Medical guide to the alkaline, sulphurated, iodurated and bromurated Marlioz waters near Aix (Savoy) : chemical composition of the Aesculapius spring, its curative effect in some affections, chiefly in lymphatism, scrofula, syphilis, skin and lung diseases : with remarks on the possibility of extending the hydrologic treatment to the indigent / by Dr. Macé ; translated by John P. Leonard.

MEDICAL GUIDE

TO THE

MARLIOZ WATERS

NEAR **AIX** (SAVOY)

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MEDICAL GUIDE

TO THE

ALKALINE, SULPHURATED, IODURATED AND BROMURATED

MARLIOZ WATERS

NEAR **AIX** (SAVOY)

CHEMICAL COMPOSITION OF THE ÆSCULAPIUS SPRING; ITS CURATIVE EFFECT IN SOME AFFECTIONS; CHIEFLY IN LYMPHATISM, SCROFULA, SYPHILIS, SKIN AND LUNG DISEASES.

WITH REMARKS

ON THE POSSIBILITY OF EXTENDING THE HYDROLOGIC TREATMENT TO THE INDIGENT.

BY

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TRANSLATED BY

JOHN P. LEONARD,
FORMER INSPECTOR OF FRENCH AMBULANCES

TRANSLATOR'S PREFACE.

This Work on the mineral springs of Marlioz, near Aix, in the translation of which I assisted the Author, shows clearly in what diseases those important waters are to be used. It shows also how a hydro-mineral treatment may be brought within the reach of the indigent. The Author, after a serious study of the question, has been enabled to give some very useful information on it. By recommending his Work to my countrymen, whether physicians or invalids, I believe I am rendering them a real service.

JOHN P. LEONARD,

(*Former Inspector of French Ambulances*).

PREFATORY NOTICE.

English practitioners and patients having asked me for some information relative to the Marlioz Spring, I give it to them in the following unpretending work ; and owing to this circumstance, Marlioz will have its own special notice.

Up to the present, except the analysis of the Marlioz waters by Dr. Bonjean, in 1857, nothing particular was published on this spring, which, however, was well deserving of notice, particularly at present, when every little mineral streamlet has its own monography.

Until now, Marlioz was only known by the light thrown on it by its brilliant neighbour Aix, to which Marlioz was like a satellite. Without disdaining to give assistance to the waters of Aix, the Æsculapius Spring requires to be known for its

intrinsic value, and to attract patients on its own account.

Professor Bazin's lectures being the most recent, scientific, and impartial study on mineral waters, I shall often quote his opinion, sometimes, however, adding a note of interrogation when it appears questionable. I quote many others also, hoping that, as the spark springs from the shock of stones, light may emanate from the contrast of various opinions.

From my researches, the truth which seems to be evident is, that the Marlioz Spring, recommended in the different works on mineral waters, particularly for diseases of the lungs, is, above all, useful to lymphatico-scrofulous and enfeebled patients.

I take the opportunity of here thanking Mr. J.P.L., who has been kind enough to assist me in the translation of this work.

CHAPTER I.

IMPORTANCE OF THE MARLIOZ SPRING.

If Aix has become so much the resort of English patients, it is, as Dr. Tilt, of London, assured me, due to Baron Despine.

Several times that learned physician, held in such high esteem and so much honoured by his confrères in England, crossed the Channel, to make known to English people those Aix baths which he so well appreciated himself.

Since Mount Cenis has been pierced, Aix, being on the road to Italy, has become the first resting place where it is convenient for travellers to stop, so that every year the number of English visitors and bathers becomes more considerable.

Baron Despine, in his "Practical Guide to the Baths of Aix in Savoy," speaks of Marlioz, situated at about a mile from Aix, on the road to Chambéry, but he merely mentions the existence of that spring. To complete his work, I give some information on those waters already appreciated by English medical men, as may be seen by the following interesting letter by Dr. Nicholson. That letter will justify the work I have undertaken.

"How often do we encounter on the continent patients at bathing places which they should never

have approached: victims of rheumatism and gout, doomed by their medical advisers to bathe in efficacious waters which unfortunately flow in valleys damp and deep (*e. g.* St. Gervais, La Caille, Uriage, etc.), or persons afflicted with diseases of the lungs and air passages, drinking waters of undoubted value, but at altitudes such that they cannot breathe, or but with such efforts that the aggravation of their complaints is certain. For benefit to result from residence at a bathing place, it is necessary not only that the patient should drink and bathe in waters that suit his case, but that he should do so in a climate which will at any rate counteract the tendencies of the water.

"It is often advisable that patients sent to Italy for the cure of disease or restoration of strength, should undergo a course of mineral waters, and for that purpose they are made to deviate from their course north, south, east and west, in search of that which is directly in their path. Being desirous myself of finding a thermo-mineral treatment for the air passages in a locality not remote from Italy, as Eaux-Bonnes or Cauterets, nor at so great an elevation, I determined to try Aix-les-bains or Marlioz, near Aix, and being satisfied with the results, I am desirous of drawing the attention of the English physicians to the advantages afforded by the combined action of the climate and the waters of Aix and Marlioz, under certain circumstances.

"Aix is situated on the railroad from Paris to Mount Cenis, 14 hours from Paris, in a very beau-

tiful, richly-cultivated valley, with a lake at one end and surrounded by high mountains. In July and August it is too warm to please most persons arriving directly from England, although then best suited to the treatment of rheumatism and skin diseases, in which its sulphur waters are peculiarly efficacious; but in the spring and autumn months, when other bathing places are not open, Aix may be safely visited on going to or coming from Italy.

The waters of Marlioz are cold; they contain sulphates of soda, lime and magnesia, iodine, bromine and iron in small quantities, but of free sulphurated hydrogen more than any other mineral springs in Europe. Within a few years this gaz has been administered at Marlioz in inhalations, injections and inspirations of very finely pulverized particles. The water is also drunk in laryngitis, bronchitis, asthma, and with or without those symptoms which lead us to suspect scrofulous or tubercular disease. In these cases the treatment is accompanied or helped according to the advice of the local physicians by the thermo-sulphurous waters and inhalations of Aix.

"The use of the waters is happily seconded by the influence of climate, for the air of the valley of Aix (about 800 feet above the sea, in the latitude of 45°, 38) is so soft and sedative that, according to Dr. Lombard, of Geneva, those who from nervous irritability cannot sleep elsewhere, sleep at Aix.

"I hope that what I have stated will attract the attention of English medical men to this locality. More information can be easily acquired in professed

systematic works on bathing places, and in the little monography of Dr. Lombard, of Geneva, and Dr. Baron Despine of Aix. For Marlioz consult the article on iodurated waters in 'Bains de France' by Dr. Petrequin, of Lyons."

"*Aix, July* 7, 1862."

"Marlioz is a diminutive of Challes, and the Æsculapius Spring, as it is called, is cold, slightly gazeous, and alkaline, contains bromine, and is in a high degree sulphurous. I found it to give, when tested by the sulphurous hydrometer, 24, and even as much as 30 degrees. Mr. Bonjean, on a total of 0 gr. 429, found 6 cc. 70 of sulphurous hydrogen, 0,067 of sulphur of sodium, 0,244 alkaline, and a little iron and manganese.

"The quantity of iodine and bromine contained in the water when tested for our "Traité des Eaux," by Messrs. Henry and Bonjean, gave 0.0001944 and 0.000515 bromine.

"Though less active than the waters of Challes, those of Marlioz are recommended for the same affections. It is when inhaled, they are most useful in cases of chronic cattarrh and in the first and second stages of phthisis." (See "Dictionary of Mineral Waters").

When speaking of the waters of this spring, Petrequin says:

"The sulphurous iodurated waters of Challes, Marlioz and Greoulx are beneficial in affections of the digestive organs, but their action is particularly

useful in chronic affections of the mucous of the respiratory organ" (laryngitis, phthisis, laryngia and onic catarchrrhe).

"It is in those diseases that they succeed best, and it is not to be wondered at, when we remember that the sulphur contained in them acts in a special manner on the pulmonary mucous. To this may be attributed the fact, which we ourselves observed, of the cure of chronic bronchitis from the use of sulphated water, without iodine. It must not be forgotten also, that catarrhal affections are frequently connected with the herpetic diathesis, and if we find sulphur combined with iodine so effective in dermal affections, it is but natural to expect that they should prove equally useful in combating the same diathesis when it takes the form of cattarrhal affections of the different mucous membranes.

We found, ourselves, calcic or sodic sulphurated water to bring relief and even effect a complete cure in those kinds of catarrhs.

Sulphurous iodurated waters may therefore be equally, if not more, beneficial in the treatment of catarrh. Experience proves the truth of this statement, and we firmly believe that sulphurous iodurated waters constitute the best remedy for those diseases."

Moreover, the following table drawn up by Dr. Bonjean, showing that the sulphurous element exists in larger quantity in the Marlioz spring than in the waters of the Pyrenees, proves also that it deserves to be more generally known and appreciated.

COMPARATIVE TABLE

OF THE QUANTITY OF SULPHER CONTAINED IN THE WATER OF MARLIOZ AND IN THE MOST NOTED SULPHUROUS WATERS OF FRANCE.

