar to all the chief sulphurous watering places. It is provided with seven cold and two hot rooms for the gaseous inhalation of sulphuretted hydrogen; as also with two rooms recently fitted up for mineral-water pulverisation, and two others for nasal and pharyngeal injections; ordinary and vapour baths; thermal, Scotch, and local douches, and hydro-therapeutic appliances for both sexes. There are also *Buvettes*, or saloons, for drinking the waters, at the Springs and in the Park; with special saloons which have recently been refitted for the use of the water as a gargle. Every provision has been made for the comfort and convenience of the visitors.

These gaseous sulphurous waters have, during the last few years, acquired a great reputation, on account of the numerous cures and wonderful effects which have been obtained from their use; and especially in the treatment of Chronic Chest-affections, Asthma, and all diseases of the Respiratory organs; such as Laryngitis, Bronchitis, Throat Affections, Loss of Speech, Chronic and Granulous Angina, Pharyngitis, etc. They give also excellent results in all the various Skin Diseases, Diseases of the Womb, Scrofulous Affections, Wounds from Firearms, Osseous Diseases, Lymphatic Weakness of Children, and Rheumatic Affections. Their gaseous inhalation has also given excellent results, and wrought numerous cures, in the treatment of Tuberculosis.

Allevard is situated at the distance of a two hours' journey from Grenoble; six hours from Lyon or Geneva; twelve hours from Marseille; sixteen hours from Paris, and ten hours from Turin.

The nearest station is Goncelin, and there is a service of omnibuses to meet all the trains.

For all particulars and information, application should be made to the Superintendent (*Régisseur*) of the Thermal Establishment, Allevard.

(Rhenish Prussia.) APOLLINARIS. (Altitude 225 ft.)

A spring in the Valley of the Ahr, near Neuenahr, in Germany.

DOSE.—Being a table water it may be taken *ad lib.*

Analysis according to Bischoff, in grains per gallon.

1. SOLIDS.	Carbonate of Soda	87·99	Grains.
	Chloride of Sodium	32·62	„
	Sulphate of Soda	21·00	„
	Phosphate of Soda	Traces	
	Salts of Potash	Traces	
	Carbonate of Magnesia	30·94	„
	Carbonate of Lime	4·13	„
	Oxide of Iron, with Alumina	1·40	„
	Silicic Acid	0·56	„
		178·64	grains.
2. GASES.	Free and semi-combined Carbonic Acid	194·32	
	Combined Carbonic Acid	56·49	
		250·81	

(Hautes Pyrénées, France.) BARÈGES. (Altitude 4000 ft.)

This water is very useful in cases of obstinate chronic rheumatism, also for diseases of the skin, syphilis, scrofula, wounds from fire-arms, diseased bone, ulcers, and partial paralysis.

DOSE.—Two to four half-pint tumblersful daily. It is not advisable to take this water except under medical supervision.

Analysis, according to M. Longchamp, in grains per gallon, of "Le Tambour" Spring.

1. SOLIDS.	Sulphuret of Sodium	3·60 Grains.
	Sulphate of Soda	3·84 ,,
	Chloride of Sodium	3·07 ,,
	Silica	5·19 ,,
	Lime	0·22 ,,
	Magnesia	0·26 ,,
	Soda	0·39 ,,
		16·57 Grains.
2. GASES.	Nitrogen	0·04 Cub. Inches.

(Wisconsin, U.S.A.) BETHESDA.

This water is reported to have been successfully used in the treatment of diseases of the kidneys, the medical properties of the spring having been accidentally discovered by a sufferer from saccharine diabetes, who from drinking the water underwent (it is stated) a perfect cure. It is now prescribed for other forms of kidney disease, and it is said to be very efficacious in Bright's disease, inflammation of the bladder and kidneys, dropsy, gravel, &c.

DOSE.—From eight to ten tumblers daily.

Analysis according to Professor C. F. Chandler.

In grains per gallon, there are :—

1. SOLIDS.	Chloride of Sodium	1·3920 Grains.
	Sulphate of Potassa	0·5460 ,,
	,, Soda	0·5424 ,,
	Bicarbonate of Lime	20·4264 ,,
	,, Magnesia	14·8656 ,,
	,, Protoxide of Iron	0·0504 ,,
	,, Soda	1·5072 ,,
	Phosphate of Soda	
	Alumina	0·1464 ,,
	Silica	0·8892 ,,
	Organic Matter	2·3796 ,,
	Total	42·7452 Grains.

(Switzerland.) BIRMENSDORF. (Altitude 1300 ft.)

A bitter water, very mild in its action, the mineral constituents being small as compared with those of most of the well known waters of this class. It is useful in liver complaints, jaundice, hepatic calculus, hypochondriasis, hæmorrhoids, and as a mild laxative.

DOSE.—From half to three-quarters of a tumblerful taken half an hour before breakfast.

Analysis according to Bolley in grains per gallon.

Sulphate of Potash	7·294	Grains.
,, Soda	492·492	,,
,, Lime	88·844	,,
,, Magnesia	1540·945	,,
Chloride of Magnesium	32·228	,,
Carbonate of Lime	0·931	,,
,, Magnesia	2·268	,,
Magnesia (Crenic)	7·070	,,
Peroxide of Iron	70·749	,,
Alumina	1·959	,,
Silica	2·114	,,
	2246·874	Grains.

(Rhenish Prussia.) BIRRESBORN. (Altitude 1100 ft.)

ALKALINE CHALYBEATE SPARKLING WATER.

The Birresborn Water is of a high degree of organic purity; almost tasteless, highly charged with carbonic acid gas, and possessing all the special characteristics of a really good table water. It is a cooling and refreshing drink, quenching the thirst, and mixing well with wines or spirits. As such, it may be taken *ad lib.*

Its chemical composition is as follows, in grains per gallon:

Bicarbonate of Soda	199·6345	grains.
,, Lithia	0·2342	,,
,, Lime	19·1092	,,
,, Baryta (and Strontia)	0·0108	,,
,, Magnesia	76·5011	,,
,, Protoxide of Manganese	0·0468	
Bi-borate of Soda	Trace	
Sulphate of Potash	3·6464	,,
,, Soda	9·5148	,,
Bromide of Sodium	0·0254	,,
Chloride of ,,	72·6334	,,
Iodide of ,,	0·0003	,,
Nitrate of Soda	Trace	
Phosphate of Alumina	Trace	
Silicic Acid	1·1614	,,
Total	382·5183	,,
Carbonic Acid Gas (Free)	170·7642	,,
Total constituents	553·2825	grains.

The Birresborn Water exercises a most favourable action on the digestive organs. It is, therefore, particularly recommended for the treatment of disorders of the stomach; and even also for the more serious maladies of gout and calculus, in which cures have been effected with its aid.

Hesse-Nassau.) BONIFACIUS. (Altitude, 825 ft.)

The carburetted saline springs of Salzschlirf are four in number, of which the principal is the Bonifacius Spring, remarkable chiefly as a lithiated mineral water, reputed to contain a higher proportion of that element than any other known spring. As is well known, lithia has, of recent years, assumed a prominent position in the

therapeutical practice of the faculty as an important remedy for a numerous class of troublesome diseases. The mineral water of the Bonifacius Spring is therefore highly recommended on account of the presence of an unusually high proportion of lithia, as will be seen from the following comparative statement. The proportion of lithium-salts contained in one litre, or 1,000 grammes, of various mineral waters is as follows: Salzschlirf-Bonifacius, 0·218; Elster, 0·108; Budapest-Salvator Spring, 0·088; Baden-Baden, 0·053; Durkheim, 0·039; Assmannshausen, 0·027; Homburg, 0·021; Kissingen, 0·020; Ober-Salzbrunn, 0·013; Bilin, 0·012; Weilbach, 0·009. It appears therefore that the Bonifacius water contains a higher proportion of lithium-salts than any other natural mineral water at present known.

The internal effect of the Bonifacius water on the system, when drunk, is to stimulate and regulate the action of the intestines and urinary organs, to promote the conversion of albumen and other elements, and to dissolve and to remove certain abnormal and prejudicial secretions and concretions—uric acid and its salts, calculus, gravel and gallstone. The Bonifacius water, being naturally highly charged with carbonic acid gas, is agreeable to the taste and most easily digestible. It undergoes no deterioration by storage or transport. As regards the dose, it may be taken daily in quantities up to one litre, and thus continuously for years, without exercising any prejudical or other than beneficial effect.

The Bonifacius water is strongly recommended by the highest authorities of the medical profession on the continent—as well as in recent treatises on medicine by the eminent Professors and Doctors Niemeyer-Seitz, Kehrer, Cantani, Ditterichs, Senator, Kunze, v. Mering and others—on account of the high per centage of lithium, chloride of sodium, and carbonic acid which it contains. It is a valuable remedy for the treatment of gout, diseases of the bladder and kidneys, gravel and calculus, and biliary concretions. It is also used with great success in chronic catarrhal affections of the stomach and intestines, habitual constipation, want of appetite, bronchial catarrh, liver complaints, jaundice, hemorrhoidal affections, rheumatism, scrofula, rhachitis, obesity, and rheumatic affections.

The chemical composition of the Bonifacius Spring is shown by the following analysis, in grains per gallon.

Chloride of Sodium	716·912	grains
„ Magnesium	69·076	„
„ Lithium	15·274	„
Sulphate of Soda	9·919	„
„ Potash	11·214	„
„ Lime	109·179	„
Bicarbonate of Lime	46·431	„
„ Magnesia	0·581	„
„ Oxide of Iron	0·672	„
Iodide of Magnesium	0·343	„
Bromide of „	0·329	„
Silicic Acid	0·798	„
Total Solid Constituents	980·728	grains
Carbonic Acid gas (free)	58·102	grains

Temperature 10·6 Centigrade (51° Fahr.)

(Basses-Pyrénées, France.) BONNES. (Altitude 2300 ft.)

The properties of this water are somewhat similar to those of Barèges and Cauterets, but not being so exciting in its effects, it is more suitable for delicate persons and children. It increases and promotes the natural secretions of the skin and kidneys, and is very useful in asthma, catarrh, phthisis, quinsy, and other affections of the respiratory organs.

DOSE.—From one-quarter to one-half of a tumbler, taken before breakfast, with the addition of two or three spoonfuls of boiling milk.

Analysis according to Professor Attfield, F.C.S. (1877.)

		Grains per Gallon.
1. SOLIDS.	Chloride of Potassium	2·40
	,, Sodium	17·59
	Sulphate of Soda	2·86
	Silicate of ,,	5·28
	Sulphate of Lime	11·14
	Silica	1·02
	Magnesium, Lithium, Nitrates, Phosphates	Traces
		40·29
2. GASES.	Sulphuretted Hydrogen, 1½ cubic inches per gallon.	

(Puy-de-Dôme, France.) BOURBOULE (LA). (Altitude 2600 ft.)

Sodio-chloruretted, bi-carbonated, arsenical, sparkling water.

The mineral water of La Bourboule—of which there are two chief springs "Choussy" and "Perriere"—is, of all known waters, that which contains the largest proportion of arsenic, allied with the best adjuncts for its assimilation. It is a natural arsenical medicament, far preferable to any pharmaceutical preparation, because it is in this form that arsenic is most easily digestible and most efficacious. By its use, moreover, all those risks of error by excess of quantity, which are not entirely inseparable from artificial preparations made in the laboratory of the chemist, are avoided. One litre of the water contains 28 milligrammes of sodic arseniate (or at the rate of 1·96 grains per gallon); so that the third part of a litre (nearly 3–5ths of a pint, or a large tumblerful) contains the average dose of arsenic pharmaceutically administered. Furthermore, the mineral constituents of the Bourboule water are the same as those of the blood. It contains about 6⅔ grammes of mineral salts, viz., nearly 3 grammes each of chloride of sodium, and bi-carbonate of soda, with other minor elements in small proportions; making it equivalent to the "mineral serum of the blood, issuing naturally from the bowels of the earth." This mineral water is, consequently, of all others the best adapted to repair the waste of the mineral constituents of the blood; it alone combines all the properties which go to constitute the most fortifying, the most restorative, and the most easily assimilated medicine. It is eminently fitted for, and digestible by delicate children, debilitated adolescents, and adults of weak constitution, on whom its revivifying influence is most remarkable.

The chemical composition of the Bourboule waters, as deduced from the analysis of Messrs. J. Lefort and Bouis, are as subjoined:

In grains per gallon.		
Metallic Arsenic	0·4935	grains.
or Arsenious Acid	0·7567	,,
or Arseniate of Soda (Codex Standard)	1·9929	,,

The subjoined table shows the proportions of its other chemical constituents, per litre:—

Carbonic Acid (free)	3·626	grains.
Chloride of Sodium	198·842	,,
,, Potassium	11·361	,,
,, Lithium	Trace	
,, Magnesium	2·240	,,
Bicarbonate of Soda	202·440	,,
,, Lime	13·335	,,
Sulphate of Soda	14·588	,,
Peroxide of Iron	0·147	,,
Protoxide of Manganese	Trace	
Silicic Acid	8·400	,,
Alumina	Trace	
Organic Matter	Trace	
Total	454·979	grains.

The Bourboule water is invaluable for the treatment of cachexia of all forms, chlorosis, anemia, lymphatism, scrofula, herpetism, cutaneous affections, tetter, eczema, psoriasis, angina, bronchitis, laryngitis, asthma, pulmonary phthisis, and all herpetic affections of the respiratory passages, intermittent fever, visceral obstructions, chronic rheumatism (arthritic), paralysis, chronic gout, albuminuria, and diabetes with cachectic complications.

The dose varies from half a tumblerful to two or three tumblerfuls a day, one-half the quantity for children. It may be taken at mealtimes, pure or mixed with wine. Sometimes it is best taken half an hour before meals. If the digestive organs are at all unfavourably affected by it, it may be warmed by the bain-marie, or mixed, either with a warm infusion of limes, or with orange-peel juice, or Selters waters, etc. In case of colics or diarrhœa, two or three drops of tincture of opium, or belladonna, may be added.

Bourboule water, used as a lotion, local douche, or pulverised in the form of spray, is in general an effective cure for slight cutaneous diseases, or affections of the mucous membrane, where accessible, especially when imbibed at the same time. It preserves the freshness and beauty of the complexion, and heals chaps, by restoring the suppleness of the epidermis.

Bourboule Water undergoes no deterioration by bottling and exportation.

(Mecklenburg Co., Va., U.S.A.) BUFFALO LITHIA. (Altitude 500 ft.)

This alkaline water, fresh from the spring, is devoid of taste or odour, and undistinguishable from ordinary potable water. There are three Springs, known as Nos. 1, 2, and 3, all of well established remedial value; but Spring No. 2 is the most important from the therapeutical point of view.

Professor W. P. Tonry, of the Maryland Institute, Baltimore, gives the following analyses of the Buffalo Lithia waters, of the three Springs. Results in grains per gallon.

	No. 1.	No. 2.	No. 3.
Sulphate of Magnesia	1·530	0·885	0·150
„ Alumina	8·180	9·067	3·035
„ Lime	19·251	33·067	2·353
„ Potash	0·463	—	—
Carbonate of Potash	—	29·300	1·852
Bicarbonate of Lime	39·277	14·963	2·524
„ Lithia	1·484	2·250	Traces
„ Baryta	—	1·750	—
„ Protoxide of Iron	0·500	0·300	3·774
Chloride of Sodium	1·256	4·921	0·217
„ Silicon	1·725	1·873	0·570
Phosphoric Acid	Traces	Traces	Traces
Iodine	Traces	Traces	—
Organic Matter	Traces	Traces	Traces
Total Number of grains, per gallon	73·666	98·376	14·475
Sulphuretted Hydrogen	5·9 cubic ins.	8·3 cubic ins.	3·4 cubic ins.
Carbonic Acid Gas	69·1 „	59·2 „	11·6 „

The Buffalo Lithia Water is superior to any solution of Lithia Salts, artificially prepared, for therapeutic use; and is, moreover, better borne by the stomach. It has come into note, of recent years, as a valuable aid in the cure of all that large class of disorders dependent on a Uric Acid Diathesis; Gout, Rheumatism, Rheumatic Gout, Gravel, and Calculus; in chronic Bright's Disease, and all affections of the Kidneys, Bladder and Urethra, requiring alkaline treatment; in the various diseases of the digestive organs, including Dyspepsia, Liver disease, Jaundice, Diarrhœa, Constipation, Hæmorrhoids; in Blood Poisoning, Chronic Malarious Fevers, chronic Gonorrhœa, Gleet, and Scrofulous Affections; in some of the affections peculiar to Women, particularly in Suppressed, Difficult, and Painful Menstruation; in Albuminuria, Nausea, and Uræmic Poisoning, arising from Pregnancy; as well as in Albuminuria and Dropsical Effusion, in Scarlatina patients.

(Vosges, France.) BUSSANG.

A ferruginous and alkaline water, very efficacious in strengthening the digestive organs, and correcting sluggishness of the bowels and kidneys.

DOSE.—Two or three half-pint tumblersful daily. If preferred it may be taken mixed with wine or lemon juice, and the best time for drinking this water is about half-an-hour before meals.

Analysis according to Ossian Henry.

			Per Gallon.
1. SOLIDS.	Carbonate of Soda	55·23	Grains.
	„ Lime	23·80	„
	„ Magnesia	10·50	„
	„ Strontia	Traces	
	„ Protoxide of Iron	1·19	„
	Crenate of Iron, Manganese, and traces of Chloride of Sodium	5·46	„
	Sulphates of Soda and Lime	7·70	„
	Silicate of Soda, „ Lime, „ Alumina	0·14	„
		104·02	Grains.
2. GASES.	Free Carbonic Acid	28·70	„

(Bohemia.) CARLSBAD. (Altitude 1000 ft.)

The principal springs are the "Sprudel" and the "Schlossbrunnen." The waters are very useful in diseases of the stomach, liver, kidneys, bladder, spleen, also for diabetes mellitus, gout, chronic catarrh of the womb, &c., &c.

DOSE.—From half-a-tumblerful to two tumblersful to be taken in the morning fasting.

Analysis according to Gottl, in grains per gallon.