SULPHUROUS PLACES	TEMPERATURE of the springs	FOR ONE LITRE		IODINE	BROMINE
		Sulphydremétric degrees.	Weight of the sulphur in sgrammes.		
	Degrees				
Marlioz	14	30°	0,038	0,0001944	0,0000515
Allevard	24	28°	0,035	traces.	traces.
Bagnères de Luchon : several sources.	34 to 68	23°			
		The richest source La Reine			
Bagnols	45	20°	0,025	»	»
Le Vernet..... id.	33 to 58	18°	0,022	»	»
		The richest			
Enghien	10 to 14	14°	0,016	»	»
Amélie-les-Bains.. id.	40 to 64	13°	0,016	»	»
		12°	0,015	»	»
Barèges..... id.	31 to 45	The richest			
Uriage	24 to 45	11°	0,013	traces.	»
Ax..... id.	42 to 73	8°	0,010	»	»
Pierrefonds	12	8°	0,010	»	»
Vinça	23	8°	0,010	»	»
Bonnes	32	6°	0,007	»	»
Cauterets (Larramieu source)	43	6°	0,007	traces.	»
Saint-Sauveur	22	6°	0,007	traces.	traces.
Saint-Honoré	32	1°	0,0012	»	»

The richest and most noted of these springs are sulphurated by free sulphydric acid, and without sulphur, whereas the spring of Marlioz is sulphurated, not only by free sulphydric acid, but alsc by alkaline sulphur, which allows the water to be conveyed at a distance without any decomposition. Besides, almost all the springs indicated in this table are without iodine and bromine, elements found in the Marlioz waters.

CHAPTER II.

HISTORICAL NOTICE ON MARLIOZ.

The Christopher Columbus of the Marlioz Spring was not a native of Savoy, as it might be supposed, but a Spaniard, Chevalier de Gimbernat, a learned chemist of the Academy of Sciences at Munich, and author of several scientific works, among which we shall notice his researches on baregine, which he considered as an organic substance having the characteristics of the *oscillaires*, and which for that reason he called thermal *zoogen*.

The sulphurous rivulet of Marlioz, flowing down the slope of the hill towards the valley, betrayed the nature of its waters by a sulphydric odour, and by a whitish deposit left on the stones and the grass it flowed over.

But, except a few peasants affected by wen, scrofulous and herpetic diseases, attracted to those springs by tradition, or a sort of instinct, they were otherwise almost unknown.

Chevalier de Gimbernat, in his excursions in the environs of Aix, discovered this spring, neglected until then, though it was later ascertained that in sulphurous principles it was, compared to those of Aix, in the proportion of 30 to 4.

In September, 1822, near the close of the thermal season, the learned chemist, who had come to Aix to cure an obstinate acnea, was about to leave the place, with his forehead and face still covered with pimples, when he fortunately thought of trying the waters of the rivulet he had discovered, and the results were that the horrible pimples, which disfigured him, disappeared. In the warmth of his gratitude, Chevalier de Gimbernat gave to the latter fountain the name of Æsculapius Spring, which, though rather a pretentious one, it has still retained.

"These cold sulphurous waters," Gimbernat said to Colonel Chevillard, "will be the complement to those of Aix; they will become precious curative ones later; the environs will be built upon by strangers having recourse to this spring. Humanity will be largely indebted to you, if you could establish a well there, by draining the waters, which both for internal and external purposes will be of the greatest service in all skin diseases, whatever may be their causes. (Extract from the "Livre de Souvenirs" of Colonel Chevillard).

Were our gratitude to De Gimbernat as deeply felt as that of the latter for Marlioz, a marble slab would long since have recorded his words and his title to our gratitude. It was also this learned man who, two years after having discovered the Marlioz spring, was the first to study the gas freely escaping from the waters of Baden (Switzerland), and who showed the best method for administering these gaseous

vapour baths. It was in 1822 that De Gimbernat drew attention to the Æsculapius Spring; in 1838 it was yet so little noticed, that Dr. Bonjean, in his chemical analysis, says, speaking of the waters of Marlioz: "It is regrettable they were so long neglected, and is to be hoped that they will be soon brought into use, and that all the advantages that may be derived from this sulphurous spring will at last be fully understood."

Having made an accurate analysis of this water, he recommended it to the attention of practitioners. In spite of this advice, it was only in 1850 that advantage was taken of these rich hydro-mineral resources.

The first work undertaken to collect these waters in a reservoir is due to Messrs. G. de St. Quentin and Rigaud. There was but a small *buvette* there; but in a short time, the vines, the orchard and the meadow which surrounded it were transformed into a beautiful park and garden, and a sort of miniature establishment was raised.

Seven years after, when Mr. Billet became the owner of this park, the Æsculapius Spring was endowed with a cold gazeous inhaling room. Then the wish expressed long before by Dr. Petrequin and by the Medical Board of Aix was attended to. This diminutive inhaling room, of an octagon form, with a thatched straw roof, soon became insufficient, and the Medical Board of Aix requested Mr. Billet to build a more comfortable establishment. Three years after, a most suitable building rose gracefully

on the slope of the hill, facing the village of Tresserve and the gigantic mountain called *Dent du Chat*.

At last, Mr. Mottet * came, and a series of usefu improvements were made. And now the establishment is endowed with all the comforts and accessories necessary for a well managed watering place. Apparatus for douches of every kind are to be found there. Nothing is wanting ; there is even a gymnasium for children, where they can develope their muscular system under the skilful management of Mr. Chalvignac, director of the medical gymnasium of Cannes, well known for his successful treatment of deviations of the spine. Nor is this all: Mr. Mottet intends to unite Marlioz and Aix by means of a tramway, if no obstacle comes to prevent this scheme.

Let a few cottages or villas be built on the slope or at the foot of the hill, and Gimbernat's prognostic would soon be realized. Then would Marlioz, which is only at present like the Passy of Aix, become one of its suburbs.

* To-day Mayor of Aix.

METHOD OF ANALYSING THE WATERS.

Substances contained in the water.	Reactive Agents.	Effects Produced.
Atmospheric air	Gallic acid and potash, or better, pyrogallic acid	A reddish tinge, becoming violet of a light or deep shade.
Carbonic acid	Blue reactive paper.....	Take a red tinge of a more or less violet hue.
Carbonates.....	Red reactive paper	Turns to blue in water deprived by heat of its excess in carbonic acid.
Carbonates.....	Sulphuric acid / Azotic " / Chlorhydric " } diluted.....	Effervescencc and evaporation of carbonic acid with the deposit.
Sulphates*	Chloride of carium.....	White deposit, not dissolved by diluted chlorhydric and azotic acid.
Chlorure.....	Nitrate of silver.....	A whitish opal tinge, turning black when exposed to the light, and further, if the chlorure exist in certain quantity, there is a white curdy deposit. Both disappear under the action of ammonia, but they do not with azotic acid.
Azotates	Gold leaf, with pure sulphuric acid and pure chlorure of sodium	This mixture, added to a soluble and concentrated deposit obtained from the evaporation of water containing azotates, produces a dissolution of gold to be treated after by the proper reactives.
Iodures and bromures.	Hypoazotic acid and chloroform	Pour into a litre of water containing iodure 0.5 of hypoazotic acid, and after mixing, add 0.5 of chloro-

		form, and stir the mixture. The chloroform unites itself with the iodine isolated by the acid, and takes a reddish violet hue. Set apart it can be tested by a solution of potash to obtain other reactions; Bromine is obtained in acting upon the decanted liquid with azotic acid and chloroform.
Salts of lime	Oxalate of ammonica.....	White deposit produced at once.
Do. do.	Soap solution	Opal tinge with cloudy flakes or curly deposit, according to the proportions of calcareous salts ; carbonate of lime excepted.
Do. do.	Phosphhate of soda	White deposit.
Salts of magnesia....	Phosphate of ammoniaca....	Flaky deposit in the water previously treated by phosphate of soda to separate the lime from it.
Do. do.	Liquid ammonia	Flaky white deposit.
Alumine	Do. do.	Flaky white deposit.
Do.	Sulph. of alamine and potash	White flakes of alumini and of sulphate of lime.
Iron	Ferro cyanure of potassium..	A blue tinge by dissolving in acids the deposit left by evaporations.
Organic matter	Reactive blue and red papers	To calcinate in a tube closed at one end the deposit of the evaporation of the water, the reactive papers being previously introduced. After calcination they become both blue, if ammoniacal substances have been formed ; a red in the contrary case.*

* See further on how by sulphydrometer it is easy to find the quantity of sulphur.

* It is better to act upon large than upon small quantities of water.

ANALYSIS OF THE WATERS OF ST. HONORÉ, ALLEVARD, AND MARLIOZ.

ST. HONORÉ. Temp. 26° cent. F. Alt. 272 mèt.		ALLEVARD. Temp. 16.7° cent. F. Alt. 400 mèt.			MARLIOZ. Temperature 14° cent. F. Alt. 265 mètres.		
Hydrosulphuric acid free.	0.070	Hydrosulphuric gas	0.052	Gaseous Elmnts.	Hydrosulphuric acid free	6.70
Free carbonic acid	1-9 vol.	Carbonic acid	0.022	Gaseous Elmnts.	Carbonic acid	4.64
Azot	qntity.	Azot	qntity. undet.	Gaseous Elmnts.	Azot	9.77
Oxygen	undet.			Sulphurous Elements.	Silicic acid	0.006
Bicarbonate of lime	0.098	Carbonate of lime	0.034	Sulphurous Elements.	Sulphur of sodium	0.067
" " magnesia.		" " magnesia	0.018	Sulphurous Elements.	Carbonate of lime	0.186
Bicarb. of soda and potass.	0.040	Chlorid. of sodium	0.334	Sulphurous Elements.	" " magnesia	0.012
Carbonate terreux	0.069	" " magnesium	0.068	Sulphurous Elements.	" " soda	0.040
Silicates of potass	0.034	Sulphate of alumine	qntity. undet.	Sulphurous Elements.	" " iron	0.013
" " soda				Sulphurous Elements.	" " maganese	0.001
" " alumine	0.023	" " magnesia	0.065	Sulphurous Elements.	Sulphate of soda	0.028
Alkaline sulphur	0.003	" " lime	0.053	Sulphurous Elements.	" " lime	0.002
Sulphate antydr. of soda	0.132	" " soda	0.021	Sulphurous Elements.	" " magnesia	0.018
" " " lime	0.032	Silicic acid	qntity.	Sulphurous Elements.	" " iron	0.007
" " " magnesia	—	Oxyde of iron	undet.	Sulphurous Elements.	Chloride of magnesium	0.014
Chloride of sodium	0.300	Iodine	0.006	Sulphurous Elements.	" " sodium	0.018
" " potassium	0.005	Brome	qntity. undet.	Sulphurous Elements.	Iodine	0.0001944
Alkaline Iodides	qntity. undet.			Sulphurous Elements.	Bromine	0.0000515
Oxyd. of iron	0.007			Sulphurous Elements.	Glairine	qntity. undet.
Silicic acid and glairine.	qntity. undet.					

CHAPTER III.

THE RANK OF MARLIOZ IN THE MINERAL SPRINGS.

From analysis given of the Marlioz Waters, in what hydrologic sections should they be placed? A proper classification remains to be made, and hydrologic science has not yet found its Linné or its de Jussieu. Scientific men are far from agreeing on what is requisite for classifying a mineral water.

Chemists pretend that it is the basis that should determine the class in which a mineral water should be placed; others maintain that it should be the acid, because, they say, it gives the water a more important character than the basis does, and they consequently suppress the ferruginous waters as a class, and disseminate them into different groups, according to the nature of the acids.

To show the difficulty of classifying the waters, let us take, for instance, one by Mr. O. Henry, when he made his researches on the congelation of mineral waters. He divides them in four groups:

The first is called *Saline Water;* it comprises chlorurated springs, as Bourbon-l'Archiambault and Bourbonne; sulphated Waters, as those of Vitel and Contrexeville; iodated and iodo-bromurated waters, as Saxon and Bondoneau.

Tne second group comprises *alkaline bi-carbonated waters*, charged with bi-carbonate of soda, lime, and potash, such as Vichy Vals, Mont Doré, Plombieres, Ems, and Salsburg.

The third group compriscs *sulphurous waters*, the mineralisation of wnich is generally due to the sulphur of sodium. Mr. O. Henry places in this group the waters more or less thermal of Bonnes, Cauterets, Luchon, Bareges, and the cold waters of Labassère, Challes, and Marlioz.

A fourth group comprises the *ferruginous waters* : Forges, Orezza, Spa, and Pyrmont.

The learned chemist, taking into account the sulphydricated gas and the 0.067 of sulphur of sodium contained in Marlioz waters, places it among the sulphurous springs ; but if the name of a spring depended upon the salt, which predominated in it, would not the calcareous carbonate, represented by 0.186, give to Marlioz its mineralogical designation ? And would not the 0.252 of alkaline bi-carbonate, contained in this water, place it among the bi-carbonated alkaline ? On the other hand, owing to its sulphates of lime, of soda, of magnesia, of iron, and to its chlorures of magnesium and sodium, and to its iodurc and bromure of potassium, might not Marlioz be placed beside Saxon and Bondonneau, among the saline waters ?

All the chemical classifications which have been made were arbitrary, and have failed. It would be perhaps better to depend upon a well-

known aphorism thus modified : *Naturam aquarum ostendunt curationes*, and to take for a reactive the human body, "the most important physical apparatus in the world," according to Gœthe.

Mr. Bazin affirms that all mineral waters produce pathogenitic effects. If such be the case, we ought to be able to know the special action of each spring, and consequently, in after days, and in a practical way, be enabled to classify them.

Waters chemically analogous will be then separated therapeutically.

Marlioz and Wilbach, both sulphurous, will be separated; the first enriching the blood, the second impoverishing it.

On the other hand, alkaline waters such as Ems, Royat and Montdore, would be placed beside the sulphurous waters for their special effects in lung diseases.

Up to the present, the first therapeutic classification we have, merely attributed to the alkaline waters the affections of the organs below the diaphragm, and to the sulphurous ones, those above the diaphragm.

If the general classification of waters is difficult, it will be still more so, to subdivise most natural categories, as, for instance, sulphurous ones.

Those waters were classed under the titles of sulphurated sodic, sulphurated calcic, sulphydricated, and degenerate sulphurous ones. According to Dr. Fontan, the following is what separates the waters of the two first classes : the sulphurous

sodic, or natural waters, spring from the primitive strata; sulphurous calcic, or accidental ones, from the second, or tertiary layers. The first are less mineralised, the second more so.

Whilst the first exhales pure azote, the second exhales carbonic acid, sulphurous hydrogen, and very little azote. The sulphurous sodic contains scarcely any calcareous or magnesium salts, whilst the sulphuric calcic contains calcareous or magnesium salts and cholorures.

The sulphurous sodic are generally warm, the sulphurous calcic most frequently cold.

The first contain sulphur sodic, the second contain sulphur or sulphate of lime. Nature assists very badly in those theoretical classifications.

From the above comparative characteristics given, Marlioz should be rather placed among the calcic-sulphurated waters than among the sodic-sulphurated ones, as was done; but it may be seen that, like Aix in Savoy, Vernet (Pyrenees Orientales), Marlioz possesses at the same time the mineralising principles said to belong to the sodic waters, and those which characterise calcareous waters.

Dr. James shows Allevard and Weilbach as two types of sulphydricated springs. Could not Marlioz with its 6.70 cc of sulphurated hydrogen, claim its place near them? For the present, as nothing better can be offered, we must content ourselves with the table given in the *Gazette des Eaux*, in which the appropriate Spring is placed opposite the affection for which it is useful.

For want of a proper classification, we merely give the following statement relative to our spring :

It is alcaline, sulphurous, iodurated and bromurated. In the same way as Aix-la-Chapelle and Aix in Savoy are similar, so Allevard, Marlioz and Saint-Honoré offer the greatest resemblance.

Chemically, they contain the same elements.

Physiologically, they are not exciting at the outset,as Eaux-Bonnes are, for the lungs, and Cauterets, Labassère, Schinznach are for the skin ; nor immediately sedative, as Weilbach, Saint-Sauveur, Penticouse ; but they may prove exciting or calming, according to the way in which they are used.

Therapeutically , they claim the diseases of the respiratory organs, those of the tegumentary and of the glandular system.

They are consequently analagous springs, and it can be said of their Naiads that they have a family likeness, and the words of the poet may be attributed to them :

. . . *Non facies omnibus una*
Nec diversa tamen, qualis decet esse sororum.

CHAPTER IV.

MINERAL INGREDIENTS CONTAINED IN THE WATER— THEIR PHYSIOLOGICAL EFFECTS.

1. *Gaseous Elements.*

The predominating quantity of azote (9c. 77c.), as well as sulphydric acid (6c. 70c.) and carbonic acid (4c. 64c.), vaporised in the inhaling room, must act powerfully, not only on the skin and the mucous membranes of the respiratory organs, but also upon the functions of the nervous system. Azote existing in large quantity in this spring, must, by bein absorbed by the lungs, act powerfully on the nutrition and on the formation of organic principles.

Dr. Demarquay, having introduced sulphurated hydrogen into the sub-cutaneous cellular tissue of a rabbit, observed that this gas, in escaping by the lungs, produced an irritation of the mucous membranes of the bronchi. If, on the contrary, the gas is introduced directly into the lungs by inhalations, we find, with Magendie, that then it may act as a sedative.

Not toxic, when absorbed by the intestines or injected in the veins, the sulphydric gas would easily become so, when absorbed by the respiratory mucous, which carries it into the heart by the

arteries, and brings it into contact with the red blood; whereas, in the other cases, it is brought into contact with the black blood. It is not astonishing if the effect produced by this gas be different, according to the way in which it has been introduced, though it will always be by the lungs that it will chiefly escape; the proof of which is afforded by placing a paper impregnated with a solution of lead under the nostrils of the animal on which the experiment is made; the paper then becomes black, no matter how the gas was introduced into the body.

What precedes shows the importance of being particular in prescribing the waters, either by drinking or by inhaling them, according to the circumstances and as the case may require.

The Æsculapius Spring contains a large quantity of carbonic acid, which is a precious advantage; for, according to Dr. Herpin, of Metz, carbonic acid is the vital spirit of mineral waters, and one of their most useful and efficacious principles.

We know that it is to carbonic acid that is partly due the exciting and exhilarating action of champagne on the brain. On the other hand, in certain cases of nervous erethism, this gas exercises a calming and sedative effect.* Russian physicians, acting on this principle, prescribe champagne as a sedative for young women of nervous and irritable constitutions.

*The action of carbonic acid is analagous in that case to that of various other stimulants, which, administered in proper doses, act under certain circumstances as a narcotic.

On the mucous of the stomach, carbonic acid gas acts as a stimulant, and facilitates the digestion of the mineral salts with which it is combined, so that it may be considered that the value of a mineral spring is in proportion with the quantity of carbonic acid it contains.

2. *Solid Matter*.

The value of the presence of silicic acid in mineral waters has been fully appreciated since it has been proved by Dr. Bonjean that this acid, combined either with soda or with potash, acquires a dialytic action or a dissolving one on the lithates, and it is owing to this quality that it enters into the composition of the dyalitic pills of Dr. Bonjean, and into the anti-gouty ones of Dr. Laville. Under the action of air, sulphur of sodium is decomposed by silicic, which gives a silicate of soda and a slight evaporation of sulphuric acid.

Sulphur of sodium is the principle which mineralises and alkalinises the springs of the Pyrenees. It also serves to designate an entire sub-division of mineral waters—the sodic-sulphurous ones.