		Sprudel.		Schloss-brunnen.
		Grains.		Grains.
1. SOLIDS.	Sulphate of Soda	199·606	...	101·45
	Bicarbonate of Soda	90·624	...	85·55
	Chloride of Sodium	87·245	...	84·63
	Sulphate of Potash	3·696	...	115·58
	Bicarbonate of Lime	20·198	...	24·19
	„ Magnesia	3·994	...	2·99
	„ Protoxide of Iron	0·307	...	0.23
	Phosphate of Alumina	2·150	...	0·31
	Silica	10·520	...	4·30
		418·340	...	419·23
		Cub. Ins.		Cub. Ins.
2. GASES.	Carbonic Acid	78·033	...	173·767
	Nitrogen	0·318	...	0·632

The "Muhlbrunnen" is also imported, but is in very small demand—the composition of the water varies but slightly from the above.

(Puy-de-Dôme, France.) CHATELDON.

Temperature 10° C. (50 Fahr.) Gaseous Alkaline and Ferruginous Waters. The following is the most recent analysis of these waters :—

Constituents in grains per gallon.

Carbonic Acid	152·46	grains.
Bicarbonate of Lime	36·12	,,
,, Magnesia	18·76	,,
,, Soda	26·67	,,
,, Potash	0·21	,,
,, Protoxide of Iron	2·45	,,
Sulphates of Soda and Lime	3·50	,,
Chloride of Sodium	2·10	,,
	242·27	grains.

The gaseous alkaline and ferruginous water of Chateldon (*Source de la Montagne*) has long been successfully used for stomach diseases, such as—gastritis, gastralgia, weak digestion, bile, vomiting, etc. In inveterate chronic gastritis, full doses of the Montagne water have produced the most wonderful effects.

They are also used for diseases of the genital and urinary organs—gravel, calculus, nephritic colics, and diabetes.

The limpidity, fresh and agreeable flavour of this water—which it retains for a long time when bottled—entitle it to a place in the front rank of mineral waters. For these reasons also the Montagne water will always be in favour with physicians, for persons of a delicate stomach, and who cannot endure the taste of ferruginous waters in general. Chlorosis (paleness), anemia, and all the periodic diseases of females, yield to this treatment, which is both inexpensive and agreeable.

These waters are particularly adapted to relax the nervous system, and calm all spasms and irregular emotions. They have also long been prescribed for nervous, hysterical, and lymphatic females.

The Montagne water, from its richness in carbonic acid, mixes admirably with wine, without alteration in colour or taste ; and it is far superior to the artificial aërated waters, of which the use is attended with such great disadvantages. Thus used, the Montagne water will be found the safest laxative as well as an excellent tonic for convalescents.

The Chateldon water is very pleasant to drink, and is therefore an excellent table-water when mixed with wine.

(Vosges, France.) CONTREXÉVILLE. (Altitude 3100 ft.)

Source Le Cler.

Calcareo-Sulphated and Bicarbonated Water.—Temp. 11° to 12° C. (51° to 54°Fahr.)

Analysis of the *Le Cler* Spring :—

Constituents in grains per gallon.

Bicarbonate of Lime	28·00	grains.
,, Magnesia	2·31	,,
,, Soda	0·56	,,
Sulphate of Lime (anhydrous)	97·30	,,
,, Magnesia	16·45	,,
,, Soda	1·05	,,
Chloride of Sodium	0·56	,,
Silica, Iron, Alumina	2·45	,,
Total	148·68	grains.

The *Source Le Cler* flows from a subterranean vein at a lower level than that which supplies the other Contrexéville springs (*Sources du Pavillon, du Prince* or *des Bains, du Quai*, and *La Souveraine*). It is situated about 100 metres (310 feet) higher in level than the last-named, but is their perfect analogue.

The water of the Source Le Cler, secured and completely insulated by works recently executed, yields not less than 15,000 litres daily, clear and limpid, identical in taste and temperature with the other Contrexéville waters; it is equally acceptable to the stomach, while in richness of mineral constituents it slightly surpasses them. But, notwithstanding its superior mineralisation, this water is digestible with extreme facility, and stimulates the digestive organs as well as all the secretions.

Its selective action on the urinary organs is such that the quantity of liquid expelled exceeds that of the water imbibed. It acts as a perfect flush, irrigating the lumbar regions, and washing away those uric acid sediments which, by agglomeration, constitute calculi. At a more advanced stage, when, in fact, calculi have taken the place of the preliminary sand or initial gravel, the observed facts justify the assertion that this water has the property of penetrating those calculi of recent formation, of facilitating their passage through the urinary canals, by drawing them along, and pushing them, after having polished them, while at the same time it imparts to the mucous membrane a power of tolerance of their presence by the cessation of its irritability through the reduction of inflammation. This modifying action on the mucous membrane accounts for the favourable influence of the Le Cler water upon vesical catarrh.

But it must not be thought, as some writers would have us believe, that the therapeutic effect of the Contrexéville waters ends with this mechanical flushing, consequent upon the copious imbibition of an easily digestible water. On the contrary, these waters, and particularly the *Source Le Cler*, by stimulating all the secretive organs, promote the process of elimination of all alimentary residues; and it is by reason of this modification of the equilibrium between the entry and the discharge of nutritive substances, that it exercises so truly effective an influence on gouty diathesis, hepatic affections, diabetes, etc. In fact, all those diseases, nowadays classified under the generic name of manifestations of uric acid diathesis, and that Professor Bouchard has so ably specified and described—diseases due to imperfect nutrition—are susceptible of favourable modification, and may be successfully treated by means of an agent which, like the *Source Le Cler* and other Contrexéville waters, so powerfully promotes the elimination of excess of uric-acid in the system.

The foregoing brief particulars will suffice to show how valuable a resource is offered to therapeutics in the *Source Le Cler*.

Source du Pavillon.

The Contrexéville waters are cold, clear and colourless; they deposit in the pipes and reservoirs an oily and ochreous sediment, and on contact with the atmospheric air their surface becomes covered with an iridiscent film. They are fresh and agreeable to the taste, with an acidulated flavour, somewhat inky, leaving subsequently a styptic after-taste. Taken internally, they are rapidly absorbed. They bear carriage well.

The Pavillon Spring may be regarded as typical of the Contrexéville mineral waters. It yields a calcareo-sulphated and bicarbonated water, alkaline, with a preponderance of lime-salts, and containing aperient salines in the form of sulphates of soda and magnesia, also iron and arsenic, together with traces of fluoride of calcium. This spring is used exclusively for drinking, and yields no less than 12.230 gallons per day, issuing at a normal temperature of 11·5° Centigrade (52·25° Fahr.), and having a density of 1·029, or a little higher than that of distilled water.

As regards its mineralisation, we note that Dr. Cruise, of Dublin, in a recent pamphlet on these waters, states that Dr. Tichborne's analysis of the important Contrexéville waters found that the solid constituents amounted to 166·7 grains per gallon, as compared with 299·5 found in the water taken fresh from the spring. But the accepted analysis, as published, is that of Dr. Debray, as under:—

Analysis of the *Pavillon* Spring ;—

Constituents in grains per gallon.		
Bicarbonate of Lime	28·14	grains
„ Magnesia	2·45	„
„ Protoxide of Iron	0·49	„
„ Lithia	0·28	„
Sulphate of Lime	81·55	„
„ Soda	16·52	„
„ Magnesia	2·10	„
Silica	1.05	„
Chloride of Potassium	0·42	„
„ Sodium	0·28	„
Fluoride of Calcium	Traces	
Arsenic	Traces	
Total	133·28	grains
Carbonic Acid (free)	5·60	„
Together...	138·88	grains

DOSE.—An ordinary dose of the Pavillon water is half a bottle daily, taken as a diet drink, with either milk, wine or spirit. According to effect, the quantity may be increased to a whole bottle. The water holds sufficient free carbonic acid to make it pleasant to drink, and to mask the slight inky flavour.

Its effects are diuretic, laxative, and lastly tonic, owing to the presence of iron, arsenic, and calcic-fluoride. In suitable moderate quantities it acts as a mild purgative, promoting appetite, stimulating the blood-circulation, and the sudatory action of the skin, as well as the flow of bile; and it exercises a special effect in augmenting urinary secretion to a remarkable and valuable degree. It is, in fact, upon the urinary organs that the Contrexéville water exercises its most powerful selective action. Its presence in the vascular system is manifested by a quickened pulse, more frequent respiration and increased activity of all the secretions, more particularly those of the bladder and intestines. Its effect is rapid; a few hours sufficing for its elimination by the kidneys, and expulsion by the intestines; indeed, the diuresis engendered is greatly in excess of the actual quantity of fluid taken into the system. Further, the water exercises a solvent action on the mucous in the passages, and on small concretions which it dislodges and carries away. It effectually removes abnormal and morbid conditions of the urinary mucous membranes, so as to correct and subdue excess of either acid or alkali in the urine. It is therefore a valuable adjunct in the treatment of gouty diathesis, especially atonic, gravel and calculus, as well as in cystitis for which it is almost a specific; for liver disease, diabetes; for nocturnal eneuresis (incontinence of urine) in children, and all chronic affections of the urinary organs.

(Ardêche, France.) DESAIGNES.

Source César, called "Eau de César."

Alkaline sodio-bicarbonated water. Temperature 4° C. (39° Fahr.).

The *Eau de César*, for therapeutic use, has received the authorisation of the Académie de Médicine, Paris, at their meeting of the 5th July, 1877.

A recent analysis, made (March, 1881) partly on the spot by M. Ferrand, chemist, Lyon, member of the Conseil d' Hygiène du Rhône, etc., gave the following results, for the *Source César*:—

Constituents in grains per gallon.		
Carbonic Acid (free)	211·82	Grains.
Bicarbonate of Soda	215·60	„
„ Potash	18·13	„
„ Lime	14·91	„
„ Magnesia	10·43	„
„ Protoxide of Iron	0·49	„
Chloride of Sodium	7·28	„
Sulphate of Soda	0·35	„
Residue, insoluble in acids (Alumina, Silica)	2·94	„
Total	481·95	Grains.

These waters are, therefore, rich in alkaline bicarbonates and comparatively poor in calcareous elements. Moreover, they are very rich, not only in free carbonic acid, but also in carbonic acid in combination, which, in fact, becomes entirely disengaged in wine, or even in the acid fluids of the stomach, and is therefore set free.

The *Source César*, known by the name of *Eau de César*, is one of the most highly gaseous springs in France; it contains 3 grammes of bicarbonate of soda per litre, but more than 1½ volumes of carbonic acid; and that chemical composition renders it an eminently digestible water, and at the same time very agreeable to drink, for the carbonic acid completely masks the flavour of the alkaline salts.

That richness in carbonic acid is so much the more remarkable in that it is perfectly preserved when the water is bottled, which arises from the fact that the water is taken under conditions of temperature that prevent the loss of the gas. In fact, this is what happens at the *Source de César*: the water issues from the rock at a very great depth—it is taken at the very moment of its issue—its temperature, winter and summer, is uniform, 4° C. above zero (about 39° Fahr.); and at that low temperature the carbonic acid gas remains in a state of complete solution, and only makes its presence known by the piquant flavour which it imparts to the liquid.

It is so much the more necessary to emphasise these conditions under which the water is drawn, because they are perhaps unique of their kind, and fully account for and explain the wonderful results obtained by the use of this water.

The *Eau de César* has acquired a great reputation in France; the city of Lyon alone consumes 500,000 bottles of the water.

(Germany.) EMS. (Altitude 291 ft.)

Ems is situated on the Lahn, in a narrow valley enclosed by lofty hills, and the temperature is constantly mild and in summer very relaxing. The waters are very useful in bronchitis and that form of catarrh which is frequently observed in gouty persons. The water has a beneficial action on the mucous membrane, especially in cases of troublesome cough and copious or tenacious expectoration. These waters are also prescribed for sluggish liver, dyspepsia—producing throat irritation, &c.

DOSE.—One to two bottles daily.

Analysis according to Fresenius in grains per gallon.

		Krähnchen. Grains.	Kesselbrunnen. Grains.
1. SOLIDS.	Bicarbonate of Soda	148·376	151·974
	Chloride of Sodium	70·841	77·705
	Sulphate of Soda	1·377	0·061
	„ Potash	3·286	3·937
	Bicarbonate of Lime	17·246	18·129
	„ Magnesia	15·051	14·360
	„ Protoxide of Iron	0·166	0·278
	„ „ Manganese	0·072	0·047
	„ Baryta / „ Strontia	0·011	0·036
	Phosphate of Alumina	0·032	0·096
	Silica	3·797	3·648
		260·255	270·271
		Cub. Ins.	Cub. Ins.
2. GASES.	Free Carbonic Acid	83·249	67·886

(Nassau, Germany.) FACHINGEN. (Altitude 337 ft.)

This water strongly resembles Selters, but is slightly more chalybeate. It is useful in affections of the bladder and kidneys, derangement of the digestive organs, acidity, heartburn, &c.,

DOSE.—Half a tumblerful before breakfast, and as an occasional beverage.

Analysis according to Fresenius in grains per gallon.

I. SOLIDS.	Bicarbonate of Soda	280·883	Grains.
	,, Lime	28·960	,,
	,, Magnesia	22·912	,,
	,, Protoxide of Iron	1·103	,,
	,, Strontia	0·008	,,
	,, Lithia	0·006	,,
	Sulphate of Soda	1·372	,,
	Phosphate of ,,	0·506	,,
	,, Lithia	0·002	,,
	,, Lime	0·004	,,
	,, Alumina	0·003	,,
	,, Silica	2·610	,,
	Fluoride of Calcium	0·027	,,
	Chloride of Sodium	45·574	,,
	,, Calcium	0·034	,,
		384·004	Grains.
2. GASES.	Carbonic Acid	329·750	Cub. Inches.
	Nitrogen	0.256	,, ,,
		330·006	Cub. Inches.

(Germany.) FRIEDRICHSHALL. (Altitude 920 ft.)

This bitter water, as a natural aperient, is both harmless and efficacious. It may be taken with impunity for a considerable length of time, and no evil effects are caused by its prolonged use, and it may be discontinued at any time without producing inconvenience. It is useful in almost every form of disease affecting the liver, kidneys, bowels, &c., and is strongly recommended by many eminent members of the medical faculty as a remedy in cases of calculous disease. It is also useful in diseases of the respiratory organs. It not only assists digestion but improves the appetite.

DOSE.—A wine-glass to half-a-tumblerful half-an-hour before breakfast. If a speedy action is required, or the bowels are much constipated, a little warm water can be added. For children the dose should be diminished in proportion to age.

Analysis according to Liebig in grains per gallon.

I. SOLIDS.	Sulphate of Soda	465·1	grains.
	,, Magnesia	395·5	,,
	Chloride of Sodium	611·0	,,
	,, Magnesium	302·5	,,
	Bromide of ,,	3·7	,,
	Sulphate of Potash	15·2	,,
	,, Lime	103·4	,,
	Carbonate of ,,	1·1	,,
	,, Magnesia	11·6	,,
	Silica	3·3	,,
		1912·4	grains.
2. GASES.	Carbonic Acid	53·2	cub. inches.

(Rhenish Prussia.) GEROLSTEIN. (Altitude 1200 ft.)

An artesian well, near the ruins of Castle Casselburg (in the Eifel Mountains), hence named the "Schlossbrunnen."

DOSE.—Being a table water, may be drunk *ad lib.*

Analysis in grains per gallon.

1. SOLIDS.	Carbonate of Soda	57·43052 grains.
	„ Lithia	0·07210 „
	„ Lime	40·00010 „
	„ Baryta	0·00623 „
	„ Magnesia	31·96368 „
	„ Protoxide of Iron	0·02212 „
	„ „ Manganese	0·01169 „
	Sulphate of Potash	0·20076 „
	„ Soda	7·18389 „
	Chloride of Sodium	17·57238 „
	Bromide of „	0·01470 „
	Iodide of „	0·00014 „
	Phosphate of Soda	0·01547 „
	Silicic Acid	5·82428 „
		160·31806 grains.
2. GASES.	Carbonic Acid in combination with carbonates, as bi-carbonates	58·23916 grains.

(Yorkshire.) HARROGATE. (Altitude 420 ft.)

These waters have a great reputation for the cure of skin diseases, and in the successful treatment of those complaints arising from a bad condition of the blood, produced by indigestion, gout, rheumatism, chorea, chlorosis, anæmia, &c. which frequently precede, and cause disease of the skin. The water is very useful in cases of lead and mercurial poisoning, secondary symptoms of syphilis, &c.

DOSE.—From a tumblerful to a bottle daily; the first dose to be taken before breakfast.

Analysis of the Old Sulphur Well, according to Dr. Hofmann in grains to the gallon.

1. SOLIDS.	Sulphuret of Sodium	15·48 grains.
	Sulphate of Lime	0·13 „
	Carbonate of „	12·37 „
	Fluoride of Calcium	trace
	Chloride of „	81·74 „
	„ Magnesium	55·69 „
	„ Potassium	64·70 „
	„ Sodium	860·18 „
	Bromide of „	trace
	Iodide of „	trace
	Ammonia	trace
	Carbonate of Protoxide of Iron	trace
	„ „ Manganese	trace
	Silica	0·25 „
		1090·54 grains.
2. GASES.	Carbonic Acid	22·00 cub. inches.
	Carburetted Hydrogen	5·84 „
	Sulphuretted „	5·31 „
	Nitrogen	2·91 „
		36·06 cub. inches.

(Hesse Homburg.) HOMBURG. (Altitude 600 ft.)

Homburg is situated about two miles distant from the Taunus Mountains, and is about three-quarters of an hour by railway from Frankfort. The air is very bracing even in the summer months. There are several springs, of which the "Elisabeth" is the principal. The water is laxative and tonic, and is very useful in cases of torpidity of the bowels and the digestive organs. It is prescribed in cases of venous congestion of the abdominal organs, plethora, dyspepsia, chlorosis, hysteria, hypochondria, diseases occurring after typhus or intermittent fevers, engorgements of the liver and spleen, inactive circulation of the portal system, &c.

DOSE.—About three tumblers daily.

Analysis of the "Elisabethbrunnen," according to Liebig, in grains per gallon.

1. SOLIDS.	Chloride of Sodium	791·5 grains.
	,, Magnesium	77·9 ,,
	Carbonate of Protoxide of Iron	4·6 ,,
	,, Lime	109.9 ,,
	,, Magnesia	20·1 ,,
	Sulphate of Soda	3·8 ,,
	Silica	3·2 ,,
		1011·0 grains.
2. GASES.	Free Carbonic Acid	214·8 grains. (484·6 c. i.)