It is in the form of sulphur of sodium and hydrogen sulphurated that sulphur most generally exists in sulphurous waters.

The measuring of the doses of sulphur is made by means of the sulphydrometer. It consists in a graduated glass tube filled with tincture of iodine. The latter escapes drop by drop from the lower orifice into the vessel containing the sulphurous

water to be analysed, which besides contains a solution of starch.

A blue colour appears, and indicates from that moment that the sulphur is completely replaced by its equivalent in iodine. The graduated tube, by showing the quantity of iodine used, gives at the same time the quantity of sulphur that has been replaced.

The amount of sulphur in mineral waters sometimes varies, and thus may depend on river or rain water which may flow into them in more or less abundance. It was so, says Dr. Bonjean, on the 19th June, 1850, at Marlioz; the water of the Adelaide spring marked 40 degrees by the sulphydrometer, although that spring was a fifth less sulphurous than the Æscapulius one, on which I made all my experiments.

But it is less the quantity of the sulphur than its stability that constitutes the value of a mineral water.

According to MM. Bazin and Gubler, the physiological action of sulphur is the following: If we take finely pulverised sulphur, there is formed when brought into contact with the saline and pancreative secretions, sulphur of potassium and sodium, which are carried into the circulation, and the gas which escapes from the intestines betray the hydrogen sulphurous odour; there is an irritation of the intestines produced, which causes abundant evacuations, purgative effects more or less active, according to the dose.

In large doses, according to M. Gubler, sulphur produces a real inflammation of the bowels, and piles. Sulphur increases the circulation and congests the viscera. It congests the brain also, and causes vertigo, encephalic pains, and increases perspiration. The sulphur, by stimulating the capillary circulation, raises the temperature of the skin, and may produce eczematic eruptions.

On the lung, the stimulating action of sulphur is shown by a marked congestion susceptible of causing hemoptysis. All those phenomena find, however, a satisfactory explanation, in the elimination of the sulphur by the digestive organs, by the skin, and particularly by the respiratory organs, as was experimentally proved by M. Claude Bernard.

The bicarbonate of lime found in much larger proportions in our waters than sodic bicarbonate, is a regenerating element which has a tonic effect on the organic tissues.

Bicarbonate of magnesia, as is most frequently the case, is combined with bicarbonate of lime.

Those salts are often united to combat an excess of humoral acidity, pyrosis, and chronic affections of the stomach and liver.

The bicarbonate of soda, or Vichy salt, has similar properties ; it thins the blood and makes it more fluid. Its too prolonged action might give rise to serous infiltration.

Sulphate of iron and bicarbonate of manganese are often associated.

In the same way as in nature, magnesia accom-

panies lime, iodine accompanies sulphur, manganese accompanies iron.

Iron is the great restorative of the system, manganese is its auxiliary and substitute.

The preparations of manganese, say Hannon and Pétrequin, must be placed in the same rank as ferruginous preparations ; what iron cannot do, manganese will, and whenever preparations of iron do not cure, it is because manganese is wanting in the blood.

Prescribe that metal, and you will find the chlorotic state disappear.

Sulphates of soda, lime and magnesia seem in this state to attenuate the heating effects of the ferruginous elements.

Chlorures in mineral waters play the part, with bromine and iodine, that the fatty elements does in cod liver oil ; one may thus see the importance of chlorure of magnesium (0,014), and chlorure of sodium, (0,018), in the Marlioz Spring. They favour hematosis and, on that account, the reconstituting action of the blood.

To give more activity to the bromine and to the iodine, such is the action attributed by M. Gubler to the fatty element in cod liver oil, and such also is the action, as I have already said, attributed by Dr. Bazin to the clhorure contained in bromo-iodurated waters. Iodine and bromine are the two principal curative agents in cod liver oil, and in sulphurous and chlorurated waters. "We are inclined to compare the action by the fatty substance and chlorure of sodium, in this

case, with that of the iodine of potassium in the cure of syphilis."—BAZIN.

Iodine and bromine have a great similarity of action; both cause a certain intoxication; both manifest their action on the "velum palati." But whilst iodine, besides the exciting qualities it possesses, which give a sort of inflammatory action to it, shows itself at first by a cold in the head; bromine, on the contrary, produces on the same parts a loss, or at least a diminution of the sensibility. Both produce auditive derangement. One causes inflammation of the conjunctiva, and even edema of the eyelid; the other weakens the sight.

Whilst iodine decreases in size the breasts, the testicle, the thiroid gland (for which reason it is used to combat wen), bromine taken in large doses engorges the lymphatic glands of the neck. Whilst iodine brings on palpitations of the heart, bromine, on the contrary, has a sedative effect on it. Both are quickly absorbed, and soon show their presence in the liquids secreted. Both increase urinary secretion and act on the sebaceum gland, to produce acnea; but the acneic eruption due to iodine is inflammatory; the one caused by bromine is not so.

To resume, iodine is stimulating, and bromine sedative. Though Chaptal said that when we analyse mineral waters we dissect their corpse, it is not the less necessary to know all the ingredients contained in a spring, and their special action. Thus we shall understand more easily the effect of Marlioz waters, in which we find manifested the

double action of iodine and bromine, which is well marked, though in our water, as it is in cod liver oil, those elements are in infiinitesimal proportions.

Can minerals in such small quantities act? Ordinary water contains mineral substances only in imperceptible doses, and yet, in those doses, they are indispensible to human life. A pigeon, for instance, however well fed it may be, would die of mineral starvation, if it only got distilled water for drink. This results from experiments made by Chossat, and renewed lately by our confrère and friend, Dr. Dussard. Wens, affecting the inhabitants of places where they are obliged to drink waters deprived of certain ingredients, which exist in very small doses in good water; and, caried teeth, that we find among people of certain localities, are proofs of the action of mineral substances dissolved in water in almost imperceptible doses. We will add that medicinal substances dissolved by nature are more easily assimilated and more active than those prepared by chemists. "All the preparations of sulphur were prescribed by us, M. Bazin said, and although in the system this metalloid is transformed into sulpherous alkaline, nevertheless the effect of any of those preparations cannot be compared for its activity to those of the natural sulphurous springs."

It may be also believed that substances, by being united with others, multiply the curative effects of the latter, as the electro-multiplicator bobine increases the intensity of the electric current.

Mr. Bazin, we said, considered that chrolure of

soda multiplies the action of bromine and iodine in mineral waters.

Recently the Drs. Sir James Paget and Sweeney observed that carbonate of ammonia, united with iodine of potassium, doubled the action of the latter.

In my practice atTangiers (Morocco),I observed that arsenic multiplied the febrifuge effect of the kina preparations to which it was united. It is, perhaps, electricity which multiplies the curative activity of minerals dissolved in the water ; such is the opinion of Scoutetten. This learned physician proved, in fact, that the less-charged mineral waters make Nobili's electro-meter's hand stir, whereas river water has no effect on it.

This would explain the effects of waters scarcely mineralised, as the Evian waters, for instance, the efficacy of which cannot be called in question, though according to Mr. C. James they are less mineralised than the waters of the Seine.

Lately, Dr. Marcet asked himself whether the organic elements, contained in sulphurous waters, did not constitute their most active principle. Whatever may be the case, the efficacity of mineral waters can no longer be called in question.

CHAPTER V.

PHYSIOLOGICAL EFFECTS OF THE WATERS OF MARLIOZ SPRING.

In the inhaling rooms, the patient feels the effects of the threefold action of the gaseous principles of the waters of Marlioz.

According to Trousseau, sulphurated hydrogen, inhaled several times a day at short intervals, and in small quantities, at a temperature not exceeding 24 degrees centigrade (75 F.), has a calming effect on cough, and a marked sedative one on the heart.

Dr. Guilland gives the case of a patient who, after half an hour in the inhaling room, had his pulse invariably lowered by four or five pulsations. We shall see the same fact ascertained by Dr. Videl, who further declares the calming effects on the pulse last even after the period of inhalation.

This decrease in the action of the heart shows that a smaller quantity of blood is sent into the lungs in a given time, and there is, in consequence, a decrease also in the respiratory action and in the temperature, which is further assisted by the mixture of the hydrogen of the hydro-sulphuric gas with the oxygen in the lungs.

Those patients who, in the inhaling rooms of Marlioz, breathe the sulphurous hydrogen, the sedative action of which is increased by azote and carbonic acid, find their lungs at once placed in the position most favourable for all diseased organs—at rest.

And there is a further advantage, for if the invalid has catarrh, he finds in the inhaling room carbonic acid, so much recommended by Hufeland for facilitating expectoration. And it is, moreover, greatly assisted by the alkaline salts in the room, and by their fluidifying action on the mucous and albuminoid matter obstructing the bronchial tubes. It was formerly in the ammoniacal atmosphere of stables that such effects were sought for. At present our sulphurous inhalations are preferred, and the more so, as stables have ammoniacal inhalations only when in a state of filth.

To produce a salutary effect by inhalation, it is necessary that the patient should from time to time take deep inspirations, in order to carry the medical air to the extremity of the bronchial tubes.

In the baths, as well as in the inhaling rooms, the iodurated sulphurous element causes a sensation in the throat, and is accompanied in some cases with a feeling of heat. When the patients only drink the waters, those sensations are not so marked.

It is by no means uncommon that the first inhalations cause cephalgy, and to avoid that slight inconvenience, patients not yet acclimatised are recommended to leave the room every quarter of

an hour to breathe in the open air for a few minutes.

A momentary feeling of intoxication is felt by some, and a soporific effect by others, the latter not depending on the temperature of the season, for I observed it in September as well as in August.

Taken in baths, the effect of the Marlioz waters is to produce a calming result on the heart and on the lungs, more marked than that obtained by ordinary tepid baths. For, to the calming effect of the tepid bath is joined the sedative action caused by the evaporation of the water. Scarcely has the patient entered into the bath, when he feels a peculiar taste in his mouth. Far from giving rise to that slight eruption called *La Poussée*, as the waters of Allevard are said to do, those of Marlioz calm the irritation of the skin sometimes caused by the first baths taken at Aix. A question may be asked here : Is it the presence of glairine which accounts for the calming effects of the Marlioz waters on the skin?

Taken internally, those of the Æsculapius Spring act as the sulphurous waters do in general on the nervous system. Do they produce an exciting effect on the intellectual faculties ? as was lately affirmed by a physician, giving the names of a poet and of a preacher who never were better inspired than when influenced by sulphurous waters. For my part, I have never known any case which would warrant a comparison of sulphurous springs to the Parnassus ones, and I believe such cases easily explained by the return to health, which raises the

spirits. It may be said that Hygia is truly the inspiring muse in that case.

Bordeu says that sulphurous waters have an effect similar to that produced by coffee or light wine, when one is not accustomed to them.

During the first days the sleep is restless, and the Marlioz waters have moreover a tendency to cause congestive effects on the brain, which I not only experienced on myself, but observed also in others, which can only be attributed to iron and manganese, for, if it were due to the presence of sulphur, other sulphurous springs would cause the same effects.

In 1869 I made a trial of those waters on myself, by taking one glass in the morning and two in the afternoon, and what was most marked in their action, was a congestive effect on the brain.

On the mucous of the mouth and throat nothing like the sulphurous angina, said to be produced by the *Eaux Bonnes*, appeared.

I scarcely had that peculiar sensation in the throat generally felt by inhalation, and in the bath. I noticed only at first a slight increase of appetite. Urinary secretion increased.

After ten or twelve days the congestive symptoms in the brain were more marked—heaviness in the head, buzzing in the ear, giddiness, flashes of light before the eyes—and sand blinds, a slight trouble in the vision, to which I am subject, increased. I felt at first a necessity for movement, followed after a few days by a feeling of lassitude.

After a fortnight, I left an interval of ten days

without taking the water; the congestive phenomena disappeared, a fact that proves that the temperature of the month of August had no effect on it.

As soon as I began to take two or three glasses of the water a day again, there was a return of the same symptoms.

Dr. Bonjean made an experiment of these waters on himself for the space of an entire month, drinking daily as much as a *litre* in glasses, every second hour, leaving after a fortnight's experiment an interval of three or four days.

His observations are the following:—"The first day the urine was less acid than in its usual state, and was partly discoloured; the following day it was only of a yellowish colour, and on the third it was made quite colourless by a slight alkaline reaction, without leaving any mucous deposit."

The learned chemist observed that not only the urine, but also the other secretions, became alkaline. It must also be observed that an increase in the quantity of the urine persists as long as the experiment lasts.

Dr. Lambron considers that the sulphites and hypo-sulphites of soda, have for effect to keep the globules of the blood in their healthy state, and it is on this theory that Dr. Churchill has based his treatment of pulmonary diseases.

Not only does the Æsculapius Spring, owing to its sulphate of soda and lime, preserve the properties of the globules of the blood, but, from the presence of carbonate of iron, and manganese, it increases

the globulary quantity, and receives moreover an indirect action by the vitality which iodine gives to the lymphatic glands, which are a sort of physiological laboratory, from which the globules of the blood emanate.

The Marlioz waters contain a large quantity of calcareous bi-carbonate, since this salt stands with regard to all others as 186 to 412. That being the case, it is important to remember the effects of calcareous salts on the system ; effects demonstrated by the labours of Boussingault, Dupasquier and Chossat. The carbonate and phosphate of lime contribute to the formation of the mineral substance of the bones, but Boussingault shows that the animal, when growing, has in its tissues a quantity of lime far greater than what is necessary for the development of the bones, and that the quantity of calcareous salts furnished by the food, being inferior to what is found in the animal, the latter must find in the water he drinks the quantity deficient. Renewing the experiments made by Boussingault, Dupasquier endeavoured to discover what calcareous salt gave the skeleton the largest quantity of the clayey element, and found it to be bi-carbonate of lime.

Why is there a larger quantity of lime than (according to Boussingault) is requisite for the development of the animal ?

May it not be owing to the transformation of alkaline phosphate into calcareous phosphate, a salt to which Dr. Dussard lately drew attention? The physiological function of this salt must be most important, for Leh-

mann assures us that it is constantly found in those darts in which new cells are in formation, and that the quantity of it contained in the animal's body, is in proportion with its activity ; that it is in the bird we find the largest quantity of calcareous phosphate, and in the inert mollusque the least.

This calcareous carbonate, that fowls and other birds living on grain, seek instinctively, to give it as basis to the phosphates of soda and potash contained in the seed they use for food ; this calcareous carbonate, I repeat, is the predominating element of our waters. The success of the Æsculapius Spring in lymphatism and in its derivatives (scrofula and rachitism) are further explained here. For besides the specific action of the iodine and bromine, we find in it a certain quantity lime, fit for transforming alkaline phosphate into calcareous phosphate, which excites and increases the assimilation and the *dis*-assimilation, and is appropriated at the same time for consolidating the bones of rachetic patients.

The effect of the Marlioz waters will vary with the patients according to the manner in which they are prescribed. Taken in short inhalations, for instance, they will not produce the same effects as they would if taken in large doses.

To resume, the Marlioz waters, exciting, from the sulphur, iodine and iron they contain, are sedative on account of the presence of bromide of potassium, of sulphydric, carbonic and nitrogen gas. On the skin, its action is calming, owing, perhaps, to the presence of glairine.

It is an alterative from its iodine element; it is directly tonic and invigorating on account of its salt of lime, of iron and manganese, and indirectly so by the regenerating action of iodine on the lymphatic gland.

The reconstitutive action of these waters is their predominating one; and therefore they are most beneficial in all cases of depression of vitality.

CHAPTER VI.

CUTANEOUS AFFECTIONS.

"Taken into the stomach, or in baths, these waters (Marlioz) are most useful in all kinds of cutaneous affections, whatever may be their cause." —(De Gimbernat).

"Sulphurous mineral waters constitute the special medical treatment for herpetic diathesis and skin diseases.

"It is by no means necessary to have recourse to any other thermal treatment, except when some particular diathesis requires other waters." Durand Fardel, "Traité Thérapeutique des Eaux Minérales." (page 392).

With regard to the first affirmation, we must take into account the enthusiasm and gratitude of the learned Spaniard.

The second affirmation proves that, according to Mr. Durand, Fardel sulphurous waters constitute a real specific for herpetic affections.

If Mr. Durand Fardel exalts mineral waters too much, and gives them too great importance for cutaneous diseases, it is to be feared that Mr. Bazin

falls into a contrary exaggeration, when he says: "Sulphur, far from acting as an alterative, and from being the best remedy for herpetic diathesis, is rarely beneficial in it, and in affections derived from it."

"*Iliacos intra muros peccatur et extra.*"

On both sides there is exaggeration.

The fact on which Mr. Bazin supports his statement, that sulphurous waters are powerless in herpetic affections, seems to us to be entirely insufficient. He bases his opinion on the fact that herpetic patients, whom he sent to the sulphurous springs, came back to him with prescriptions of the physicians attached to those springs, recommending arsenic to combat the diathesis; but that does not prove that the sulphurous waters had not acted usefully. We prescribe arsenic as an auxiliary to complete the cure of herpetic affections, in the same way as we prescribe sea bathing to complete the cure of lymphatic ones. Sea bathing and arsenic being recommended, in no way prove that the sulphurous waters were not efficacious.

Practitioners at the sulphurous springs were wrong in declaring that all dermal affections could be cured by those springs. It was to extend too far their action, and there were cases in which they were unsuccessful. Patissier was one of the first to show that such was the case; and to-day a reaction has set in in a contrary direction. Dr. Bazin, who leads that movement, will have rendered a real service to sulphurous waters, by removing from them those affections on which they have little effect.

The learned professor of the Hospital of St. Louis inaugurated a method of treatment for skin diseases which it is important to known.

According to this new doctrine, the treatment is to be based, not upon the general designation of the skin disease, but, before all, upon the diathesis with which it is connected. Mr. Bazin, attributing each dermal affection to a diathesis, opposes to the former the remedy required for the latter. But here is the difficulty. He holds that each diathesis gives a peculiar character to the dermal affection, and that it may be the only means of recognising a diathesis remaining otherwise in a latent state. This peculiar stamp would be therefore the only help for the diagnosis, based, as it may be judged, upon slight differences which, no doubt, are seen by the specialist, capable of distinguishing a syphilitic eczeme from a scrofulous or an arthritic one; but will the less experienced practitioner be enabled to do so?

Dr. Bazin, finding for all skin diseases a diathesic cause, except for parasitical cutaneous affections, dermatosis will be either arthritic, herpetic, syphilitic or scrofulous; and, according to their nature, termed arthritides, herpetides, syphilides, scrofulides.* Each of those divisions contain nearly all the series of the cutaneous diseases, either of a dry or secreting form. Each has its period marking the progress of the disease. The arthritides and the herpetides are primary, secondary, and in the third stage malignant. For syphilides and scrofulides the

* Names given to cutaneous or mucous affections, according to their natures

accidents are primary, secondary, tertiary or visceral, according as the disease has more or less extended from the surface to the interior.