(Hungary.) HUNYADI-JÁNOS. (Altitude 460 ft.)

This spring is one of the Ofen group, situated near Buda on the Danube. The water is aperient, and is recommended for habitual constipation, for persons of gouty habit, hæmorrhoids, disorders of the liver, in chronic affections of the organs of respiration and circulation, in organic diseases resulting from fatty degeneration and during pregnancy, and in many diseases peculiar to females, and as a safeguard against the evil consequences of indiscretion in diet.

DOSE.—For ordinary aperient purposes a half wine-glassful may be taken at bed-time, or a wine-glassful taken in the morning fasting. It is most efficacious when warmed to a temperature not below 60°, or when an equal quantity of hot water is added to it.

Analysis according to Bunsen.

In grains per gallon.

1. SOLIDS.	Sulphate of Soda	1578·598 grains.
	,, Magnesia	1564·500 ,,
	,, Potash	8·442 ,,
	Bicarbonate of Soda	47·320 ,,
	,, Strontia	1·890 ,,
	,, Protoxide of Iron	0·042 ,,
	,, Lime	55·769 ,,
	Chloride of Soda	119·336 ,,
	Silicious Salts	0·742 ,,
	Total Solid Constituents	3376·639 grains.
2. GASES.	Carbonic Acid, free and half combined...	33·582 grains.

(Buda-Pest, Hungary) HUNYADI-LÁSZLÒ.

APERIENT BITTER WATER.

The following is extracted from the *Bulletin de l'Académie de Médecine* (3rd January, 1882) :—

"M. A. S., the owner, residing at Vienna (Austria), and represented at Paris by the Compagnie Générale des Eaux Minérales et Bains de Mer, has requested an authorisation for the introduction and sale, in France, of the mineral water called Hunyadi Lászlò, situated at Buda-Pest (Austria-Hungary).

"This spring, the source of which is quite near to those of Hunyadi János, Francis-Joseph, Victoria and Rákóczy, has the following constituents, in grains per gallon :—

Sulphate of Magnesia	1691·90	grains.
„ Soda	1611·40	„
„ Potash	6·30	„
„ Lime	127·40	„
Bicarbonate of Soda	47·18	„
Chloride of Sodium	92·61	„
Iron and Alumina	0·70	„
Silica	3·50	„
Total inorganic elements... ..	3580·99	grains.

"From its composition this water is to be classed among mineral waters. We, therefore, recommend the Academy to pronounce a favorable opinion, in order that the Hunyadi-Lászlò spring may be employed in France for medical purposes.

"The conclusions of the present report, on being put to the vote, were adopted by the Academy."

The region of the bitter saline waters of Ofen (Buda-Pest), comprises a series of springs (eight in number), very similar in composition, and offering a very well graduated mineralisation, as will appear from the annexed table, taken from the analysis made by Professor Balló, of Buda-Pest. This table only gives the most important mineral constituents, for the chief springs—in grains per gallon :—

	Hunyadi Lászlò. Grains.	Hunyadi János. Grains.	Rácóczy. Grains.	Széchenyi. Grains.
Magnesia and Sulphuric Acid	1694·455	1569·526	1454·95	723·6698
Soda and Sulphuric Acid.....	1594·670	1254·911	1012·34	1050·5565
Chlorate of Potash	11·144	11·039	10·64	8·4665
Lime	114·044	105·854	—	89·1996
Total fixed constituents...	3575·005	3141·544	2833·74	1998·2039

It will be interesting to give the complete analysis of the Hunyadi Lászlò water, made on the spot by Professor Balló (the official chemist of Buda-Pest), for comparison with that of the Academy. It will be seen that, with some insignificant differences, they are identical.

In grains per gallon.

Sulphate of Magnesia.....	1694·455	grains.
„ Soda	1594·670	„
Chlorate of Potash.....	11·144	„
Lime.....	114·044	„
Bicarbonate of Soda	47·180	„
Chloride of Magnesium	108·262	„
Alumina	0·980	„
Bicarbonate of Iron	0·182	„
Silicates	4·088	„
Total.....	3575·005	grains.

The quantity of carbonic acid being 28·707 grains per gallon, deducting that which is combined with soda, there remains 3·997 grains of free carbonic acid.

The Hunyadi László water, mineralised in almost equal proportions by the sulphates of soda and magnesia, accompanied by an alkaline chloride, and by a certain proportion of bi-carbonate of soda and free carbonic acid, constitutes, in virtue of these relations, and by the considerable quantities of its chief elements, a laxative medicament, free from all the inconveniences of drastic purgatives, and the action of which is always certain, while it may be mild or energetic at pleasure.

The proportion of the neutral sulphates which it contains allows of, and even often necessitates it being taken in small quantities. This is a great advantage, if only on account of the bitterness, of which this kind of natural preparations can never be divested.

DOSE.—A table spoonful or a claret-wineglassful is sufficient for young children. A wineglassful or two suffices equally to obtain a laxative effect in the case of adults. A larger dose will of course produce a more powerful effect.

(Hessen-Nassau.) JOHANNISBRUNNEN.

This spring of natural mineral water is situated near Zollhaus Station, Aarthal, in the Province of Hesse-Nassau, Germany. The water issues from a very deep cleft in a rock at a temperature of 50° Fahrenheit, and is as clear as crystal. It is highly charged with free carbonic acid gas, of great purity, and contains bicarbonates and chlorides in such proportions as to render it agreeable to the taste and permanent.

Therapeutically, the Johannisbrunnen water stimulates the functions of the mucous membranes and quickens the circulation of the blood. It is highly recommended in cases of indigestion and feeble appetite, also for rheumatic affections, and it is valuable for persons of a sedentary occupation. It may be taken pure or mixed with hot milk. On account of the large proportion of carbonic acid, it is an excellent tonic and table water, alone or with wine or cognac. It is of great purity and contains no traces of organic matter. It can be exported and stored for a long time without deterioration.

The chemical composition of the Johannisbrunnen water appears from the following analysis, made on the spot by Dr. H. Plaskuda, Cologne.

	Grains per gallon.
Bicarbonate of Soda	25·5789
„ Potash	0·9128
„ Lithia	0·0889
„ Lime	51·8238
„ Magnesia	21·2674
„ Protoxide of Iron	0·0686
„ „ Manganese	0·1456
Chloride of Sodium	71·6037
Sulphate of Soda	2·0797
Silicic Acid	0·7910
Total solid constituents	174·3604
Free Carbonic Acid	170·6670
Total	345·0274

(Bavaria.) KISSINGEN. (Altitude 600 ft.)

Situated in a charming valley, surrounded by orchards, vineyards and woody mountain scenery. There are several springs, of which the Rakoczy—so named from the discoverer, a Croatian officer—is the principal, and is the one chiefly used for drinking purposes. The water is clear and sparkling; the taste saline, bitter, and slightly astringent. It is very beneficial to persons suffering from atonic dyspepsia and laxity of the intestinal fibre, excessive mucous secretion impeding the abdominal

functions, and weakness proceeding from age or exhausting disease. It is also useful in cases of hepatic derangements, scrofula in persons of phlegmatic and torpid constitutions. Helminthiasis and hæmorrhoids are frequently cured by a course of the Kissingen waters.

DOSE.—One bottle daily.

Analyses.

In grains per gallon.	Rakoczy, by Liebig. Grains.	Pandour, 1856. Grains.	Max Brunnen Heckenlauer, 1869. Grains.
1. SOLIDS. Chloride of Sodium	407·5435	386·4497	162·1343
,, Potassium	20·0830	16·8980	26·3232
,, Magnesium	21·2653	14·8141	7·5606
,, Lithium	1·4014	1·1760	0·0510
,, Manganese	41·1873	41·8439	14·0186
,, Calcium	27·2559	21·0308	13·3184
Bicarbonate of Magnesia	1·1928	3·1353	4·7880
,, Lime	74·2672	71·0388	39·5643
Proto-carbonate of Protoxide of Iron	2·2106	1·9397	0·1687
Phosphate of Lime	0·3927	0·3654	0·3500
Silicic Acid	0·9030	0·2870	0·2380
Nitrate of Soda	0·6517	0·2471	5·4124
Bromide of Sodium	0·5866	0·4963	...
	598·9410	559·7221	273·9275
2. GASES. Free Carbonic Acid	91385·0	105385·0	88025·0

(Rhenish Prussia.) KREUZNACH. (Altitude 285 ft.)

This water is employed both internally and externally with great benefit in cases of scrofula, and glandular swellings.—Dr. Sutro says: "In whatever form the disease (scrofula) may appear, whether the glands of the neck be swollen and indurated, or whether the eyes, ears, nose, mesenteric glands or bones become affected, Kreuznach will be found beneficial." The water is also used in cases of constitutional syphilis, diseases of the skin, rheumatism, paralysis, tuberculosis, and leucorrhœa. Outwardly it is chiefly used in the form of Motherlye or salts, directions for the use of which are given on the bottles.

DOSE.—Half-a-pint to a pint daily.

Analysis of "Elisenquelle," according to Lowig, in grains per gallon.

1. SOLIDS.	Chloride of Sodium	728·83 Grains.
	,, Calcium	133·89 ,,
	,, Magnesium	40·71 ,,
	,, Potassium	6·24 ,,
	,, Lithium	6·13 ,,
	Bromide of Magnesium	2·78 ,,
	Iodide of ,,	0·35 ,,
	Bicarbonate of Lime	16·93 ,,
	,, Baryta	0·10 ,,
	,, Magnesia	1·06 ,,
	,, Protoxide of Iron	1·50 ,,
	Silica	1·29 ,,
	Phosphate of Alumina	0·25 ,,
		940·06 Grains.

(Obersalzbrunn, Silesia.) KRONENQUELLE.

This is a sodio-lithiated saline water, slightly ferruginous, clear as crystal, devoid of colour and odour, and having a crisp, agreeable and slightly saline flavour. It is of recognised therapeutical value for the treatment of nephritic and arthritic affections, and gouty diathesis. It ranks among the soda-lithia springs, and as a prophylactic against tendency of uric acid to form concretions in the joints and to crystallise in the kidneys and bladder, resulting in gravel and calculus. This favourable action is due to the quantity of lithia contained in the water, in conjunction with the natural and efficacious combination, in quantity and quality, of the constituents necessary as dissolvents for uric acid.

The water keeps very well, and bears transport, retaining its valuable properties for a long period. When kept in bottles, the small quantity of ferrous bicarbonate which it contains precipitates in brownish flakes of hydroxide of iron; and this sediment may be left or taken by the patient with perfect safety. One or two bottles are to be taken daily during active treatment, diet being properly regulated, and wines and spirits in general avoided or taken in limited quantity. The use of the water should be continued for some little time after recovery (about 2 or 3 bottles a week) and renewed from time to time for a week or two.

Professor Poleck's careful analyses give the following as the chemical constituents of the Kronenquelle water, in grains per gallon:—

Chloride of Sodium	4·1293	grains
Sulphate of Soda	12·6070	,,
,, Potash	2·8602	,,
Bicarbonate of Soda	61·0848	,,
,, Lithia	0·7980	,,
,, Lime	49·8848	,,
,, Magnesia	28·3339	,,
,, Strontia	0·1960	,,
,, Protoxide of Manganese	0·1267	,,
,, ,, Iron	0·6391	,,
Phosphate of Alumina	0·0252	,,
Alumina	0·0329	,,
Silicic Acid	2·4220	,,
Total Solid constituents	163·1399	grains

Free Carbonic Acid (at 50° Fahr. and Bar. 30) in 1000 parts by volume .. 849·4 parts

LEAMINGTON SPA.

This is a natural saline mineral water of considerable repute, from long date, as a medicinal agent. It has a recognised therapeutical value, in the treatment of dyspepsia and indigestion, chronic or acute; congestion of the liver and kidneys, and the internal obstructions and congestions peculiar to the female sex; piles or hæmorrhoids; gout, rheumatic gout, and articular rheumatism, muscular rheumatism and cramps, and all forms of sciatica; poverty of the blood (these waters being used in conjunction with preparations of iron salts); palsy and lead poisoning; scrofulous, lymphatic and other glandular enlargements; rickets; tubercular disease of the digestive organs; enlarged tonsils; goitre; wasting diseases of children; chorea or St. Vitus' dance; jaundice, enlargement of the spleen; eczema and certain other forms of cutaneous affections; herpes, lepra, and psoriasis.

The usual dose is half-a-pint, warm or cold, on rising in the morning; but in some cases, particularly of chronic disease, one pint, taken in two doses, is required. Walking exercise should intervene. The water exercises a mild stimulating effect on the excretory functions of the bowels and kidneys.

The latest analysis by Mr. James Cutting, of the Pump Room Well, agrees with other modern and ancient results, and indicates the following chemical constitution of the Leamington Waters. Temperature, 40° Fahr. Sp. Gr. 1·0127.

	Grains per gallon.
Sulphate of Soda	287·76
Chloride of Sodium	688·16
„ Calcium	166·32
„ Magnesium	94·88
Silica	0·96
Iron	0·88
Iodide of Magnesium	Trace
Bromide of „	„
	1238·96

Carbonic acid is the chief gaseous constituent, with small quantities of oxygen and nitrogen.

(Bohemia.) MARIENBAD. (Altitude 1900 ft.)

This spa is beautifully situated about twenty-five miles from Carlsbad, and is of comparatively modern origin. The water owes its efficacy chiefly to the sulphate of soda, and is of course purgative. It is chiefly used in diseases arising from luxurious habits, plethora, abdominal enlargement, gravel, gout, and derangement of the digestive organs. It is also used for hæmorrhoids, gall stones, congestion of the brain and its membranes, maladies of the eye, hypochondriasis and chronic catarrh of the uterus and many female complaints.

DOSE.—One bottle daily.

Analysis according to Kersten in grains per gallon.

		Kreuzbrunnen. Grains.		Ferdinandsbrunnen. Grains.
1. SOLIDS.	Sulphate of Soda	362·69	...	387·66
	Bicarbonate of Soda	123·94	...	139·99
	Chloride of Sodium	111·66	...	153·97
	Sulphate of Potash	4·49	...	4·99
	Bicarbonate of Lithia	0·77	...	1·10
	„ Lime	66·30	...	60·21
	„ Strontia	0·17	...	0·08
	„ Magnesia	53·99	...	52·99
	„ Protoxide of Iron	4·82	...	6·53
	„ „ Manganese	0·53	...	1·66
	Phosphate of Alumina	0·54	...	0·14
	„ Lime	0·18	...	0·15
	Silica	6·79	...	7·41
		736·87	...	816·88

(Vermont, U.S.A.) MISSISQUOI.

The spring is situated about three miles from the town of Sheldon, Franklin Co., Vermont, and has a local reputation in cases of cancer, diseases of the kidneys, scrofula, cutaneous affections, and impurities of the blood.

DOSE.—One bottle a day, as follows; a tumblerful one hour before breakfast, and a like quantity before each meal, and a tumblerful on retiring for the night: the last may be dispensed with if it produces wakefulness.

ANALYSIS.—The proprietors withhold the analysis on the ground that its publication might lead to imitations, remarking that—"In no aspect of the case would a published analysis of the Missisquoi spring water accomplish any good, but, on the contrary, it might be productive of much evil."

(Corsica.) OREZZA. (Altitude 1730 ft.)

This water is ferruginous and is chiefly used for drinking purposes, and as it contains a large proportion of free carbonic acid and bicarbonates, it is readily absorbed into the system. It is useful as a tonic in cases of debility, weak appetite and digestion, and also in female complaints, chlorosis, fluor albus, chronic affections of the alimentary canal, and generally in all affections arising from debility of the system.

DOSE.—It may be drunk freely as a table water, or if the digestion is very weak, from half to one tumblerful may be taken to commence with, and the dose gradually increased to one bottle per day.

Analysis according to Poggiale in grains per gallon.

1. SOLIDS.	Bicarbonate of Lime	42·14 grains.
	„ Magnesia	5·18 „
	„ Protoxide of Iron	8·96 „
	Sulphate of Lime	1·47 „
	Chlorate of Potash } „ Soda }	0·98 „
	Aluminium	0·42 „
	Silicic Acid	0·28 „
		59·43 grains.
2. GASES.	Free Carbonic Acid	1·248 per 1.000 prts.

(Loire, France.) POUGUES. (Altitude 780 ft.)

This bath at one time enjoyed great popularity, and after having been much neglected is now regaining its celebrity. The water is very useful in dyspepsia, gravel, catarrh of the bladder, and chronic disorders of the digestive organs. It contains very little carbonic acid, and when bottled for exportation it has been found advisable to increase the quantity, as otherwise the water deteriorates very rapidly.

DOSE.—One bottle daily—one or two glasses to be taken before breakfast, and one glass an hour or two before dinner.

Analysis according to Ossian Henry, "St. Leger" Spring, in grains per gallon.

1. SOLIDS.	Bicarbonate of Lime	92·883 grains.
	„ Magnesia	68·334 „
	„ Soda, with traces of Potash	44·534 „
	„ Protoxide of Iron	1·442 „
	Sulphate of Soda	18·900 „
	„ Lime	13·300 „
	Chloride of Magnesium	24,500 „
	Silicic Acid and Alumina	2·450 „
	Glairine	2·100 „
		268.443 grains.

(Bohemia.) PÜLLNA. (Altitude 1225 ft.)

These are cold springs, with sulphates, known as bitter waters, on account of the taste of the water. From its low temperature, the nature of its salts, and the comparative freedom from free gas, the Püllna water preserves its qualities, in transport and storage, without detriment to its medicinal properties. It is one of the most efficacious purgatives known to the faculty, though mild in its action. According to Barruel's analysis, one litre (1,000 cubic centimetres) contains 62 grammes of salts, comprising 21 grammes of sulphate of soda, and 34 grammes of sulphate of magnesia;

together with small quantities of lithia and bromide of potassium, which increase in a high degree its medicinal action, and impart the peculiar and valuable characteristics which distinguish a natural aperient mineral water, as more salutary than, and far superior to, any artificial preparation of the salts, as a medicament. The municipal authorities of Püllna are the proprietors of these springs, and every care is officially taken in the bottling to preserve the pure natural character of the "Püllnaer Gemeinde-Bitterwasser."