Now it imports to say that for Dr. Bazin mineral waters, as well as other medecines, may have on the disease :

1. A direct or specific action in preventing morbid symptoms by physiological effects produced.

2. An indirect or pathogenetic action. " Medecines produce on the man in good health at the surface of some one of his organs lesions and alterations which constitute *pathogenetism.*»* Advantage is taken of this, in order to cure in the invalid affections analagous to those produced on healthy men. It is the application of the principle of the substitutive medication ; it is in fact the homæopathic treatment, such as Hypocratus conceived it, but not such as it came, with its special doses, out of the hands of Hanneman.

This said, we shall now resume the eminent professor's opinion relative to the use of sulphurous waters.

The arthritides, " most tenacious, yield only to the alkaline treatment ;" sulphurous springs do not suit them, unless the patient is lymphatic. For herpetides the specific waters are arsenical ones ; as to sulphurous springs, " they may be useful in these cases, as in other constitutional diseases, by their substitutive action, and principally in secreting

* This idea was expressed several years ago, in a thesis, by a friend of mine—Dr. Ellis, of the United States.

affections, and in those which are more of an atonic than of an inflammatory nature; they are therefore rarely indicated in herpetis."

In syphilides, sulphurous waters act dynamically to invigorate the system, and chemically to dissolve albuminate of mercury, but bromo-iodurated waters are in this case preferable to sulphurous ones. The way in which they are to be prescribed varies according to the form of the syphilide. The papulo-vesiculous form requires the sulphurous spring; the lychenoide form requires the alkaline waters, and the arsenical ones are requisite for the squamous form.

For scrofulides the type of hydro-mineral medication is water containing at the same time bromine, iodine and chloride of sodium; they constitute a specific. Owing to their stimulating effect on the skin, sulphurous waters are highly useful as a pathogenetic medication.

For mild cases of scrofulides, light sulphurous waters should be given in preference. In the third period of the disease, strong sulphurous ones are requisite.

For scrofulides with pimples and secretion, the sulphurous bromo-iodcrated springs are recommended.

For lichen and eczema, alkaline sulphurous waters, such as those of Marlioz, Bagnols, are the best.

They are also effective in scrofulides of the mucous membrane of the larynx, pharynx, and vagina, except in parasitical affections, more common tha

is supposed, and for which sulphur is a sovereign remedy. * In other cutaneous affections it acts only by its dynamic and patho-genitic action. Such at least is the opinion of the learned physician of the Hospital St. Louis, a safe guide on such subjects, although some of his assertions may be questioned. For instance, he declared that skin disease does not exist without diathesis. Is his opinion well founded? He denies that cutaneous affections can be caught by contagion, unless they be of a parasitical nature, and yet, I know a confrère who positively contracted a syphilitic eczema, from having sat, when in a perspiration, on the seat of a water-closet.

From what precedes, it may be concluded that dermatosis connected with either lymphatism, scrofula, or syphilis, would have better chances of being cured at Marlioz, than an inflammatory one, or one connected with herpetis or arthritis. At first, it might be supposed that the secreting dartrous affections would be more easily cured at Marlioz than the dry ones. But statistics have not yet decided the question. A fact seems proved, and that is, that acnea, which finds in the waters of the Æsculapius Spring, a double patho-genetic medicine, bromine and iodine, is cured at Marlioz.

* The labours of Dr. Declat on phenic acid, of Dr. Danet on the formation of pus and on the preservation of meat prove that parasiticism plays a more important part in pathology than was supposed, and that Raspail was more clear-sighted than it was supposed at first.

Dr. Despine confided to me that he had among his English patients, several cases of acnea cured by the following treatment :

He began by submitting his patient to a stimulating treatment at Aix, in order to make the disease more acute ; he then sent him to take sedative baths at Marlioz. The Aix waters he used as nitrate of silver, those of Marlioz as a poultice. I continued myself the same practice with beneficial effects.

Chevalier Gimbernat, of whom I spoke in the beginning of this work, no doubt followed, without knowing it, this method. He tried withont success the Aix waters; they only irritated his acnea, and he was on the point of leaving the place uncured, when fortunately chance took him to the small sulphurous stream of Marlioz, which had such a favourable effect.

CHAPTER VII.

LYMPHATISM.

In 1869, I accompanied to Marlioz a young girl of fourteen, having all the characteristic symptoms of a strumous affection. The cervical glands were more or less swollen, and one of them having been ulcerated for four months. The edges of the sore were of a purple hue and flabby, the skin pale, and with no tendency to cicatrise. After some days treatment at Marlioz, the sore assumed a different aspect; vitality became evident from the appearence of healthy looking granulations which always precede and help cicatrisation; it went on rapidly, and when, after 35 days' treatment, the patient left the place, the cervical glands were disgorged and the sore covered over with a healing tissue. What makes the case still more interesting, is the fact that the young girl resides in a warm climate at the sea-side, and that she had for an entire year taken cod liver oil and Blancard's pills of iodine of iron without effect.

The rapid improvement in the health of this young girl, who was my first patient at the waters, induced me to study carefully the effects of the Marlioz Spring as far as regards their action in the cure of scrofulous and lymphatic affections, and I have come

to the conclusion that the Æsculapius Spring is above all an anti-strumous one.

Lymphatism is one of the plagues of our generation, and one of the great triumphs of modern medical practice is to regenerate entirely the constitution of these weak and delicate beings, whose lives, for want of a proper hygienic treatment and preventative measures, would only have been a prolonged state of suffering, if they had even lived. A lymphatic constitution is the prelude to scrofula. Bad air and insufficient food tend to develope strumous affections in the poorer classes; but scrofula is not always a disease of the indigent; it is often to be met with in the higher classes of society, where it is sometimes transmitted to children by syphilitic parents. It is in this case a last remnant of syphilis transmitted like an original stain to the descendants.

A want of proportion in the constituant parts of the economy, with a preponderance of the lymphatic system and of the mucous secretions, are what characterise this affection, which is at the outset often hidden under deceitful appearances, a pale and rosy complexion, which is called lymphatic beauty. Beware, for the serpent is concealed under the flowers; beware also if the child has an angular shaped head, highly developed over the orbits, which for the parents and friends seems to promise future genius; and above all, watch carefully if, with that, he has a swollen abdomen, the spleen and liver highly developed, irregular digestion, mucous evacuations,

mixed up with ill digested food; this little being, with the complexion of the lily and the rose, this future genius, is simply a lymphatic child, and if the evil is not cut at the root, he is destined to become a scrofulous one.

This disease, which extends from the surface to the centre of the system, sparing no organ, affects principally, however, the glands, the skin and the bones; it betrays itself in the physical appearance of the patient. Nutrition being imperfect, the body becomes lean, the skin flabby and pale, secreting acid perspiration and predisposing the system for tinea and for different other herpetic affections. The mucous membranes become delicate and favourable to catarrh; those of the nose and eyes become irritated and secrete a corrosive liquid; the cornea is often affected, the eye supports the effect of light with difficulty, and on the other hand, the nose and the upper lip increase in size, which give a characteristic appearance to the countenance; the glands become engorged, particularly those of the neck; if the inflammation extends to those of the mesentery, the disease is then vulgarly called in French *carreau* (*tabes mesenterica*); the word *ecrouelle* is used to characterise those of the cervical glands.

The evil extending further, reaches the bones, when the patient is said to be rachetic. The bones of the rachetic subject lose by degrees their phosphate of lime, become soft and pliable, and while the body of the long bones decrease in size, their articulating extremities become large; the loss of phos-

phate of lime in one or several dorsal vertebræ causes a deviation of the spine. Not only does the scrofulous subject lose the phosphate of lime which enters into the composition of the bones, but he also loses the nitrogenous elements. It will not be uric acid charged with nitrogenous principles that his urine will contain, but oxalic acid, composed principally of carbon and oxygen.

When emerging from lymphatism, which is its preparatory stage, scrofula reveals itself definitively, Mr. Bazin classes it into four different periods.

The first is characterized by superficial cutaneous affections and by mucous catarrhal ones. In this stage he observes that there are often excroissances of different kinds: warts for the skin, polypus for the mucous membranes.

Almost all the varieties of skin disease, particularly the secreting ones, are to be found in scrofulides of the first stage: porrigo, larvalis, eczema, achor, impetigo, erythema, prurigo, lichen, etc., acnea, with all its hypertroppic and secreting forms (sebacea, punctata, indurata, etc.). The primary scrofulides of the mucous membranes are of an eruptive nature, as those of the skin, or they are inflammatory and catarrhal. The eruptions of mucous membranes are to be found on the conjunctiva, the vulvaria mucous membrane, etc., with the same characteristics they have when developed on the skin. There is an impetiginous conjunctiva, a eczematous vulvitis, etc., and all the known catarrhal inflammations, from coriza, with impetigo

of the nostrils and thick upper lip, to the granular and muco purulend vulvitis which is sometimes developed in little girls.

The second period shows only as yet lesions of the teguments more deep seated than in the first, but while, with the exception of the acnea, the scrofulides in the first stage leave no cicatrice, those of the second leave indelible ones. We find in this stage of the malady, lupus, which often reveals itself in the form of ecthyma pustules, the impetigo rodens, noticed by Bateman, the molluscum, and atrophic acnea. The mucous scrofulous accidents of the second stage are leucorrhea, with granular and deep erosions of the neck of the uterus, obstruction of the prostate and of the canal of the urethra.

In the third period we find the articulary scabby affection (*ccrouelle articulaire*), a word used by the ancients to designate scrofulous arthropathy, vulgarly termed *white swelling*. Sometimes it is rheumatism, sometimes a fall which makes this disease conspicuous in the scrofulous subject.

In the first case, it is a rheumatic white swelling, in the second it is a traumatic one. Caries of the bones, with or without necrosis and exfoliation, with or without tubercles, cold abscesses on the surface of the bones, abscesses by congestion, retractions, atrophies, and muscular transformations, the fatty degeneration of the muscular and osseous tissues, are accidents of the third period.