This water acts powerfully as a purgative, and the action is assisted by the addition of an equal part of warm water. It is very useful if taken occasionally in constipation of the bowels, torpid condition of the liver, and generally in a congested state of the brain, thoracic and abdominal viscera, and hæmorrhoidal vessels. It is a powerful solvent, and is beneficial in counteracting a tendency to gout and the formation of calculous concretions, and it may be taken with advantage by females of a full habit, who suffer from painful and difficult menstruation, and who require a frequent aperient.

DOSE.—A wineglassful, either pure or mixed with warm water, taken an hour before breakfast; and in obstinate cases a similar dose at bed time. The water should be taken fasting. For children under 7 years of age the dose is from one to two table spoonfuls. To disguise the bitter flavour, if necessary, small quantities of milk, tea, coffee, fruit liquor, or of white or red wine, may be mixed with the water.

Analysis according to Dr. Struve in grains per gallon.

1. SOLIDS.	Sulphate of Soda	1238·00	Grains.
	,, Potash	48·00	,,
	,, Lime	26·00	,,
	Carbonate of ,,	7·70	,,
	Sulphate of Magnesia	930·86	,,
	Chloride of Magnesium	166·66	,,
	Carbonate of Magnesia	64·06	,,
	Phosphate of Lime	0·03	,,
	Silica	1·76	,,
		2483·07	Grains.
2. GASES.	Carbonic Acid	20·34	Cubic Inches.

(Waldeck.) PYRMONT. (Altitude 400 ft.)

A valuable ferruginous water, of service in dyspepsia, diarrhœa, chlorosis, debility after fever, loss of blood, &c., &c., also for constitutional weakness.

DOSE.—Half-a-pint two, three, or even four times a day, according to circumstances. It may be used as a beverage at meals—mixed with wine, if preferred.

Analysis according to Professor Wiggers, in grains per gallon.

		Trink-brunnen-grains.	Neu-brunnen. grains.
1. SOLIDS.	Bicarbonate of Protoxide of Iron	5·77	4·57
	,, Protoxide of Manganese	0·45	10·13
	,, Lime	104·77	123·74
	,, Magnesia	1·72	2·15
	,, Ammonia	0·03	Traces.
	Sulphate of Lime	90·54	4·74
	,, Potash	2·33	4·99
	,, Soda	—	22·19
	,, Magnesia	38·89	29·51
	Chloride of Sodium	5·15	89·08
	,, Lithium	0·26	0·14
	,, Magnesium	6·96	—
	Nitrate of Soda	0·01	0·01
	Silica	0·26	2·87
	Alumina	0·11	1·33
		257·25	295·45
2. GASES.	Free Carbonic Acid	154·08	136·62

(Rhenish Prussia.) ROISDORF. (Altitude 1000 ft.)

This spring is situated near Bonn on the Rhine.

DOSE.—Being a table water, it may be drunk *ad lib.*

Analysis according to Bischof in grains per gallon.

		Trink-quelle. Grains.	Stahl-quelle. Grains.
1. SOLIDS.	Chloride of Sodium	146·0	38.6
	Bicarbonate of Soda	60·4	13·8
	„ Lime	21·6	21·8
	„ Magnesia	30·6	10·3
	„ Protoxide of Iron	0·5	2·0
	Silica	1.2	7·0
		260·3	93·5
2. GASES.	Carbonic Acid	190 Cub. Inches.	

(Echzell, Ober-Hessen, Germany.) ROMAN SPA.

The waters of the Roman Spa Springs, near Echzell, in Oberhessen, Germany, are to be classed in the category of so-called acidulated mineral waters, strongly impregnated with carbonic acid, and holding in solution considerable quantities of bicarbonates, alkaline salts, carbonate of magnesia, etc. The water issues from the spring at a temperature of 51° Fahr., is clear and sparkling, and has a pleasant biting flavour. From the combination of mineral constituents, and the large quantity of carbonic acid gas contained—in every 1,000 parts, by volume, there are 3,560 parts of carbonic acid, free and partly fixed, being a greater proportion than any other known natural mineral water—the Roman Spa waters are admirably adapted for table use. They are carefully bottled in their natural state, and bear transport and storage without deterioration. They are perfectly pure and free from organic matter or other hurtful ingredients.

According to the latest analysis of these waters, made by Dr. Fresenius in 1884, their chemical composition is as under:

	Grains per gallon.
Chloride of Sodium	116·067
„ Potassium	4·697
„ Calcium	13·139
Sulphate of Lime	9·625
Carbonate of „	56·630
„ Magnesia	105·826
„ Protoxide of Iron	3·066
Silicic Acid	6·146
Total Solid Constituents	315·196
Carbonic Acid (free and in solution)	216·363
Total	531·559

(Germany.) ROSBACH.

This spring is situated not far from Homburg.

DOSE.—Being a table water, it may be drunk *ad lib.*

Analysis according to Professor Wanklyn.

One gallon (70,000 grains) contains in solution—

1. SOLIDS.	Chloride of Sodium	83·0 Grains.
	Bicarbonate of Lime	25·7 „
	„ Magnesia	12·6 „
		121·3 Grains.

(Puy-de Dôme, France.) ROYAT. (Altitude 1400 ft.)

The Royat waters are assimilated to the serum of the blood, and Dr. Gubler (Professor of Therapeutics of the Faculty of Medicine at Paris) has called them "mineral lymph." Owing to the presence of iron, arsenic and other fortifying and restorative elements (such as chloride of sodium, sodic iodide and bromide, and carbonate of lime and magnesia, etc.) they are especially valuable for the treatment of anemia, chlorosis, and general debility; as also of catarrhal affections of the digestive and respiratory organs, conjoined with general weakness and a gouty or rheumatic diathesis. These waters are endowed with a high degree of tonic and resolvent action, and are prescribed (in addition to the foregoing maladies), for gastro-intestinal dyspepsia, glandulous angina, laryngitis, bronchitis, humid asthma, diabetes, uric gravel, catarrhal affections of the genito-urinary canals, articular visceral gout and rheumatism, and cutaneous diseases.

There are three springs—Cæsar, Saint-Mart, and Saint-Victor.

CÆSAR SPRING.—This water is diuretic, tonic, and antidyspeptic. It is extremely limpid, colourless, inodorous, and of a very agreeable acidulated flavour, slightly ferruginous and alkaline. Its constant temperature is 84° Fahr., and its density 1·0016. It exercises on the physical economy all the action of the alkaline waters, without their inconveniences. It is an exquisite table water, and may be mixed with wine, upon which it has no decomposing effect. A remarkable property of the Cæsar water of Royat is its diuretic action. In catarrhal affections of the bladder, gravel or gout, it may be relied upon to exercise an elective modifying action upon the genito-urinary organs. In a state of ordinary health, the Cæsar water stimulates the mucous membrane of the stomach, promotes the appetite, augments the urinary secretion, facilitates digestion, and relieves nausea. In short it may be advantageously employed in the treatment of cases of difficult and painful digestion, chlorosis, chloro-anemia, neuralgia, liver complaint arising from prolonged indigestion, diabetes, gravel, vesical and uterine catarrh, leucorrhea, seminal weakness, neurosis, and in some kinds of intermittent fevers, as well as in dilatory convalescence after grave febrile maladies.

SAINT-MART SPRING.—A tonic, antidyspeptic and antiarthritic water. This water is limpid, colourless and inodorous, of an acidulated flavour, slightly alkaline, arseniated and lithiated. Its temperature is 88° Fahr. This is also an excellent table water, and does not decompose wine when mixed therewith; it is easily digestible on account of the large proportion of carbonic acid. Its chief characteristic is its resolvent property, and it exercises a manifest diuretic effect. The Royat Saint-Mart water is admirably adapted for persons suffering from imperfect digestion, gastro-intestinal dyspepsia, gastralgia, and passive congestions arising from defective blood circulation, especially in connection with arthritic affections (rheumatism or gout). It is applicable to the treatment of anorexia, pyrosis, uric gravel, diabetes, and albuminuria, etc., conjoined with gouty or rheumatic diathesis.

SAINT-VICTOR SPRING.—A tonic, restorative, antianemic water. This is the most highly ferruginous of the Royat waters; and like the others, very limpid, colourless, inodorous, with an acidulated flavour, slightly alkaline. Its temperature is 68° Fahr. Chief among its restorative mineral constituents are iron and arsenic. Abundantly charged with carbonic acid, these waters bear transport and storage well, and preserve their peculiar properties. The Royat Saint-Victor water may be taken pure or mixed with wine, which it does not decompose. It is resolvent, restorative, stimulating, and tonic; facilitates digestion, promotes assimilation, and stimulates the general circulatory and secretory functions. It is particularly suitable to females, especially girls and young women suffering from chlorosis, amenorrhea, dysmenorrhea, neuralgia, gastralgia, gastro-intestinal dyspepsia, sterility, and debility. It is highly recommended for delicate persons during convalescence from any grave malady.

The Thermal Establishment of Royat is fitted up with all the modern appliances of hydro-therapeutics. There are 115 baths of flowing thermal water, large swimming bath, besides douches, appliances for inhalation, pulverisation, etc., a gymnasium, and special carbonic acid baths and douches. There is also a Casino, in which are given, during the season, concerts and theatrical performances.

The chemical composition of the three Royat Springs above-named, by M. Truchot and M. Lefort, is given in the annexed table of analyses, showing their solid and gaseous constituents.

SPRING.	St.-Mart (M. Truchot.)	St.-Victor (M. Truchot.)	Cæsar (M. Lefort.)
Yield in gallons in 24 hours.....	5·500	6·600	7·590
Temperature (Fahrenheit)	88°	68°	84°
Solid Constituents per gallon	grains.	grains.	grains.
Bicarbonate of Soda	56·021	62·202	27·440
„ Potash	13·146	16·100	20·020
„ Lime.....	67·872	70·847	48·020
„ Magnesia	45·556	45·248	27·790
„ Protoxide of Iron.....	1·610	3·920	1·750
„ „ Manganese	trace	trace	trace
Sulphate of Soda	10·241	11·585	8·050
Phosphate of „	trace	trace	0·980
Chloride of Sodium	109·585	115·479	53·620
Iodide and Bromide of Sodium	traces	traces	traces
Silica	6·615	6·650	11·690
Alumina and organic matter.....	traces	traces	traces
Chloride of Lithium	2·450	2·450	0·630
Arseniate of Soda (Codex)	0·091	0·315	0·049
Total Solid Constituents	313·187	334·796	200·039
Free Carbonic Acid Gas	119·63	104·44	860·3

(Pyrenees, Spain.) RUBINAT.

The Rubinat natural mineral purgative water belongs, by its composition, to the group of cold sodio-sulphated waters, having a temperature of about 60° Fahr. on issuing from the spring, and being bright, colourless and inodorous, with a slightly saline flavour. Its use is approved by the Paris Académie de Médecine, and licensed by the French Government.

Its rich mineralisation places it in the first rank of natural mineral aperient waters and perhaps the most valuable, on that account, for therapeutic uses. The usual dose of Rubinat water, to ensure a non-irritating but strongly purgative effect, is from a half to one wine-glassful, taken in the morning fasting. Its action is prompt, especially if followed by a cup of hot tea, coffee, or milk.

The Rubinat laxative water is invaluable for the treatment of all intestinal complaints, congestion, constipation, and generally all abdominal obstructions ; as also for accumulations of bile, etc., and gastric fever.

From its analysis by Professor Bouchardat, the chemical composition of the Rubinat water appears to be as under :—

	Grains per gallon.
Sulphate of Soda	6748·707
„ Potash	16·120
„ Magnesia	228·540
„ Lime.....	136·004
Chloride of Sodium.....	144·064
Silica, Alumina, and Ferric Oxide (trace)...	2·100
Total solid constituents.....	7275·535

Mounicq, Basses-Pyrénées, France.) SAINT BOÈS.

A natural, sulphonaphthalic, Arsenical, Ioduretted, Water, unique in chemical composition and therapeutic qualities ; it is cold (temperature 54° Fahr.) limpid, strongly sulphuretted and naphthalic. It bears transport and storage without deterioration.

The St. Boès water is a powerful natural specific against the various diseases of the skin, and of the mucous membranes generally, of the bronchia, lungs and chest. It is invaluable for the treatment of bronchitis, laryngitis, angina, phthisis, both pulmonary and laryngeal, all kinds of catarrh, asthma, chronic diseases of the stomach, dyspepsia, gastritis, gastralgia, imperfect digestion, chronic venereal diseases, tetter, eczema, etc.

This special water should be taken under medical prescription. The dose varies from a spoonful to a glassful (according to the nature of the disease and the age of the patient), two or three times a day, some time before or after meals, and either pure or mixed with milk or syrup. It may also be used as a gargarism, or by inhalation in the form of spray with the aid of a pulveriser *ad hoc*, in which case hot milk or syrup may also be added.

ST. BOÈS NAPHTHA.—This is a special preparation of the natural sulphuretted, arsenical tar, contained in the St. Boès water, concentrated and solidified in Granules, of which three will suffice to alleviate the most obstinate cough.

(Loire, France.) SAINT GALMIER. (Altitude 1350 ft.)

This water is useful in cases of dyspepsia, as it not only assists digestion but also increases the appetite. Its refreshing and invigorating properties have made it the most popular natural mineral table water in France. Indeed it may justly be ranked as one of the best known waters for table use, and for admixture with wine, which it in no way affects.

DOSE.—Being a table water, it may be drunk *ad lib.*

Analysis of the "Badoit" Spring in Grains per Gallon.

1. SOLIDS.	Bicarbonate of Soda	39·20 grains	
	„ Potash	1·40	„
	„ Lime, „ Magnesia	100·80	„
	Sulphate of Soda, „ Lime	14·00	„
	Silicate of Alumina	9·38	„
	Chloride of Magnesium	33·60	„
		198·38 grains	
2. GASES.	Free Carbonic Acid Gas	1¼ volumes per volume	

SAINT GALMIER-NOËL.

The GRANDE SOURCE NOËL is reputed to be the most highly impregnated with free carbonic acid of the St. Galmier waters, containing two volumes of that gas in one volume of the water, in its natural state, in which condition it is carefully bottled (being taken direct from the spring at a depth of 100 feet) by means of special patented apparatus, so as to preserve its natural limpidity, purity, and sparkling condition. It is a richly gaseous acidulated water, of the density of 1·022, eminently digestible, temperative, and slightly laxative. One of the very best of table waters.

The chemical composition of the St. Galmier Noël water is shown by the following analysis, made by M. Clouet, Professor of the Ecole de Médecine at Rouen.

	Grains per gallon.
Bicarbonate of Soda	21·00
„ Lime	46·90
„ Magnesia	25·55
Sulphate of Soda	8·40
„ Lime	4·97
Chloride of Sodium	4·62
Silica, Manganese, Strontia	traces
Iron	2·10
Total solid constituents	113.54

(Upper Savoy, France.) SAINT-GERVAIS.

The public vehicles, by which the service of communication between Geneva and Chamouni is carried on, call at the Thermal Establishment of Saint-Gervais.

The establishment comprises bath-rooms, douches, inhalation, pulverisation, and a complete hydrotherapeutic course.

Therapeutic Properties of the Saint-Gervais Waters.

The waters of Saint-Gervais are at the same time slightly sulphurous and chloro-sulphated. Their mineralisation—which is rather high, 35 grains per gallon—is mainly due to chloride of sodium, sulphate of soda, and sulphate of lime. This composition indicates their laxative qualities. But they are also digestive waters—a property due to the presence of carbonic acid and of bicarbonate of lime.

The Saint-Gervais waters are employed both for external application and internal use. One of the springs (Torrent) contains sulphide of calcium, so that it is possible to regulate at will the use of the sulphur constituent.

The therapeutic specialisations of the Saint-Gervais waters are chiefly, though not exclusively, directed to the treatment of certain cutaneous diseases and particular affections of the alimentary canal, namely atonic dyspepsia, and dyspepsia coincident with habitual constipation. The superiority of the treatment by the Saint-Gervais waters is more specially manifest in the case of skin diseases, assuming an inflammatory form, which, for that very reason, are aggravated by the use of strongly sulphurous (sodic) waters. The temperature of these waters enables them to be used as a remedy for sub-acute eczema, which is so intractable to our ordinary remedies, and which one is afraid to treat with the aid of mineral waters. On account of the laxative and dietetic properties of these waters, and their medium temperature, as well as of the great quantity of glairine which they contain, their use does not engender those symptoms of irritation which result from the use of other waters. Their efficiency is quite as great, even when the eczema has become chronic. On this point Professor Hardy expresses the following opinion: —* "In eczema, when the period of secretion is too prolonged, and the crusts are continually renewed by intermitten growths, at short intervals, we may seek to accelerate the cure by mineral waters. But, in that case, care must be taken to avoid the use of mineral waters too highly charged with salts of sulphur, as well as of waters which are too warm; inasmuch as such waters infallibly augment the intensity, extent, and duration of the malady. At the stage to which I refer, the waters which are to be placed in the very first rank are certainly those of Saint-Gervais. Of a low temperature, diuretic, diaphoretic, slightly purgative, and containing only a small proportion of sulphur, these waters are perfectly suited to eczema, when it has already, for several months, pursued a chronic course, without having arrived at the stage of complete siccity. They are equally valuable when eczema has attained the final stage, and assumed the squamous or lichenoid form. In the case of nervous, gastralgic persons, I have very often to congratulate myself on the beneficial effect of these waters in effecting and establishing a cure."

(Upper Engadine, Switzerland.) SAINT MORITZ. (Altitude 5910 ft.)

This bath is the highest in Europe. It has a low temperature and is very gaseous. The springs are three in number, of which the Paracelse is most generally used. The water is acid and bitter, and has a slightly chalybeate character. It promotes digestion and the action of the bowels when inactivity arises from want of tone. It increases the renal secretions, and imparts a degree of vigour to the system. It is very useful in cases of general debility when unconnected with the existence of organic disease.

DOSE.—Commence with half-a-glass and increase to three or four glasses daily. It should be taken before breakfast and luncheon.

Encyclopædic Dictionary of Medical Science; Article *Eczema*, p. 421.

Analysis of the "Paracelse" Spring, according to Planta and Kekurle, in grains per gallon.

		Grains.
1. SOLIDS.	Bicarbonate of Lime	89·824
	,, Magnesia	16·884
	,, Iron	3·178
	,, Manganese	0·413
	,, Soda	20·545
	Sulphate of ,,	24·367
	,, Potash	1·435
	Chloride of Sodium	2·828
	Silicic Acid	3·465
	Phosphoric Acid	0·042
	Alumina	0·028
		163·009

(Jura, France.) SALINS LES BAINS. (Altitude 1054 ft.)

SODIO-CHLORINATED WATERS.

The Springs of Salins issue at a temperature of from 10° to 12° C. (50° to 54° Fahr.). They contain, in grains per gallon, the following solid constituents :—

Iodide of Sodium	Trace.	
Bromide of Potassium	2·1455	grains.
Chloride of Potassium	17·9634	,,
,, Magnesium	60·9084	,,
Carbonate of Lime	Trace.	
,, Magnesia	Trace.	
Sulphate of Lime	99·1662	,,
,, Potash	47·6560	,,
Chloride of Sodium	1592·1605	,,

That is to say, a little more than 1820 grains per gallon.

The Establishment at Salins, which is open from May 15th to September 30th, contains 45 bath-rooms, 6 ordinary, and 4 Scotch douche rooms, as well as a fine *piscine* (or public bath) where the water is constantly renewed; and lastly, a complete set of hydrotherapeutical apparatus and appliances.

The Springs of Salins-les-Bains hold one of the first places in the list of waters of the sodio-chlorinated group. Their mineralisation is indeed so rich, that these waters are almost exclusively utilised for external treatment. The specialisation of the Salins waters, says M. Durand-Fardel, in his *Traité des Eaux Minérales*, is perfectly well defined. They are employed for the various manifestations of scrofula, and more particularly for those which are deeply seated, glandular, cellular, osseous, and articular. The treatment by the Salins waters represents an alterative, restorative, and resolvent medication of a very energetic kind. In this respect the water gives remarkable results in the treatment of ganglionic congestions, obstructions of the liver, of the spleen, and of the womb; also of catarrhs developed under the influence of scrofulous diathesis, chronic choryza, ozena, otorrhea, etc.; and of all scrofulous and articular affections dependent upon scrofula or tertiary syphilis. In short, the medicinal use of the Salins waters possesses the same therapeutic attributes that appertain to those of Kreuznach and Nauheim, which have for a long time past appeared to have a virtual monopoly of those important properties.

The treatment of all the above-named diseases can be carried on at home, by employing the mineral salts of the parent-waters, which are prepared and exported directly from the Springs, in bottles containing half-a-litre (500 grammes).

Those salts are the natural, unmanufactured product of the desiccation of the parent waters, resulting from the preparation of the salt in the local salt-works. This product contains, in an extreme degree of concentration, all the characteristic properties of the brine and Mineral waters of Salins.

(U.S.A.) SARATOGA.

There are about a dozen springs which are used on the spot for drinking purposes. The "Congress" and the "A" springs are bottled for export. The water is alterative and contains in a small degree iodides and bromides, and is useful in cases of glandular and visceral obstructions, in diseases of the skin, tendency to scrofula, and disorders arising from a torpid condition of the vessels connected with the formation of chyle.

DOSE.—From one to two bottles daily.

The following Analysis of the principal Saratoga Spring (Saline), by Professor C. F. Chandler, shows its mineral constituents, in grains per gallon; Temperature 52° (Fahr.).

	Congress.
Chloride of Sodium	60·0660 Grains.
„ Potassium	1·2072 „
Bromide of Sodium	1 2828 „
Iodide of Sodium	0·0204 „
Bicarbonate of Lime	14·9388 „
„ Magnesia	10 8228 „
„ Soda	1·1208 „
„ Lithia	0·4488 „
„ Baryta	0·1140 „
„ Strontia	Trace.
„ Protoxide of Iron	0·0372 „
Sulphate of Potash	0·1332 „
Phosphate of Soda	0·0024 „
Silica	0·1260 „
Alumina	Trace.
Organic Matter	Trace.
Total Solid Constituents	90·3204 Grains.
Carbonic Acid Gas (free) cubic inches	58·8

(Goslar-am-Hartz, Germany). SAUERBRUNNEN.

NATURAL MINERAL WATER OF THE HARTZ MOUNTAINS.

The Sophien-Quelle, at Goslar-am-Hartz, is a natural mineral table-water of excellent quality, unsurpassed by any of those yet known and most popular; it is pure, soft, free from all abnormal organic or inorganic elements, and of a most agreeable flavour. It stimulates the appetite and promotes digestion, producing itself no troublesome effects on the stomach, though taken in large quantities. It is inodorous and of normal aëration.

Its properties have been examined, and its beneficial action is vouched for, by the most eminent authorities: Dr. R. Fresenius, Professor at Wiesbaden, Dr. Skaliveit, Royal College of Hygiene, Hanover, Dr. John Attfield, London, Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, the well known author of a Manual of Chemistry and of a handbook of water supplies.

The water of the Sophien Spring is particularly adapted for use in tropical countries, where a pure potable water is a hygienic necessity for Europeans, who frequently suffer from disease, resulting in death, engendered by drinking impure and unwholesome water.

The Subjoined Analysis of the Sauerbrunnen Sophien-Quelle shows the mineral constituents in grains per gallon.

Chloride of Sodium	·20699
„ Potassium	·25578
Sulphate of Magnesia	·73157
Bicarbonate of „	·92610
Silica	·62300
Total solid Constituents	2·74344

(Nassau.) SCHWALBACH. (Altitude 909 ft.)

The waters of two of the springs are imported into England, viz., the "Weinbrunnen" and the "Stahlbrunnen." As chalybeates they are invaluable in cases of debility, or in improving the condition of the blood, especially when the latter is in an impoverished state, indicated by the partial absence of red globules.

DOSE.—Two or three small tumblersful daily, either pure or mixed with milk or wine.

Analysis according to Fresenius in grains per gallon.

		Stahlbrunnen. Grains.		Weinbrunnen. Grains.
1. SOLIDS.	Bicarbonate of Protoxide of Iron ...	5·144	...	3·544
	„ „ Manganese	1·128	...	0·560
	„ Soda	1·264	...	15·072
	„ Lime	13·600	...	35·152
	„ Magnesia	13·040	...	35·736
	Chloride of Sodium	0·416	...	0·528
	Sulphate of Soda	0·488	...	0·384
	„ Potash	0·232	...	0·456
	Silica	1·968	...	2·856
	Phosphate of Soda, Borate of Soda, and Organic matter	Traces	...	Traces
		37·280	...	94·288
		Cub. Ins.		Cub. Ins.
2. GASES.	Free Carbonic Acid	402·160	...	364·800
	Sulphuretted Hydrogen	0·024	...	0·024

(Ober-Selters, Nassau.) SELTERS. (Altitude 800 ft.)

The Ober-Selters Spring, which is closely allied to the hitherto better known Nieder-Selters, had, previously to the year 1870, been long disused; but nevertheless, in former times, and down to 1794, it had a special reputation of its own, and it has, since 1870, been reopened and restored, by special works undertaken for the purpose. This spring yields a water very similar to the Nieder-Selters Water. When freshly drawn from the spring, it is clear and colourless; but under the action of atmospheric oxygen it assumes a faint opal tint, by the conversion and precipitation of the small quantity of the bicarbonate of protoxide of iron which it contains. This being almost entirely insoluble, there remains in the bottled water an inappreciable quantity of that salt. The water has a most agreeable, fresh and piquant flavour. Its natural temperature is about 53° Fahrenheit.

The water of this spring is used exclusively for bottling, and is largely exported. As a table water it is superior even to that of the kindred spring at Nieder-Selters, close by.

The medicinal use of the water is very extensive; it is beneficial for acidity of the digestive organs, diseases of the kidneys, bladder, liver and lungs, bronchitis, gout, rheumatism, and all diseases in which the use of an alkaline water is indicated.

DOSE.—Half a tumbler to a tumblerful before breakfast. The water may also be used for mixing with wine, spirits, or milk as a beverage for table use.

Present Chemical Composition, by Analysis according to Dr. Mohr, in grains per gallon.

1. SOLIDS.	Bicarbonate of Soda	58·4976 Grains.
	„ Ammonia	0·2919 „
	„ Baryta	0·0084 „
	„ Strontia	0·0469 „
	„ Lime	17·2550 „
	„ Magnesia	14·2100 „
	„ Protoxide of Iron	0·3248 „
	„ „ Manganese	trace „
	Chloride of Sodium	0·0294 „
	Sulphate of Potash	163·0860 „
	Silicic Acid	3·6890 „
	Alumina, Phosphoric Acid, Nitrous Acid, Boric Acid, Arsenious Acid, and Bromine	2·9400 „
	Total solid Constituents	260·3790 grains.
2. GASES.	Carbonic Acid (parts by volume in 100)	91·2
	Nitrogen	7·9
	Oxygen	0·9
		100·0

(Belgium.) SPA. (Altitude 1030 ft.)

A very favourite resort, beautifully situated. The water is ferruginous and extensively prescribed for debility and weakness of the organs. As an alkaline tonic it is useful in its action upon the bowels and kidneys, and for debilitated constitutions. It is also very efficacious in certain disorders of youth. The original "Pouhon" spring being required for the use of visitors, the "Pouhon du Prince de Condé," (of nearly identical mineral constituents), is now bottled for exportation.

DOSE.—One to four tumblersful daily, according to circumstances.

Analysis according to Struve in grains to the gallon.

1. SOLIDS.	Bicarbonate of Protoxide of Iron	3·75 Grains.
	„ „ Manganese	0·52 „
	„ Soda	7·38 „
	„ Lime	9·86 „
	„ Magnesia	11·23 „
	Sulphate of Potash	0·79 „
	„ Soda	0·38 „
	Chloride of Sodium	4·50 „
	Phosphate of Lime	50·14 „
	„ Alumina	0·09 „
	Silica	4·99 „
		93·63 Grains.
2. GASES.	Carbonic Acid	216·0 Cub. Ins.

The "Pouhon du Prince de Condé," yields an alkaline bicarbonated and ferruginous water; temperature 10° C. (50° Fahr.).

This water, when analysed, gives the following proportions per gallon.

Alkaline Bicarbonates	6·93 Grains.
Bicarbonate of Lime	7·70
„ Magnesia	7·00 „
Chloride of Sodium	1·75 „
Alkaline Sulphates	1·40 „
Peroxide of Iron	8·33 „
Silica	3·50 „
	36·61 Grains.
Carbonic Acid (free)	7·00 „

This is a cold mixed bicarbonated water—that is to say, its bases are sodic, magnesic and calcic—which endows it with notable gaseous qualities and special digestive properties. The carbonic acid exists therein to excess, both free and in a state of combination. The analyses made at the springs give its proportion as 7 grains per gallon. But its speciality arises from the iron which it contains. It is a ferruginous mineral water of the first class.

The greater part of ferruginous waters, properly so-called, are waters chiefly with calcic bases, and consequently unstable. It is a very moderate estimate to assume that the proportion of protoxide of iron, which forms a deposit on the sides of the bottle, *i.e.*, which is lost for use, amounts to about one half, or 50 per cent.

But the *Prince de Condé* water offers this remarkable feature, viz., that, even after several months in bottle, its iron still remains perfectly dissolved, that is to say, without doubt, in the form of bicarbonate; and not the smallest particle of it is deposited on the sides of the bottle.

The percentage of peroxide of iron (0·119) assigned to this water by the analysis of the *Académie de Médecine*, is perceptibly similar to that attributed by the same authority to the Orezza water, viz., 0·128 of carbonate of iron; the difference being only 9 milligrames. Particular notice is due to the superiority, in point of preservation, which is the distinctive characteristic of this spring at Spa.

The application of ferruginous waters in general, and in particular the special virtues of the *Prince de Condé* water, are so well-known that it is unnecessary to dwell upon them.

It will suffice simply to quote the uses of the Spa waters, as specified by Dr. Scheller in his exhaustive work on this station. These applications relate to chlorosis and anemia.

Among the different kinds of chlorosis, Dr. Scheuer named those of puberty, of pregnancy, of menorrhagia, of hysteria, of articular rheumatism and of chorea.

Among the various kinds of anemia, he distinguishes the following: respiratory and hæmorrhagic anemia; secretory and excretory anemia, resulting from lactation, from bronchial catarrh (bronchorrhœa), from diarrhœa, from chronic cystitis, from spermatorrhœa, &c. Anemia from privation, nervous exhaustion; besides scrofulous, paludal, and convalescent anemia, &c.

(England.) SULIS.

The Sulis Water is the natural mineral water of Bath, except that the spring water is aerated with carbonic acid gas. It is an excellent tonic and table water, and combines perfectly with wine, spirits, milk, pure syrup, lime-juice, &c.

Sulis water imparts strength and tone to the digestive organs, and vigour to the mental faculties. It is valuable for persons subject to morning sickness induced by irritation of the mucous membrane, temporary or chronic indigestion, or symptoms resulting from general debility of the stomach, and catarrhal affections arising therefrom.

The following analysis by Dr. Jno. Attfield, F.I.C., F.R.S., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, indicates its composition, and the proportions of its solid constituents in grains per gallon.

	Natural.	Aërated.
Bicarbonate of Lime	7·84	7·65
Sulphate of „	94·11	95·07
Nitrate of „	0·56	0·60
Bicarbonate of Magnesia	0·56	0·47
Chloride of Magnesium	15·24	15·02
Chloride of Sodium	15·16	15·38
Sulphate of Soda	23·14	23·85
„ Potash	6·70	6·90
Nitrate of Ammonia	1·06	0·90
Bicarbonate of Protoxide of Iron	1·22	1·15
Silica	2·71	2·61
Total Solid Constituents	168·30	169·60

(Switzerland.) TARASP. (Altitude 4600 ft.)

There are several springs, of which the principal is the St. Lucius, which is one of the richest in saline principles known. The water is efficacious in general obesity, catarrh of the stomach, enlarged liver and spleen, and a great many other affections; among which, chronic bronchial catarrh and laryngitis hold the first place. It is especially suited to the various forms of gastric catarrh and gastralgia, in inactive digestion with distension, and uneasy sensations in the epigastric region.

DOSE.—About a pint daily, to be taken before dinner; commencing with a tumblerful before breakfast. The water may be mixed with a little warm milk if necessary.

Analysis according to Von Planta in grains per gallon.

1. SOLIDS.	Sulphate of Soda	165·47	Grains
	Carbonate of ,,	272·29	,,
	Chloride of Sodium	294·01	,,
	Carbonate of Magnesia	50·76	,,
	,, Protoxide of Iron	1·52	,,
	,, Lime	124·32	,,
	Iodide of Sodium	15·36	,,
	Sulphate of Potash	29·98	,,
	Silica	2·47	,,
	Phosphoric Acid	0·02	,,
	Alumina	0·02	,,
	Fluoride of Manganese	Traces	
		956·22	Grains.
2. GASES.	Carbonic Acid	348·87	Grains.

The gases which ascend from the springs consist of—

	Per Cent.
Carbonic Acid	99·34
Nitrogen	0·43
Oxygen	0·23
	100·00

(Germany.) TAUNUS. (Altitude 390 ft.)

This spring is situated at a short distance from Frankfort-on-Main.

DOSE.—Being a table water, may be drunk *ad lib.*

Analysis according to Taylor, in grains per gallon.

1. SOLIDS.	Chloride of Sodium	179·94	Grains.
	,, Potassium	18·90	,,
	Bicarbonate of Lime	95·90	,,
	,, Magnesia	12·32	,,
	,, Soda	1·40	,,
	Sulphate of Lime	4·06	,,
	Silica	traces.	
	Alumina	traces.	
	Phosphate of Lime	traces.	
		312·52	,,
	Carbonic Acid, compressed	202·58	
	,, by estimate, in solution	121·45	
		324·03	

(Ardèche, France.) VALS. (Altitude 2475 ft.)

The waters are alkaline, and are very useful in all affections of the kidneys, bladder, &c. There are numerous springs, of which, up to a recent period, the following were best known and most familiarly used, viz. Magdeleine, Précieuse, Désirée, Rigolette, St. Jean, and Dominique. But, more recently, several other springs, or groups of springs, of which the waters are characterised by a graduating and ascending scale of mineralisation, have come into good repute. These are the Sources Vivaraises.

MAGDELEINE.—Useful in correcting excessive acidity of the secretions, gastralgia, diabetes, gout, rheumatism, albuminuria, and in nervous disorders.

PRÉCIEUSE.—Is very gaseous, and strongly recommended in obstructions of the liver, spleen and intestines, gall stones, jaundice, &c.

DÉSIRÉE.—Prescribed for diseases of the urinary organs, kidneys, bladder, &c.

DOMINIQUE.—This spring is sulphurous, ferruginous and arsenical, and is especially useful in pulmonary affections, chlorosis, anæmia, and a debilitated condition of the system. It is employed with success in skin diseases, especially of a scrofulous or syphilitic nature, and in intermittent fevers.

RIGOLETTE.—Contains iron and is useful in cases of debility arising from an impoverished condition of the blood, hysteria, and affections arising from weakness or irritability of the nervous system.

SAINT-JEAN.—This water is feebly mineralised, and may be used as a table water It assists digestion, promotes a healthy condition of the digestive organs, and is specially adapted for weakly patients.

DOSE.—One bottle daily, commencing with half a tumbler before breakfast.

Analyses of the Springs, according to Ossian Henry, in Grains per Gallon.

1. SOLIDS.	Magdeleine.	Précieuse.	Désirée	Rigolette.	St. Jean.
Bicarbonate of Lime	36·40	44·10	39·97	18·13	21·700
„ Magnesia	47·04	52·50	63·00	...	8·400
„ Soda	509·60	415·80	422·80	406·00	103·600
„ Potash	17·85	16·10	18·41	18·41	2·800
„ Protoxide of Iron with traces of Magnesia	2·03	0·70	0·70	1·68	0·420
Chlorides of Sodium and Potassium	1·12	5·60	77·00	84·00	4·200
Sulphate of Soda	17·71	12·95	14·00	15·40	3·780
„ Lime	17·71	12·95	14·00	15·40	4·900
Alumina	6·79	4·20	4·06	4·20	0·770
	656·25	564·90	653·94	563·22	150·570
2. GASES. Carbonic Acid, uncombd.	143·50	155·26	150·15	146·65	29·760

"Dominique" Spring, Grains per Gallon.