Scrofula exercising its ravages on the parenchima

and the viscera, form, for Mr. Bazin, the fourth stage of this disease, to which may be added, as an appendix, even glanders and farcy.

The specifics for scrofula are iodine and bromine. To facilitate the absorption of iodine and to administer without danger this medicine, which after a time might affect the gastric mucous, an effort was made to mix it up, sometimes with table oil, sometimes in liver pies and sometimes in cow's milk, by making the animal take for food vegetables containing iodine in large quantities.

The succes of Grimauld's syrup is due precisely to the effective way in which iodine is incorporated in an organic substance, horse radish.

However useful and ingenious those compositions may be, cod liver oil and iodurated waters will always prove more beneficial. The hydro-mineral treatment applied to lymphatic scrofulous diseases is composed, according to Mr. Bazin: firstly, of waters acting as a specific; secondly, of waters with a patho-genetic action. He reserves the chlorurated, sodic, and bromo-iodurated for the cases in which the malady has positive characteristics of the diathesis.

For slight scrofulous affections he prefers the simple sulphurous waters, or those which are sulphurous and chlorurated.

We own, we do not understand why recourse should not be had, to bromo-iodurated waters in slight cases of cutaneous scrofula, or scrofulide, in order to act as a preventive against the accidents of the second period. Why should plain sul-

phurous waters be used, which have only a patho-genetic action, instead of having recourse at once to the waters, which, like those of Allevard, Challes, and Marlioz, contain, besides sulphur, iodine and bromine ?

A spring offering at the same time, the specific and patho-genetic action must be, it appears to us, the type of hyro-mineral and scrofulous medication, and such a one is undoubtedly Marlioz. To the different organo-pathic symtoms of scrofula, which are a decrease of the vitality, impoverishment of the blood, acid perspiration, swelling and obstruction of the glands, a decrease of the azotic principles, and of calcareous phosphate, the Æsculapius Spring opposes its sulphurous, ferruginous alkaline, iodo bromurated, its azote and its calcareous carbonate.

All the chemical elements of this water seem to be combined to combat lyphathico scrofulous affection, and it is perhaps for such diseases that this spring might be considered as a specific.

Marlioz offers a remedy for lymphatic and scrofulous affections, above all, before they have gone beyond the second period.

If the disease is more deep seated, we think it would be better to have recourse to the Challes Spring, which is in the neighbourhood, and which, in comparison with the other sulphurous waters, is like a concentrated one, for when tested by the hyro-surphydrometer, it gives 154 degrees, whereas Marlioz, which comes immediately after, "*longo sed proximus intervallo,*" only gives 30 degrees.

Should the waters of Challes and Marlioz fail to bring about a useful stimulating action, the patient can have recourse to the thermal douches of Aix, so effective by their topic action, for healing fistula, so effective, too, in facilitating the exfoliation of necrosed bones, and so useful by the champooing effect (*petrissage*) on the abdominal organs.

From the advantage of the proximity of these three springs, it would appear that this little portion of Savoy is destined to be most useful for the cure of lymphatic and scrofulous diseases.

I heard Dr. Pidoux state, at the Academy of Medicine, that mineral waters are destined to regenerate the human species.

It at first appeared to me exaggerated, and yet, when I remembered that scrofula is the main cause of the degeneration of our race, that, by a hydro-mineral preventive medication, the evil can be stopped at its source, I found that the statement was much nearer the truth than I had supposed.

The anti-scrofulous waters are, as we have seen, the chloro iodo bromurated, and sulphur iodo bromurated, the latter more effiicacious, as was proved in the case given in the beginning of the chapter, but the former more available, as the sea is of easier access.

For that reason its shores were chosen for founding those establishments which I would call medical and preventive ones; for receiving young indigent and scrofulous patients, who, if they were not treated in time, would have spent their lives in the

hospitals, escape from the military service, and become much more expensive to the state.

To Dr. Barellai belongs the honour of having first thought of founding maritime hospitals for scrofulous subjects. The idea was partly realised by the Italian Government, and we find to-day Porto Santo Stefano, Roscione, Fano, Voltri, and Sestri Levante, having each an anti-scrofulous maritime hospital. Venice also possesses one, open to young scrofulous people from Lombardy, and placed under the direction of Dr. Levy.

In 1869, the Medical International Congress of Florence, struck by the advantages obtained in those maritime hospitals, proved by statistics, voted thanks to the modest promoter of that philanthropic idea.

France, which is said to be the land of progress, possesses up to the present, only one hospital of this kind, Berck, (Pas-de-Calais), and yet scrofula is an evil which has not spared us, as may be seen by the fact that in the department of the Nièvre (where the St. Honoré spring is situated !), out of 1000 young recruits, 29 were exempt from being affected with scrofula.

CHAPTER VIII.

SYPHILIS.

It is owing to the influence of iodurated sulphurous waters on the lymphatic glands, that they are so successful on syphilis, a disease in which the infection seems to have its seat principally in the glands of the neck and groin.

German physicians, in the treatment of syphilis, give the preference to waters containing chloride of soda, to sulphurous ones. English, French, Italian and Spanish practitioners prefer the latter.

Whether it is the stimulating action they have on the secreting glands, and the impulsion they give to the lymphatic circulation, to the virtue attributed to sulphites, in preserving the globules of the blood in their form and quality, or to the specific action of iodine, found constantly in waters containing sulphur in abundance, or, to all those causes united, that the fact must be attributed, it is clearly evident that sulphurous waters are most effective in syphilis.

In 1872, the Medical Congress of Lyons proposed the following question to hydro-mineral practitioners, which seemed to be addressed particularly to those of Aix and Marlioz : — " What action have sulphurous waters on syphilis? " Answering in

the name of his confrères of Aix and Marlioz, Dr. Guilland recapitulates as follows the action of those waters in the treatment of syphilis : They act

1. As a test to prove the existence of the disease.
2. As a preventive against mercurial salivation.
3. As a cure of mercurial cachexy.
4. As an auxiliary of the specific treatment, by acting on the diathesical complication alleviated by the mineral waters.
5. In fine, by their direct action on certain varieties of the disease, which resist the specific treatment.

If it cannot be affirmed that sulphurous waters are the infallible test of syphilis, it may be said that they are often so, and assist in forming the diagnosis.

When a patient, after a few days' treatment, complains of loss of sleep, pains in the bones at night, and copper-coloured eruptions of the skin, without any feeling of itching, or further irritation of those previously existing, it is the disease that unmasks itself.

"*Habemus confitentem reum.*"

Baron Marc Despine and his father observed that the syphilitic patient, taking mercury, if treated at the same time by sulphurous thermal waters, would escape from being affected by mercurial salivation.

I had myself the opportunity of confirming the truth of this statement, which may be explained by the large derivation towards the skin at the expense of the mucous secretions.

Dr. Lambron, at Luchon, treated his patients in

the same way as Dr. Despine, and as is practiced at Aix. He administers mercury to syphilitic patients under sulphurous thermal treatment.

Professor Bazin differs from his confrères, and condemns that practice, under the pretext that sulphurous waters neutralise the effects of mercury. We think, on the contrary, that those waters have for effect to make it pass more rapidly through the tissues of the economy, to utilise it completely, and to prevent it from being accumulated in the body. This results from the theory advanced by Dr. Astrié, confirmed, after serious researches, by Dr. Blanc, in a remarkable thesis. According to that theory, sulphites and hypo-sulphites, fluidifying albumeno-mercurial combinations, which would have kept the mtalloid in the system, facilitate its elimination under the form of soluble composites, which is the more easily accomplished, as the different secretions, urine, perspiration, etc., act with more energy. The iodure of potassium dissolves also the mercurial albuminates, and it is supposed that it is to the mercury, so isolated, that the cure is due. On the other hand, if there be mercurial cachexy, if the patient has a store of mercury iu his tissues in a state of insoluble salt, the sulphites and hypo-sulphites administered, having for effect to fluidify the mercurial salt, the presence of mercury in the system is shown by salivation.—Drs. Blanc, Berthier and Despine give observations to prove this fact.

I have cases myself to add to them.

That sulphurous waters help the specific, is not to be contested.

It is natural that the waters of Marlioz, Challes, and those of a similar nature, by the increased vitality they give to the whole system, will assist the action of the specifics.

They give, moreover, further help in eliminating complications.

But what is greatly questioned, is the anti-syphilitic action of sulphurous waters. Are they or are they not specific? German practitioners, Dittrich among them, say that sulphurous or chlorurated waters are in no case absolutely anti-syphilitic remedies.

Spanish physicians, on the contrary, affirm that sulphurous waters, even cold ones, can cure syphilis, without any accompanying or posterior treatment. Dr. Salgado declares that his experience of the sulphurous springs enables him to be most positive on the subject.

If the anti-syphilitic specific action of the sulphurous waters is proved beyond the Pyrenees, it is only a debatable question on this side, a question which it is difficult to decide, because, whilst in Spain it appears that the syphilitic patient comes to the waters without any preparatory treatment, on this side of the Pyrenees, he only has recourse to the hydro-mineral treatment as a last resource, and this is an answer to Dr. Rotureau, who is disposed to side with the opinion of the Spanish physicians, and who expresses surprise that sulphurous waters have

not yet been administered to combat the primary symptoms of syphilis.