Sulphuric Acid	122·5	Sulphuric Acid		91·0
Arsenious Acid		Silicate	Sesquioxide of Iron	
Sesquioxide of Iron		Arseniate		
Lime and Soda		Phosphate		30·8
Silicic Acid		Sulphate		
Chlorine		Sulphate of Lime		
Phosphoric Acid		Chloride of Sodium		
Organic Matter		Organic Matter		
				121·8

SOURCES VIVARAISES.

Apart from all the numerous springs which are to be found at Vals, concentrated within a contracted area—of which some are of old and legitimate celebrity, while others are but just becoming or have yet to become known—there is an isolated group, detached from the rest, which alone reproduces in itself all the varieties of mineralisation that distinguish the waters of this station, and give them their typical character. Those springs are the Vivaraises ; which are distinguished the one from the other, by a simple numerical designation, based on their degree of mineralisation. They are thus known as Vivaraises, 1, 3, 5, 7, 9. The following table, reproducing the analyses made by M. Glénard, the learned Professor of Chemistry at the Faculté de Médecine of Lyon, indicates plainly the mineralisation of the Sources Vivaraises, in ascending scale :—

	Sources Vivaraises.				
Constituents in 1 gallon.	No. 1. Grains.	No 2. Grains.	No. 3. Grains.	No. 4. Grains.	No. 5 Grains
Bicarbonate of Soda	1·9760	3·1735	4·0767	6·3938	7·2237
„ Potash	„	0·0110	0·1291	0·1900	0·2100
„ Lime	0·0676	0·1580	0·2020	0·2380	0·2915
„ Magnesia	0·0595	0·1286	0·4260	0·2630	0·2584
„ Protoxide of Iron	0·0547	0·0048	0·0240	0·0112	0·0220
„ Lithia	0·0106	0·0200	0·0175	0·0238	0·0190
Chloride of Sodium	0·0656	0·1100	0·0436	0·0770	0·0916
„ Potassium	„	0·1400	„	„	„
Sulphate of Soda	0·2701	„	0·0191	0·0298	0·0344
„ Potash	„	0·0210	„	„	„
„ Lime	0·2157	0·0760	0·0231	0·0365	„
Silica and Silicates.....	0·0700	„	0·0557	0·0866	0·1022
Phosphate of Alumina	„	„	„	0·0996	„
Alkaline Iodides.....	„	„	0·0317	„	„
Arseniate of Soda	„	„	0·0820	„	„
Carbonic Acid (free)	1·2844	1·6041	1·6141	1·6771	1·4343
	4·0742	5·4470	6·7446	9·1254	9·6871

As will be seen, the numerical classification of these springs corresponds approximately with the degree of mineralisation (in respect of the most important element, sodic-bicarbonate); so that, for medical prescription, no confusion between them is possible. When the object sought to be attained is an alterative or diathesic medication, recourse must be had to the strongly mineralised springs, *i.e.* to Vivaraises No. 5, 7 or 9. It is not, however, necessary in all cases to adhere to the strongest springs, and employ none but highest proportions of bicarbonate of soda. Most frequently springs No. 5 and 7 will suffice. But it will be expedient in reality to avail oneself of those representative elements which are the most characteristic of an alterative medicament. That will especially be the case in gout, gravel and diabetes, when those states or habits are respectively the chief object of the treatment.

But when definite diseases are in question, such as the various forms of dyspepsia, affections of the liver or renal affections, in short, conditions of acute pain, allied with gravel, or again catarrhal affections of the urinary passages, from pyelitis to cystitis, it will be proper to proportion the degree of mineralisation to the degree of irritability of the organs affected. In a case of simple and painless obstruction of the liver, recourse should be had to springs of a high degree of mineralisation. In the case of hepatic colics, according as they are more or less frequent and acute, Vivaraises No. 1 and 3 are to be used, and their standard of mineralisation must in such cases by no means be exceeded. The weaker springs are in general most suitable for all forms of dyspepsia. But, on the other hand, the stronger springs will be prescribed in vesical catarrh.

To sum up, there is no single application of the sodic bicarbonated Springs of Vals, for which the Vivaraises Springs are not equally appropriate, as they are perfectly representative of all the characteristic properties of the waters of that station. Their continuous scale of mineralisation permits their adaptation to every prescription, whether exacting an energetic medicament or one of a milder degree of strength.

(Allier, France.) VICHY. (Altitude 733 ft.)

The Thermal Establishment of Vichy is situated at the foot of the Auvergne mountains, in a charming valley, and is a favourite resort of invalids afflicted with rheumatism, gout, and diseases of the urinary organs. There are several springs, of which those described below are the principal. The springs are the property of the State, and the waters are bottled under the supervision of officials appointed by the French Government, so that there is an absolute guarantee of their purity and natural condition.

There are other springs in the neighbourhood of Vichy possessing mineral properties, but they are of minor importance, and have no distinctive character.

GRANDE-GRILLE—so named from the iron railing by which it is surrounded—possesses very active properties and is administered with success in lymphatic affections, disorders of the digestive organs, congestions of the liver and spleen, visceral obstruction, biliary calculi, gravel, etc.

CELESTINS is prescribed for affections of the kidneys and bladder, for gravel, urinary calculi, gout, rheumatism and diabetes. It is agreeable to the taste, but rather exciting, and is not suitable for nervous or irritable persons, or hysterical females subject to spasms, etc.

HAUTERIVE is situated about four miles from Vichy, at a village from which it derives its name, and with the exception of a slight difference in the temperature, the water strongly resembles that of the Celestins spring, and is prescribed for the same class of diseases.

MESDAMES is ferruginous, alkaline, and gaseous, and is chiefly useful for weak and debilitated constitutions, convalescents, fever patients, chlorotic and lymphatic persons, etc.

HÔPITAL resembles Grande-Grille, but is less stimulating and more suited to patients who are delicate, impressionable, nervous or disposed to congestion and hæmorrhagia. It acts principally in affections of the digestive organs.

PARC resembles the Hauterive spring.

GRAND-PUITS CARRÉ and PETIT-PUITS are chiefly used on the spot for bath service, and are not exported.

DOSE.—The quantity to be drunk daily should be indicated by the medical attendant, and the selection of the spring must be decided by the same competent authority. About a tumblerful or less may also be taken before breakfast; the Celestins, Hauterive and Parc may also be taken as a beverage, and in this way as much as a bottle may be drunk during the day, but, unless in special cases, it is not advisable to exceed this quantity.

The Mineral Salts of Vichy are prepared in several forms, viz., for use as baths, and for drinking, also as lozenges, as a corrective of acidity, and a help to digestion. A very pleasing form as Barley Sugar (Sucre d'Orge) is very useful for children and also for adults if preferred.

DIGESTIVE PASTILLES

OF THE VICHY THERMAL ESTABLISHMENT.

The Vichy lozenges are sold everywhere. This digestive enjoys a daily-increasing reputation. But the Public must be cautioned against the numerous counterfeits that are prepared; these are imitations, and quite spurious.

The reputation of the Vichy lozenges of the Thermal Establishment is justified by their efficacy in cases of difficult, slow and painful digestion.

They are useful. 1st: To those who, after a meal, feel a sort of weight upon their stomach (atonic dyspepsia). 2nd. To those whose digestion is accompanied by a development of gases (flatulent dyspepsia). 3rd. To persons, usually in sound health, but temporarily affected with accidental digestive pains.

DOSE.—4, 5 or 6 should be taken before meals, and occasionally, as required.

SALTS FOR VICHY-BATHS
At Home.

The evaporisation of the Vichy waters and the extraction of their native salts, though to all appearance an easy process, is nevertheless a work requiring great care. The operation is carried on at all periods of the year, at the springs themselves, under the eyes of the public. The mineral waters attain by degrees a sufficient density, until the salts in solution are deposited by crystallisation. When collected and dried, they are submitted to a current of carbonic acid gas issuing from the springs, and then being put into a stove properly warmed, they are pulverised, sifted, &c., before being sold to the Public.

These Vichy salts are employed in the form of baths, simultaneously with the use of the natural mineral water as a beverage, and may, under medical attendance, render great service, though a treatment at the springs is certainly preferable.

The Public are cautioned against all the like products not bearing the Stamp of the Compagnie Fermière de Vichy, and especially against all imitations and counterfeits.

The Vichy water salts for use at home are sold in packets. Each packet contains half a pound of salts, that is, the same quantity as a bath taken in the Establishment. It is only necessary to throw the salts into the water of the bath, when it is hot, and they are immediately dissolved.

Analyses of the Springs belonging to the State.

Quantities of Saline Ingredients contained in grains per gallon.

	Grande Grille.	Celestins.	Haute-rive.	Mesdames.	Hôpital.	Parc.
Free Carbonic Acid	63·56	73·43	152·81	133·56	74·69	108·85
Bicarb. of Soda	341·81	357·21	328·09	281·12	352·03	339·99
Bicarb. of Potash	24·64	22·05	13·23	13·23	30·80	20·44
Bicarb. of Magnesia	21·21	22·96	35·07	29·75	14·00	14·91
Bicarb. of Strontia	21·21	0·35	0·21	0·21	0·35	0·35
Bicarb. of Lime	30·38	32·34	30·24	42·28	39·90	42·98
Bicarb. of Protox. of Iron	0·28	0·28	1·19	1·82	0·28	0·28
Sulphate of Soda	20·37	20·37	20·37	19·50	20·37	21·98
Phosphate of Soda	9·10	6·37	3·22	...	3·22	9·80
Arseniate of Soda	0·14	0·14	0·14	0·21	0·14	·14
Chloride of Sodium	37·38	37·38	37·38	24·85	36·26	38·50
Silica	4·90	4·20	4·97	2·24	3·50	3·85
Totals	574·98	577·08	626·92	546·77	575·54	602·07

Acids and Bases contained in grains per gallon.

Carbonic Acid	309·26	329·35	394·80	352·03	330·33	354·97
Sulphuric Acid	11·48	11·48	11·48	9·87	11·48	12·39
Phosphoric Acid	4·90	3·50	1·75	...	1·75	5·32
Arsenious Acid	0·07	0·07	0·07	0.14	0.07	0·07
Hydrochloric Acid	23·38	16·38	23·38	15·54	22·68	24·08
Silica	4·90	4·20	4·97	2·24	8·50	3·85
Protoxide of Iron	0·14	0·14	6·16	0·84	0·14	0·14
Lime	11·83	11·20	11·76	16·45	15·54	16·73
Strontia	0·21	0·21	0·14	0·21	0·21	0·21
Magnesia	6·79	7·35	11·20	9·52	4·48	4·76
Potash	12·74	11·41	6·86	6·86	15·96	10·57
Soda	174·16	179·20	165·76	136·99	175·00	175·00
Totals	559·86	574·49	638·33	550·69	581·14	608·09

SOURCE LARBAUD.

Alkaline Sodio-bicarbonated Water. Temperature 15°C. (59° Fahr.)

The analysis of the SOURCE LARBAUD, made by M. Ossian Henry, gave the subjoined results, in grains per gallon :—

Carbonic Acid	92·40	grains.
Bicarbonate of Soda	341·60	„
„ Potash	15·40	„
„ Lime	16·66	„
„ Magnesia	13·30	„
„ Lithia	perceptible trace	„
„ Protoxide of Iron	1·61	„
„ Manganese	very slight trace	„
Sulphates of Soda and Lime	7·00	„
Chlorides of Sodium and Calcium	21·00	„
Nitrates	slight trace	
Iodine and Bromine	perceptible trace	
Arseniates	„	„
Phosphates	„	„
Silicic Acid, Silicate, and Organic matter	4·20	grains.
Total...	513·17	„

The water of the Larbaud Spring is rich in carbonic acid, and consequently of easy digestion. From the results of analyses that have been made, it appears that, when exported, it retains all the natural elements of the Vichy waters.

"The water of the Larbaud Spring," says M. Ossian Henry, in his admirable report to the *Académie de Médecine*, "is rich in mineralising elements. It contains a high proportion of free carbonic acid, of alkaline bicarbonates, and protoxide of iron, of which the greater part remains in solution in the water. The carbonic acid contained in the water, when bottled and exported under the best conditions, is nearly equal in quantity to that originally contained in the water as it issues from the Spring ; showing, conclusively, that it suffers no deterioration by transport. The very small quantity of nsoluble salts which this water contains, in proportion to the abundance of the other constituents, assures its perfect limpidity, a property which, I am convinced, will be fully appreciated."

This water is used as a remedy for affections of the liver and spleen, vesical catarrh, chlorosis, gravel, calculus, diabetes, dyspepsia, gastro-enteritis, refractory fevers, gout, heaviness of the stomach, &c.

The Larbaud Spring is provided with a Thermal Establishment, very well fitted up, and comprising 33 bath-rooms, and 2 douche-rooms, of all kinds.

For particulars, apply to the Régisseur de la Source Larbaud, Boulevard des Celestins, Vichy, Allier, France.

SOURCE LARDY.

Sodio-Bicarbonated Ferruginous Waters.—Temperature 23·90 C. (75° Fahr.)

The waters of the Lardy Spring are sodio-bicarbonated, like all the other Vichy waters ; they contain 343·7 grains of that salt per gallon. Their use is prescribed in all affections of the stomach, dyspepsia, gastralgia, vomiting, anorexia, heaviness of the stomach, etc. Their efficacy also extends to affections of the biliary ducts, such as : chronic hepatitis, biliary calculus, obstruction of the liver, hypertrophic kyrrhosis (especially the early stages), gout and all affections of the urinary passages, uric-acid diathesis, vesical catarrh, impoverishment of the blood, chlorosis (or pallor), protracted convalescence, adynamia, diabetes, articular rheumatism, acute and chronic.

The water of the Lardy Spring is also ferruginous, as it contains 1·96 grains of protoxide of iron per gallon. It will be prescribed, by preference, wherever the constitution requires to be strengthened by iron, as frequently happens in the above-

named affections. Its use cannot be too strongly recommended to contend against leucorrhaic dyspepsia, so frequently accompanied by headache, and pains in the back and stomach.

The analysis of the *Source Lardy*, made by M. Bouquet, Chemist, in 1874, gave the following results, in grains per gallon:—

Carbonic Acid (free)	384·93	grains.
Sulphuric Acid	12·39	„
Phosphoric Acid	3·08	„
Arsenious Acid	0·14	„
Boric Acid	Trace	
Hydrochloric Acid	23·38	„
Silica	4·55	„
Protoxide of Iron	0·91	„
„ Manganese	Trace	
Lime	19·32	„
Strontia	0·21	„
Magnesia	5·32	„
Potash	19·11	„
Soda	174·02	„
Bituminous matter	Traces	
Total ...	647·36	grains.

The Lardy Spring is fitted up with a comfortable establishment for Baths and Douches, comprising 30 bathrooms for men, and 20 for women; as well as with a service of sulphurous baths, and cold, hot, Scotch, and ascending douches, etc.

A new Hydrotherapeutic Establishment has recently been added as an annexe to the existing Thermal Establishment; visitors will find, in this new installation, every comfort that can be desired.

For full particulars apply to the Régisseur de la Source Lardy, à Vichy, Allier] France.

The Thermal Establishment of Vichy.

On account of the number, importance, and therapeutical value of the Vichy springs, as well as from the scale upon which this Thermal Establishment and its accessories are organised—no less than from the fact that, although rented and managed by the Compagnie Fermière de Vichy, the State, being of the proprietor of the springs, supervises and controls their management and direction—it may be affirmed with confidence that this is a typical first-class Thermal Establishment; for which reason the following general particulars and supplementary description of the five chief springs will be found interesting.

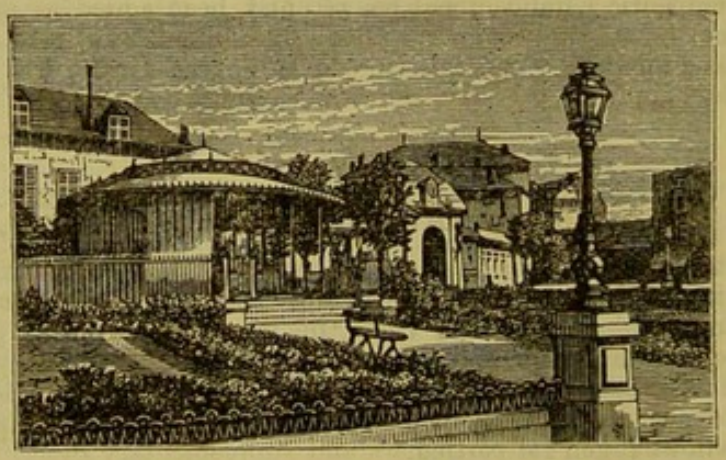
GRANDE-GRILLE SPRING.

This is probably the most universally known and, consequently, the most used spring of the Vichy thermo-mineral water basin. It is so called from an iron grating which formerly surrounded it, and which recent arrangements have since

superseded. It is situated in the Great Bathing Establishment, at one end of the Gallery of the Springs and, of all the Vichy wells, it is the best managed one. From a circular basin the agitated water bursts out, with the appearance of boiling: this is owing to the great pressure, and the large quantity of carbonic acid gas which it contains. The yield of this spring is enormous, as it is sufficient not only for drinking on the spot and exportation, but also for the baths.

According to the scale of the increase in temperature in proportion to the depth of natural springs, as established for artesian wells, we may estimate at about 1,100 or 1,200 metres (3,600 to 4,000 feet), the depth of the Grande-Grille Spring; but most probably the depth is yet more considerable, and the water, after having been possessed of a very high temperature in the depths of the earth, comes to us cooled by its passage from that great depth. According to Bouquet, the origin of the spring lies beneath the lacustrine beds and is really of geological formation, like the superimposed crystalline rocks.

The *Grande-Grille* water contains 4·88 grammes of soda-bicarbonate in a bottle. It consequently proves very active. It does not affect the stomach too strongly, and most invalids take it without effort, and digest it without difficulty. It is particularly used for disorders of the liver, visceral obstructions, and especially hepatic colics accompanying biliary lithiasis. It, in the most extraordinary way, relieves these horrible sufferings. Invalids who suffer from almost daily attacks, leave Vichy, completely restored to health, after a three weeks' stay. Those who are less fortunate, that is, continued to be exposed to the various influences which cause their diseases, remain free from renewed attacks for long periods. They succeed in maintaining themselves in health, reconciling the necessities of both health and profession, by drinking exported water and renewing the alkaline treatment, every year or every alternate year.

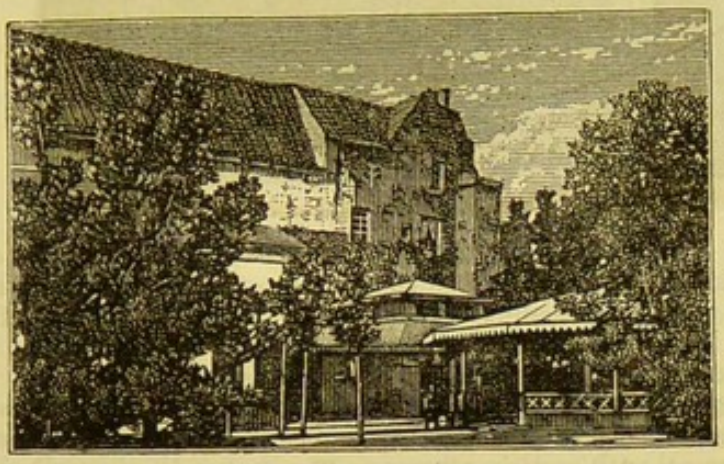


HÔPITAL OR ROSALIE SPRING.

This spring is situated in front of the Civil Hospital. It rises in a large stone basin, protected by a wrought iron pavilion. It contains five grammes of soda-bicarbonate per bottle, and is abundant enough to supply with water the adjacent bathing house. Its temperature is 31° centigrade, and its yield is no less than 60,000 quarts within the four and twenty hours; it therefore, fully supplies not only local and foreign consumption, but also the baths and shower-baths of the Thermal Establishment. The green matter which is seen around the basin, seems to be a sediment occasioned by the *thermal-protoderma*, which certainly contributes to make the water soft and unctuous. This also explains why very susceptible stomachs do not digest it so easily as that of the Grande-Grille.

Disorders of the stomach and intestinal indigestion cause a large number of invalids to visit Vichy; these being the diseases commonly treated by the Hôpital water. Most generally gastralgia, in all its forms, derives relief from it. At the same time extremely nervous or debilitated persons may have recourse to *Mesdames* or *Lardy* spring, for the cure of obstinate gastralgia, such as appears in chlorotic patients, particularly at the period of puberty. It is easy to understand the importance of such a water, if we think of the part the digestive organs play in the economy of the human system. It strengthens weakened or injured constitutions, whatever may be the

cause; in consequence of which we daily see almost, so to say, the resurrection of persons of both sexes whose stomachs cannot support the slightest food, and are scarcely able to support nature and life; yet, after a course of treatment by this water, the colour of health re-appears on their faces and they grow rapidly strong and healthy. There are almost no exceptions to this restoration. Unless the pepsine-glands of the stomach be destroyed, as sometimes happens with old people, an improvement may most generally be relied upon.



CELESTINS SPRING.

The springs of the *Celestins* took their name from a convent of the *Moines Celestins* which formerly stood on this spot, and of which some remnants are still visible. They are situated behind the old Vichy on the banks of the river, at the extremity of a garden which bears also the name of the convent. The springs burst out from the bottom of an enormous rock, and they are three in number, namely:—The *Old Spring*, the yield of which is hardly 200 quarts per day; the *Grotto Spring*, which yields about twice as much; and the *New Spring*, discovered in 1870 in the grounds recently added to the State property, and the yield of which is 18,000 quarts a day.

There are, here, a sheltered gallery, a resting place, and a billiard-room. Fine trees, beautiful beds of flowers and meandering walks enhance the beauty of the site, which is really a fairy scene. The situation of the place, garden and avenue, is alike delightful and charming.

The water is very cold and gaseous; the gas, in small bubbles, adheres to the sides of the receptacle and effervesces on the surface when agitated. It is pleasant to the taste, both on the spot and in other lands. It is one of the springs the water of which may be transported and used at a distance with the greatest advantage.

The Celestins water is employed for the cure of uric-acid gravel and nephritic colics, gout, diabetes and chronic maladies of the genito-urinary organs in their early stages. Invalids must use it prudently and moderately, on account of its energetic and exciting properties; this is the best way of securing its efficiency, and preventing evil effects. This caution is by no means superfluous, inasmuch as people feel a tendency to misuse the cool and gaseous waters especially in hot weather. Danger is not immediately perceived; but excess always proves hurtful to the patient. Experience has long shown this to be a fact which demands the serious attention of invalids.

HAUTERIVE.

This spring is situated at six kilometres distance, in a splendid park, and is only used for exportation, as it best supports the longest journies. This arises from its composition and temperature. Cold springs retain the carbonic acid gas better than warm springs, and the degree of purity of the waters chiefly depends on the presence, in excess, of this gas, which keeps the whole of their constituents in solution. The composition of the mineral water of Hauterive is similar to that of the Celestins, with a small proportion of iron. The presence of bodies in suspension and small black particles, which may be perceived through the transparent bottles, is accounted for by the precipitation of this ferruginous element. The bottle should not therefore be rejected on this account, as its virtue is by no means impaired. In short the Hauterive water is very suitable for use at a distance from Vichy.

PARK SPRING.

Facing the rue Prunelle, under the shade of the Park, in the most central part of Vichy, is the Park Spring, now almost disdained, in spite of its true and very precious curative virtues. It is, indeed, less cold and active than the Celestins, and more easily digested; it has a slight sulphurous taste. It perfectly suits the first period of the alkaline treatment, and advantageously replaces the Hôpital water whenever the case is one of gastric disorders of small importance and it is only necessary slightly to stimulate the stomach or digestive organs. We, in preference, recommend it for various cases of gravel with cystitis, when any excess over the prescribed doses might be attended with serious consequences. With this water there is no fear of causing a too great recrudescence or excitation. Its temperature is 22° Centigrade; and its yield 15,000 quarts in the four-and-twenty hours.

MESDAMES SPRING.

This spring issues just opposite the Grande-Grille, at the other end of the Gallery. It rises at a distance of two kilometres from the spot, in the *Allée Mesdames*, near the Cusset Road, and has been conveyed to the Bathing-house by pipes. The water, as it issues, is very cool and gaseous; it becomes a little warmer in its transit through the pipes; but its principal properties suffer no alteration.

The association of the soda bicarbonate with iron and arsenic, contained in this spring, makes it very proper for weakened constitutions, that require a strengthening and tonic treatment, viz; in cases of adynamia, chlorosis and general debility. It restores health to lymphatic females, suffering from immoderate discharges which slowly undermine the constitution. Its action upon the red gobules of the blood is manifest; the blood circulation grows more active, the breathing freer, and easier, and the flesh resumes its rosy tint—a certain proof of improvement. We are aware that iron ought only to be used in a moderate way, and under perfectly determined conditions; but this is the doctor's business. The same may be said as to the dose prescribed. Iron is necessary in the accomplishment of the mechanical acts of life; yet, if the organism receives more than is necessary, its presence is attended with congestion, hemorrhage, a feeling of plenitude, in short all the symptoms of vascular plethora. These facts are too well known to be overlooked and, we must say, ought not to be disregarded.

(Buda-Pest, Hungary.) VICTORIA OFENER.

The Victoria Ofener Bitterwaters are remarkable for their high degree of mineralisation, and especially the large proportions of the sulphates of soda and magnesia, the latter in particular. Out of a total of 4063·843 grains per gallon of soluble solid constituents, no less than 2296·749 grains per gallon are sulphate of magnesia, and 1201·851 sulphate of soda; these two salts together making 3498·6 grains per gallon, or about 87 per cent. of the whole.

The natural Bitter-water of the Victoria Ofener Spring, is in fact a natural fluid magnesia, and a powerful natural purgative. Great care is taken in the process of bottling the water at the springs, by means of special arrangements, to preserve the constant purity of its chemical composition and natural aperient qualities.

DOSE.—For ordinary purgative purposes, half a wine-glassful may be taken at bed time, or a wine-glassful in the morning, fasting. It is most efficacious when warmed to at least 60° Fahr., or when an equal quantity of hot water is added to it.

This water is perfectly permanent, and bears transport and storage without change or deterioration. It is of high medicinal value for the treatment of imperfect digestion, habitual or temporary constipation, affections of the stomach and liver, and other similar functional derangements; for inflammation and congestion of the brain, lungs, etc., bilious attacks and attendant secondary evils; chronic diseases of the respiratory organs, and defective blood circulation, stoppages of the blood in the hypogastric region; hæmorrhoids, cutaneous affections and pustules in the face; in rheumatic and gouty disorders; organic diseases resulting from fatty degeneration, and general obesity; abnormal formation of uric acid concretions, and subsequent formation of gravel and calculus in the kidneys and bladder; during pregnancy and in many diseases of women; as also to remove the consequences of excess in diet, etc.

The chemical composition of the Victoria Ofener Water, in grains per gallon, is shown by the subjoined analysis, by different analysts.

	Analysis of Prof. H. E. Roscoe, F.R.S., Owen's College, Manchester	Special Analysis of Prof. M. Ballo, Chemist of the City of Buda-Pest	Analysis of Dr. E. L. Ulex, Official Chemist of the City of Hamburg
Sulphate of Magnesia ...	2296·749	2266·600	2352·0
,, Soda	1201·851	1466·780	1368·5
,, Potash	30·849	21·735	89·6
,, Lime	163·128	112·140	93·1
Chloride of Sodium	123·956	157·017	159·6
Bicarbonate of Soda	83·188	34·860	147·0
Alumina	0·756	1·603	21·0
Silica	4·109	3·108	42·0
Phosphoric Acid	Trace	Trace	Trace
Total Soluble Solids	3904·586	4063·843	4272·8
Do. (found directly)	3900·750	4070·920	...
Temperature (Fahr.).....	63°	59°	54°
Specific Gravity	1·0534	1·05362	1·055

(Nassau, Germany.) WIESBADEN. (Altitude 346 ft.)

This spa possesses no less than twenty-three muriated thermal springs, of which the principal is the Kochbrunnen. The water of this spring has a taste somewhat like chicken broth, and is advantageously employed in almost all forms of gout, unless inflammatory symptoms are present. It is very effective in gouty diseases of the joints, contractions and anchylosis, also in chronic catarrh of the stomach and intestines, when occurring in gouty patients, and in the elimination of uric acid from the blood; also in promoting abdominal circulation. It is recommended in chronic rheumatism, tic douloureux and sciatica, and in certain forms of paralysis. Women suffering from paraplegia after parturition derive benefit from these waters, also sufferers from rheumatic palsy.

DOSE.—This water is prescribed in copious doses, from two to four tumblersful being usually ordered. If intended to act chiefly on the kidneys, it must be drunk cold and at short intervals, but if a diaphoretic action is required, it must be taken hot, and a considerable amount of walking exercise is enjoined. This water should be taken under medical supervision.

Analysis of the "Kochbrunnen," according to Fresenius in grains per gallon.

1. SOLIDS.	Chloride of Sodium	524·9779	grains.
	„ Potassium	11·1974	„
	„ Lithium	0·0138	„
	„ Ammonium	91·2841	„
	„ Lime	36·1720	„
	„ Magnesium	15·6603	„
	Bromide of „	0·2760	„
	Iodide of „	traces	
	Sulphate of Lime	6·9289	„
	Phosphate of „	0·0299	„
	Arseniate of „	0·0115	„
	Carbonate of Baryta	traces	
	„ Strontia	traces	
	„ Lime	32·1055	„
	„ Magnesia	0·7979	„
	„ Protoxide of Iron	0·4339	„
	„ Manganese	0·0453	„
	Silica	4·6018	„
	Silicate of Alumina	0·0392	„
	Organic Matter	traces	
	Total Solids	724·5754	„
2. GASES.	Carbonic Acid	64·16	cub. inches.
	Nitrogen	1·03	„

(Waldeck.) WILDUNGEN. (Altitude 300 ft.)

Wildungen contains several springs, all of an earthy character. The two principal are the George-Victor-Quelle, and the Helenen-Quelle. The water has a special and well-deserved reputation for its curative powers in gravel and lithic diathesis. It is no solvent of renal calculi, nor of stone in the bladder, but it is a capital diuretic, and not only promotes the elimination of gravel and renal calculi, but by its tonic action on the mucous membrane of the urinary passages, serves to prevent the formation of fresh concrements. It is also much used for chronic catarrh of the bladder, neuralgia of the urethra and neck of the bladder, dysuria and ischuria, and incontinence of the urine.

DOSE.—Two or three tumblerfuls daily.

Analyses in grains per gallon.

		George-Victor-Quelle.		Helenen-Quelle.	
		By Fresenius	By Werner	By Fresenius	By Werner.
1. SOLIDS.	Sulphate of Lime	...	0·07	...	0·21
	„ Magnesia	...	7·56	...	9·10
	„ Soda	4·76	5·53	0·91	1·26
	„ Potash	0·70	·84	1·89	2·94
	Phosphate and Nitrate of Soda	...	traces	...	...
	Bicarbonate of Lime	49·84	50·61	88·83	91·00
	„ Magnesia	37·45	36·26	95·41	98·91
	„ Soda	4·48	4·76	59·15	64·05
	„ Protoxide of Iron	1·47	...	1·26	...
	„ Protoxide of Manganese	0·14	...	0·07	...
	„ Lithia	...	traces	...	traces
	Chloride of Sodium	0·49	0·70	73·0	82·11
	Silicic Acid	1·33	traces	2·17	...
	Total	100·66	106·33	322·70	349·58
2. GASES.	Free Carbonic Acid	175·56	164·36	178·22	169·74

(Nassau, Germany.) WILHELM'S-QUELLE.

This spring is situated at Kronthal, in the Taunus Hills, near Frankfort on the Main.

DOSE—Being a table water, may be drunk *ad lib.*

Analysis according to Fresenius (January, 1879) in Grains per Gallon.

1. SOLIDS.	Chloride of Sodium.....	118·36755 grains
	„ Potassium ...	2·56046 „
	Sulphate of „ ...	1·65424 „
	Bromide of Sodium	0·04487 „
	Iodide of Sodium	0.00070 „
	Phosphate of Sodium.....	0·06678 „
	Carbonate of Sodium.....	3·57259 „
	„ Lithium ...	0·24773 „
	„ Barium.....	0·02695 „
	„ Strontium	0·14133 „
	„ Lime.....	29·28366 „
	„ Magnesia ...	6·75304 „
	„ Iron	2·07725 „
	„ Manganese	0·16576 „
	Silicic Acid...	7·07630 „
		172·03921 „
2. GASES.	Carbonic Acid combined with certain carbonates to form bicarbonates ...	18·95068 „
	Free Carbonic Acid	157·48152 „
	Total, per gallon.....	348·47141 „

(Lincolnshire.) WOODHALL. (Altitude 300 ft.)

The water of this spring is especially valuable in rheumatism, gout, sciatica, neuralgia, epilepsy, scrofula, obstinate skin diseases (particularly those of a specific character), fibrous tumours, goitre, and in fact all diseases which are benefited by the iodides and bromides.

DOSE.—As an alterative, one tumblerful twice a day one hour after breakfast, lunch, or dinner; and as an aperient, one tumblerful warm one hour before a light breakfast.

The Mutter-Lauge (Concentrated Water) is generally used warm for sponging chronic enlarged joints and tumours, or a compress of lint or oil silk may be applied. For baths, to be added to hot water of 95° to 97°, before meals.

The Iodine Salt for use at table: one teaspoonful to be taken daily, a portion with each meal.

Analyses in 100,000 parts, and grains per gallon.

	Parts.	Grains per Gall.
Total solids in solution	2361·200	1652·8400
Organic Carbon	·372	·2604
Organic Nitrogen.....	·532	·3724
Ammonia.....	·810	·5670
Nitrogen, as Nitrates and Nitrites	·009	·0063
Chlorine	1425·000	997·5000
Total combined Nitrogen	1·208	·8456
Bromine	6·280	4·3960
Iodine	·880	·6160
Arsenicum	·016	·0112
Temporary Hardness	20·000	14·0000
Permanent Hardness	245·000	171·5000
Total Hardness	265·000	185·5000

The water contains unusually large proportions of Iodine and Bromine.

APPENDIX.

NAME OF SPRING.	COUNTRY.	ALTITUDE. FEET.	PROPERTIES.	
Adelheidsquelle	Bavaria	2000	Saline	1
Æsculap	Hungary	...	Bitter Water	2
Aix-la-Chapelle	Germany	450	Sulphurous, Thermal	3
Alet	France	650	Alkaline, Bicarbonated	4
Allevard	France	1473	Sulphurous, Effervescing.	5
Apollinaris	Rhenish Prussia	225	Alkaline, Gaseous	6
Auteuil	France	...	Ferruginous	7
Bagnères-de-Bigorre	France	1900	Sulphurous, Thermal	8
Bagnères-de-Luchon	France	2000	Sulphurous, Thermal	9
Balaruc	France	...	Saline, Thermal	10
Barèges	France	4000	Sulphurous, Thermal	11
Bellthal	Rhenish Prussia	400	Alkaline, Gaseous	12
Bethesda	Wisconsin, U.S.A.	...	Alkaline	13
Bilin	Bohemia	645	Alkaline, Lithiated	14
Birmensdorf	Switzerland	1300	Bitter Water	15
Birresborn	Rhenish Prussia	1100	Alkaline	16
Bocklet	Bavaria	620	Chalybeate, Gaseous	17
Bonifacius (Salzschlirf)	Hesse-Nassau	825	Saline, Lithiated	18
Bonnes (Eaux-Bonnes)	France	2300	Sulphurous (mild)	19
Bourboule (La)	France	2600	Arseniated, Thermal	20
Buffalo Lithia	Virginia, U.S.A.	500	Alkaline, Lithiated	21
Bussang	France	...	Chalybeate	22
Carlsbad	Bohemia	1000	Alkaline, Lithiated	23
Cauterets	France	3000	Sulphurous	24
Challes	Savoy	800	Sulphurous	25
Chateldon	France	...	Alkaline, Gaseous	26
Condillac	France	...	Alkaline, Gaseous	27
Contrexéville	France	3100	Alkaline	28
Couzan	France	...	Alkaline, Gaseous	29
Desaignes (Eau de César)	France	...	Alkaline, Gaseous	30
Driburg	Westphalia	633	Ferruginous, Gaseous	31
Ems	Germany	291	Alkaline, Saline	32
Enghien	France	521	Sulphurous	33
Evian	Savoy	1000	Gaseous (mild)	34
Fachingen	Nassau	337	Alkaline, Chalybeate	35
Forges	France	...	Chalybeate	36
Franzensbad	Bohemia	1500	Alkaline, Ferruginous	37
Friedrichshall	Germany	920	Bitter Water	38
Gastein	Austria	3200	Indifferent	39
Geilnau	Germany	...	Alkaline	40
Gerolstein	Rhenish Prussia	1200	Alkaline, Gaseous	41
Giesshübler	Bohemia	...	Alkaline	42
Griesbach	Germany	1500	Chalybeate	43
Halle	Bavaria	1700	Saline, Bromo-iodised	44

	USES.
1	Alterative and tonic. Scrofula and strumous skin diseases, rheumatism and gout, special ailments of females.
2	Purgative.
3	Rheumatism, cutaneous eruptions, stiff joints, syphilis, etc.
4	Pregnancy (all stages), miscarriage, debility, dyspepsia, nausea, gastro-intestinal complaints, convalescence.
5	Asthma and affections of the throat, chest, and respiratory organs; scrofulous and cutaneous diseases; uterine ailments; osseous diseases; lymphatic weakness of children; rheumatic complaints, etc.
6	Table water.
7	Dyspepsia and debility.
8	Sluggish abdominal circulation, nervous uterine derangements, chronic rheumatism, and some forms of cutaneous diseases.
9	Bronchitis (chronic), rheumatism, scrofulous and cutaneous diseases.
10	In small local repute for paralysis.
11	Rheumatism (chronic), cutaneous and scrofulous diseases, syphilis, ulcers and wounds, diseased bones, and partial paralysis.
12	Table water.
13	Gravel and diseases of the kidneys and bladder, albuminuria, dropsy, &c.
14	Table water. Good for indigestion, heartburn, acidity of the stomach, &c.
15	Mild purgative. Useful in liver complaints, jaundice, hepatic calculus, hæmorrhoids, &c.
16	Table water.
17	Tonic; chiefly useful for female derangements.
18	For uric acid diathesis; gout, calculus, gravel, diseases of the bladder and kidneys, and biliary concretions; chronic catarrh of the stomach and intestines; rheumatism, hæmorrhoids, scrofula, &c.
19	Suitable for children and delicate persons, in cases of asthma, catarrh, phthisis, quinsy and other affections of the respiratory organs.
20	Diseases arising from impoverished blood, cutaneous affections, herpetic affections of the pulmonary passages, asthma, laryngitis, chronic bronchitis, eczema, psoriasis, &c.
21	Uric acid diathesis, diseases of the digestive organs, diseases arising from pregnancy and other affections peculiar to women, affections of the kidneys, bladder, and urethra requiring alkaline treatment.
22	Useful for strengthening the digestive organs, and stimulating the action of the bowels and kidneys.
23	Purgative. Useful in diseases of the stomach, liver, kidneys, bladder, spleen, and for diabetes mellitus, gout, chronic uterine catarrh, &c.
24	Cutaneous affections, glandular enlargements, chronic bronchial catarrh, &c.
25	Chronic catarrh, scrofula, laryngitis, diseases of the liver and abdominal viscera.
26	Table water. Diseases of the stomach and genito-urinary organs, anemia, chlorosis, &c.
27	Table water.
28	Uric acid diathesis and diseases of the urinary organs, hepatic affections, diabetes, &c.
29	Table water.
30	Table water.
31	Hysteria, anomalous menstruation, and other complaints peculiar to women.
32	Bronchitis, catarrh allied with gouty diathesis.
33	Glandular obstruction, suppressed menstruation, leucorrhea, cutaneous and scrofulous affections.
34	Derangements of the digestive organs and nervous system.
35	Affections of the bladder and kidneys, derangements of the digestive organs, acidity, heartburn, &c.
36	Chlorosis, dyspepsia, abdominal weakness, &c.
37	Abdominal infarcta and portal obstructions.
38	Purgative. Useful in diseases of the liver, bowels, and kidneys; calculus affections of the respiratory organs.
39	Nervous affections, paralysis, uterine diseases, seminal weakness, &c.
40	Table water.
41	Table water.
42	Table water.
43	Tonic table water.
44	Scrofulous struma, goitre, &c.

NAME OF SPRING.	COUNTRY.	ALTITUDE. FEET.	PROPERTIES.	
HARROGATE...	Yorkshire	420	Sulphurous	45
HATHORN	Saratoga, U.S.A.	...	Saline, Gaseous	46
HOMBURG	Hesse Homburg...	600	Saline, Chalybeate	47
HUNYADI-JÁNOS	Hungary	460	Bitter Water	48
HUNYADI-LÁSZLÒ	Hungary	500	Bitter Water	49
JOHANNISBRUNNEN	Hesse-Nassau	...	Saline, Gaseous	50
KISSINGEN	Bavaria	600	Saline, Sulphurous	51
KRANKENHEIL	Bavaria	2467	Saline, Bromo-iodised...	52
KREUZNACH...	Rhenish Prussia...	285	Saline, Bromo-iodised...	53
KRONENQUELLE	Silesia	...	Saline, Sodio-lithiated	54
KRONTHAL	Germany	500	Saline (mild)	55
LEAMINGTON SPA	Leamington	...	Saline	56
LIPPSPRING	Westphalia	378	Alkaline, Gaseous	57
LUHATSCHOWITZ	Austria	1700	Saline, Bromo-iodised ...	58
MALVERN	England	...	Indifferent (Saline)	59
MALVERN SELTZER	England	..	Indifferent (Saline)	60
MARCOLS	France	...	Ferruginous	61
MARIENBAD	Bohemia	1900	Alkaline, Chalybeate, Gaseous	62
MERGENTHEIN	Wurtemburg	591	Saline	63
MIERS	France	...	Sulphurous	64
MISSISQUOI	Vermont, U.S.A.	...	Sulphurous	65
MONT-DORE	France	3300	Alkaline, Muriated (Thermal)	66
MORNY-CHATEAUNEUF	France	1250	Alkaline, Ferruginous...	67
NEUENAHR	Rhenish Prussia...	225	Alkaline, Gaseous..	68
NEYRAC	France	...	Alkaline	69
OFEN (Rakoczy)	Hungary	461	Bitter Water	70
OREZZA	Corsica	1730	Ferruginous	71
PASSY	France	...	Ferruginous	72
PITKEATHLY	Scotland	...	Saline, Sulphuretted ...	73
PLOMBIÈRES	France	1310	Saline, mild (Thermal)	74
POUGUES	France	780	Alkaline	75
PÜLLNA	Bohemia	1225	Bitter Water	76
PYRMONT	Waldeck	400	Ferruginous	77
RECOARO	Lombardy	1465	Ferruginous	78
RENAISON	France	...	Alkaline, Acidulated ...	79
ROISDORF	Rhenish Prussia...	1000	Alkaline, Muriated	80
ROMAN SPA	Germany	...	Alkaline, Acidulated, Gaseous	81
ROSBACH	Germany	...	Saline	82
ROYAL HUNGARIAN	Hungary	...	Bitter Water	83
ROYAT	France	1400	Saline, Arseniated, Lithiated (Thermal)	84

	USES.
45	Cutaneous affections, lead and mercurial poisoning, secondary syphilis, deterioration of the blood arising from gouty diathesis, rheumatism, chorea, chlorosis, anemia, indigestion, etc.
46	Functional derangements of the digestive organs, dyspepsia, gout, gravel, rheumatism, diabetes, constipation.
47	Tonic and laxative. Useful for torpidity of the digestive organs and bowels plethora, dyspepsia, chlorosis, hysteria, hypochondria, diseases consequent on typhus and fevers, liver and spleen engorgements, etc.
48	Purgative.
49	Purgative. Used for gouty diathesis, hæmorrhoids, hepatic affections, female ailments during pregnancy, etc.
50	Table water. Excellent tonic. For indigestion, feeble appetite, rheumatic affections, sedentary habits.
51	Atonic dyspepsia, abnormal mucous secretions, debility, hepatic derangements, hæmorrhoids, and helminthiasis.
52	Scrofulous struma, goitre, &c.
53	Scrofula and glandular swellings, syphilis, cutaneous affections, rheumatism, paralysis, tuberculosis, leucorrhea, &c.
54	Gouty and uric acid diathesis, nephritic and arthritic affections.
55	Table water. Stimulates the mucous membrane and intestinal canal.
56	Dyspepsia and indigestion, female complaints, hæmorrhoids, sciatica, gout, rheumatism, palsy and lead poisoning, scrofulous, lymphatic, and glandular enlargements, cutaneous affections, chorea, jaundice, &c.
57	Diseases of the respiratory organs.
58	Catarrh of the stomach and other catarrhal affections, abdominal stasis, gouty exudations, hyperæmic enlargement of the liver.
59	Promotes urinary secretion, beneficial for affections of the bladder and kidneys, fistula, cutaneous diseases.
60	Table water.
61	Table water.
62	Purgative. Derangement of the digestive organs, plethora, gout, grave hæmorrhoids, female complaints.
63	Lithiasis, biliary obstructions, hæmorrhoids.
64	Scrofulous diseases.
65	Scrofula, cutaneous affections, impurity of the blood, kidney diseases, cancer.
66	Affections of the mucous membrane, rheumatism.
67	Table water. Arthritic diathesis, rheumatism, chloro-anemic affections, dyspepsia, &c.
68	Gout, rheumatism, bronchial catarrh, acidity, &c.
69	Aperitive, tonic, solvent, and detersive; skin diseases, scrofulous swellings, chlorosis, leucorrhea, gastralgia (some forms).
70	Purgative.
71	Table water. Tonic. For feeble appetite, debility, female complaints, chlorosis, etc.
72	A powerful tonic. Scrofula and skin diseases, abdominal tumours, plethora.
73	Purgative and diuretic.
74	Nervous affections, rheumatism, and some cutaneous diseases.
75	Dyspepsia, gravel, vesical catarrh, chronic diseases of the digestive organs.
76	Purgative.
77	Dyspepsia, diarrhœa, chlorosis, debility, etc.
78	Phthisis.
79	Table water.
80	Table water.
81	Table water.
82	Table water.
83	Purgative.
84	Debility, chlorosis, anemia, gouty and rheumatic diathesis, catarrh of the digestive and respiratory organs, gastro-intestinal dyspepsia, glandulous angina, laryngitis, bronchitis, humid asthma, diabetes, uric-gravel, catarrhal affections of the genito-urinary organs cutaneous diseases, &c.

NAME OF SPRING.	COUNTRY.	ALTITUDE. FEET.	PROPERTIES.	
Rubinat	Spain	...	Alkaline, sodio-sulphated	85
Saidschütz	Bohemia	660	Bitter Water	86
Saint-Boès	France	...	Sulphonaphthalic, Arseniated, Ioduretted	87
Saint-Galmier	France	1350	Alkaline, Gaseous	88
Saint-Galmier Noël	France	1350	Alkaline, Acidulated, Gaseous	89
Saint-Gervais	Savoy	...	Saline, Sulphurous, mild (Thermal)	90
Saint-Moritz	Switzerland	5910	Alkaline, Chalybeate	91
Salins-les-Bains	France	1054	Saline	92
Salvator	Hungary	...	Alkaline, Lithiated	93
Saltzbrunn	Silesia	1215	Alkaline	94
Saratoga	New York, U.S.A.	...	Saline	95
Sauerbrunnen	Germany	...	Alkaline	96
Saxon	Switzerland	1000	Saline, Bromo-iodised	97
Schlangenbad	Nassau	900	Alkaline (Thermal)	98
Schwalbach	Nassau	909	Chalybeate	99
Schwalheim	Germany	...	Alkaline, Chalybeate	100
Seidlitz	Bohemia	675	Bitter Water	101
Selters	Nassau	800	Alkaline, Muriated, Acidulated	102
Soden	Nassau	450	Alkaline, Gaseous	103
Solms-Gertrudis	Germany	...	Saline, Gaseous	104
Soulzmatt	France	850	Alkaline	105
Spa	Belgium	1030	Chalybeate	106
Sulis	Bath	...	Alkaline	107
Tarasp	Switzerland	4600	Saline	108
Taunus	Germany	390	Alkaline	109
Teplitz	Bohemia	648	Indifferent (Thermal)	110
Uriage	France	1300	Sulphurous	111
Vals	France	2475	Alkaline, Acidulated	112
Vals-Vivaraises	France	2475	Alkaline, Acidulated	
Vichy	France	733	Alkaline, Acidulated (Thermal)	113
Vichy-Larbaud	France	733	Alkaline, Acidulated	
Vichy-Lardy	France	733	Alkaline, Acidulated	
Victoria-Ofener	Hungary	...	Bitter Water	114
Victoria (Table Water)	Hungary	...	Alkaline	115
Weilbach	Nassau	420	Alkaline, Sulphurous	116
Wiesbaden	Nassau	346	Saline (Thermal)	117
Wildbad	Wurtemburg	1400	Indifferent (Thermal)	118
Wildungen	Waldeck	300	Alkaline	119
Wilhelmsquelle	Nassau	...	Saline, Gaseous	120
Woodhall	Lincolnshire	300	Saline, Bromo-iodised	121

	USES.
85	Purgative.
86	A powerful purgative.
87	Diseases of the skin, mucous membrane, bronchia, lungs and chest; chronic venereal diseases, angina, phthisis, catarrhal affections, etc.
88	Table water.
89	Excellent table water.
90	Cutaneous diseases, eczema, dyspepsia, constipation and affections of the alimentary canal.
91	Tonic. General debility, atonic torpidity of the bowels.
92	Scrofulous diseases, catarrh with scrofulous diathesis, ganglionic congestions, and obstructions of the liver, spleen, and of the womb; tertiary syphilitic and articular affections, &c.
93	Uric acid diathesis, arthritis, calculus, hæmorrhoids, jaundice, scrofula, derangements of the digestive and respiratory organs.
94	Chronic pulmonary catarrh.
95	Dyspepsia, jaundice, enlargements of the abdominal viscera, gall-stone diathesis, glandular obstructions, scrofulous tendency and skin diseases.
96	Excellent table water.
97	Glandular enlargements, tumours, &c.
98	Nervous and cutaneous irritability
99	Debility, impoverished blood, chlorosis, anemia, &c.
100	Table water.
101	A powerful purgative.
102	Table water. Acidity of the digestive organs, affections of the kidneys, bladder, liver and lungs, bronchitis, gout, rheumatism, etc.
103	Female complaints, atonic gout, and some forms of scrofula.
104	Table water.
105	Table water.
106	Tonic. Debility, stimulates the functions of the bowels and kidneys.
107	Dyspepsia, indigestion, nausea and general debility of the stomach.
108	Catarrhal affections of the stomach and respiratory organs, gastralgia, enlarged liver and spleen, indigestion, &c.
109	Table water.
110	Paralysis, chronic rheumatism, anomalous gout with tumefaction and contraction, derangements of the sexual organs.
111	Skin diseases and female complaints arising from debility.
112	Affections of the kidneys and bladder, gastralgia, diabetes, gout, rheumatism, albuminuria, nervous affections, debility, chlorosis, anemia, cutaneous affections, intermittent fevers, &c.
113	Diseases of the genito-urinary organs, kidneys and bladder; gout, rheumatism, gravel, calculus, diabetes, dyspepsia, debility, chlorosis, congestions of the liver and spleen, visceral obstructions, hysteria, hæmorrhagia, female nervous complaints, in convalescence, &c.
114	Purgative. During pregnancy and many diseases of women, functional derangements, &c.
115	Table water.
116	Gout, rheumatism, herpes, lead and mercurial poisoning, chronic pulmonary diseases, thoracic affections, bronchitis, chronic catarrh of the stomach, intestines and bladder.
117	Arthritic diathesis and diseases, neuralgia, sciatica, paralysis, rheumatic palsy, &c.
118	Cutaneous diseases, neuralgia, rheumatism scrofula, chlorosis.
119	Lithic diathesis, diseases of the bladder and urinary organs.
120	Table water.
121	Rheumatism, gout, sciatica, neuralgia, epilepsy, scrofula, cutaneous affections, goitre and fibrous tumours, &c.

(Calvados, France.) TROUVILLE.

Trouville is the most frequented sea-bathing place in all France. The beach at Trouville, being covered with fine and level sand for a length of over 2½ miles, offers to bathers the most complete security, and it is therefore, more particularly recommendable for children. During the months of July, August, and September, the place is crowded with visitors. The neighbouring country, finely wooded and extremely picturesque, is the object of numerous charming drives and excursions. There is a daily steamboat service between Trouville and Havre.

The Salon at Trouville, entirely re-constructed and altered in 1884, is situated on the sea-shore, and surrounded by beautiful villa residences. It is built in two stories, a raised ground floor with first floor over, and contains:—A large dancing room for children's balls; a grand hall for fêtes, concerts and theatres, fitted with a balcony and private boxes as a gallery; a large outer hall or saloon attached to the same; a ladies' saloon, with ante chamber and dressing rooms; a large saloon for racing games; a Café Rotunda; and a Restaurant.

The Saloons and Halls open on to the Grand Terrace facing the sea, and consequently give a splendid view of the sea, the spectator being sheltered from sun, wind, and rain, by the external galleries or verandah. A Kiosk has been built on the Grand Terrace for out-of-door concerts.

The first floor, to which access is given by two grand flights of stairs, at the two extremities of the galleries, is sub-divided into three parts.

The first section comprises a large Reading and Correspondence Room, situated immediately above the Saloon for racing games.

The second, exclusively reserved for the Union Club Rooms, contains a large and a small Saloon for games, a dressing room, with ante chamber and cloak room.

The third, reserved for the Trouville Club Rooms, comprises an exactly similar suite of apartments, together with an annexe, containing a Coffee Room and Buffet.

Between the two Club Rooms there is a large Billiard Room.

All the rooms on the first floor, like those on the ground floor, communicate with each other by means of large galleries, or external terraces, looking out on the sea shore, and giving an extensive view over the sea, to the coast at Havre, and at Caen.

Hazell, Watson & Viney, Limited, Printers, 52, Long Acre, London, W.C.