In a work by Dr. Ullesperger, of Munich, translated by Dr. Engel, a professor at Nancy, I find a passage which resumes on this question the opinion of three French physicians, who may be considered as high authorities. It is the more opportune to give this passage, as Marlioz is mentioned in it : —

" In general, the iodurated and bromurated waters have a certain resemblance with sulphurated ones, with regard to the action which they exercise on syphilis. Ricord, and subsequently Petrequin and Soquet say that iodine, and particularly the iodure of potassium, are almost specifics when used to combat the venereal accidents of the third period (tubercles of the cellular tissues, piriostos, exostos, caries, pharagian ulcers, pains in the bones). Iodurated mineral waters, particularly those iodurated and sulphurated, produce analagous effects." The two latter physicians say that iodurated and sulphurous waters reveal disguised syphilis, and assist in its cure, either employed alone (which is rarely done), or when combined with mercurial preparations, which the patient supports easily, when given at the same time with these waters.

Petrequin and Soquet consider iodurated sulphurous waters as most efficacious in the treatment of syphilis, even *without the assistance of a mercurial medication.* They end their observations with the following statement : —

" Iodurated saline waters, and particularly those

" iodurated and sulphurated, as Marlioz, Challes, " Bondoneau, Krankenheil, etc., appear to us, in " general, the most beneficial to combat tertiary sy- " philitic accidents."

To corroborate this statement, I shall add that at the Medical Congress at Lyons, in 1872, Dr. Quioc gave a remarkable case of tertiary syphilis which he cured by the Marlioz waters alone.

We shall conclude by saying that, the fact being proved that sulphuro-iodurated waters reveal the existence of syphilis, it becomes a duty for all those who may have sinned in their youth to submit themselves before marriage to the test of those waters. This precaution might be termed the treatment of future fathers of families.

CHAPTER IX.

DISEASES OF THE RESPIRATORY ORGANS.

1. *Affections of the respiratory mucous membranes.*

The treatment of pulmonary affections by inhalation, in an atmosphere impregnated with medicinal substances, is becoming much more in use. It shows progress.

By inhalation, the medical element intended for the lungs reaches them directly, and is brought immediately in contact with the part affected. The unfortunate stomach is thus spared the trouble of becoming the vehicle of all kinds of drugs, which, if they are intended to cure another organ, can only in the end fatigue it, bring on loss of appetite, and, consequently, an enfeebled state of the system and exhaustion.

Professor Lallemand was one of the first to see what could be done with sulphurous inhalation. "If, he says, sulphurous waters are so useful in chronic pulmonary affections when applied to the skin, or introduced into the digestive organs, how efficacious must they be when brought into direct contact with the diseased tissues, when, in fact, they penetrate into the smallest ramification of the air-tubes."

Patissier also says, in a report addressed to the Academy of Medicine : " no comparison is possible between the effects of a medicine reduced into vapour and brought into contact with the air tubes, and the same medicine in a solid or liquid state taken into the stomach." He considers inhalation as the most efficacious means.

From the appearance of the large inhaling rooms at Marlioz, it is evident that it is patients with pulmonary affections that principally resort this station.

This is better understood when we consult the Almanach of Hydrologic Therapeutic, in which we find only this indication : "Marlioz (near Aix, in Savoy), cold sulphurous waters, special treatment of pulmonary catarrh." It is, consequently, towards the effects of this spring on the affections of the respiratory organs that attention was chiefly drawn, and yet, in my opinion, it is less in those affections than in lymphatico-scrofulous ones, that the superiority of these waters exist.

This opinion was formed, perhaps, owing to the particular circumstances in which I was placed. I also thought I observed that for diseases of the respiratory organs, those affecting the mucous of the larynx are more promptly and more effectively cured, with the use of the Marlioz waters alone, than diseases, deeper seated on the bronchial tubes.

Catarrhal patients sent to Marlioz are cured; but it is necessary to observe the important assistance often given by the Aix waters.

In endeavouring to separate the action of the

Marlioz Spring, in the cure of diseases of the larynx and bronchi, we are forced to acknowledge that if Marlioz needs no help to operate the marvellous cures of laryngities; in cases of bronchorea, the waters of Aix have mostly assisted them.

It is generally after a derangement in the functions of the cutaneous organs, by the effects of cold, that the mucous become inflamed, and particularly those of the bronchial tubes. The idea of exciting an irritation of the skin in catarrhal affections of the bronchi naturally suggests itself, and to effect it, what better means exist than the douches of Aix ?

The following is the opinion of Dr. Vidal on the curative effects of the Æsculapius Spring in pulmonary cattarrh :—

"The Marlioz waters being by their chemical nature in the first rank, among the sulphurous and iodurated waters, must be like them, the special remedy for bronchial catarrh. For this reason, patients affected with different kinds of catarrhs have been sent in preference to cold inhalations; we were the more disposed to send them there, that our faith in the hot waters of Aix was never supported by results obtained. We except, however, cases of catarrh purely rheumatic, and some cases of asthma with expectoration.

The very different physiological effects obtained in both places, encourage us to use cold inhalations, the results of which are not only more satisfactory, but immediate. The calming effect on the pulse caused by the presence of sulphydric gas in a con-

siderable quantity, is ascertained to exist not only during the period of inhalation, but after. It is not so in our warm inhaling rooms, which, independent of that, gives the patient who sojourns there in July, and particularly in August, an abundant perspiration, which it is not advisable to bring on, and which our douches, if requisite, would obtain with more advantage. It is the same with regard to the cephalgy, which our warm inhalations often cause; in fact, the appetite and the strength improve rather promptly at Marlioz; the patients have for this inhalation a sort of special instinct, which comes from the feeling of relief, and the strength they obtain there.

Our warm inhaling rooms will prove useful when used in the months of April and May, of October, November and December. This question regards, however, the winter season, of which we have not to speak here.

We shall only give one case of chronic bronchial catarrh, which by its resistance to all therapeutic means employed to combat it, may be considered as one of the most obstinate forms of the affection.

The patient in question was an old man, who for twenty years was subject to catarrh, and though he employed every kind of medication to cure it, remained continually affected by that mucous secretion so abundant and tenacious. The Allevard Spring alone brought about an important change, and the winter, after he took those waters, he was much improved. Having occasion to accompany another person to Aix two years after, he followed regularly

the inhaling treatment at Marlioz, obtained exactly the same results as at Allevard. On his arrival his pulse was intermittent, frequent subcrepitating rales of the dyspneœ, extensive pulmonary emphysema; he was subject to vertigo, he had abundant cold sweats, edema of the lower extremities. The curative treatment was composed of 21 inhalations, of about an hour each. The following winter the patient felt a great improvement.

We have not to take account of the diathesic influence which may produce catarrh; for whether it is caused by rheumatism, gout, herpetic diathesis, or scrofula, it will always have to be treated by the waters of Marlioz, exclusively or combined with those of Aix, which is generally done.

We often prescribe douches to our patients affected with catarrhs, particularly when accompanied with bronchorea, when the skin is flabby, pale, cold and damp; but in most cases, the waters taken in drinks and inhalations play the principal part. The bath is most useful in chronic bronchitis accompanied with a frequent hard cough without expectoration and a feeling of heat in the chest. In these cases it imports to avoid the use of douches, too often prescribed, and which have proved often injurious." (*Extract from the Report of Dr. Vidal*, 1859).

Whether the catarrh be a simple one, caused by successive attacks of acute bronchitis, or whether it be herpetic, with a viscous expectoration, scrofulous with albuminous secretion, or rheumatismal with a serous secretion, the revulsion by the ther-

mal douches of Aix, more or less energetic, according to the case, will in general be most useful.

It therefore results from this, that the two treatments of Aix and Marlioz, being so closely combined in the cure of catarrhal affections, the Marlioz Spring cannot claim all its honours.

It is not so in certain affections of the larynx, caused by its over exercise, and which bring on edema of the vocal chords, a semi-aphonic state and hoarseness. For those cases of chronic laryngitis, Marlioz alone will be fully sufficient.

Whether the pharingo-laryngien douche acts by way of percussion, or because it carries into the folds of the mucous medicinal substances, or by substituting a therapeutic inflammation to the chronic and pathological one, the fact is, that the Marlioz douche assists powerfully in the cure. A mere plaything for the patient, some will say, since the pulverised liquid does not extend beyond the larynx. At any rate, nothing proves up to the present, that Dr. Edouard Fournier, who denies that it reaches the bronchi, is right, and that Mr. Demarquay, who affirms that it does, is wrong; but even if more conclusive experiments would prove that the latter physician made a mistake, it is indifferent to us; for the fact that the pulverised liquid penetrates to the pharyngo-laryngien mucous membrane, suffices for us in the case, and that is not contested even by Mr. Fournier. "It is possible," he says, "to exercise a topic action by means of pulverisation on the larynx, but a short, an instantaneous one, the

time necessary for cauterising that organ;" it is all we require.

While physiologists discuss; clinical experience finds, that chronic laryngitis and pharyngitis, with or without granulations are improved, that edema of the vocal chords is disgorged, and that the voice becomes clear under the iufluence of the laryngien douche, which is the true way for gargarising the throat; for to do so otherwise is simply a merewashing of the throat, of questionable utility, particularly if theinflammation extends beyond the tonsils. Those whose vocal chords are relaxed, and who consent to take the necessary repose of the voice during the hydro-mineral treatment, will be very easily cured.

Nothing proves better the success of Marlioz in these affections than the way in which this spring recruits its clients.

Singers, speakers, lawyers, and priests, whose larynx are more tired by the confessional than by the pulpit; those, in one word, whose professions oblige them to give loud and repeated vibrations of the vocal chords, come every year, in larger number, to recover their voices at our spring.

Considering the special action of the Marlioz waters on the pharyngo-laryngien mucous; and, on the other hand, that the sulphurous bromo iodurated water benefits strumous affections, the Marlioz waters are specially indicated in scrofulide of the laryngo-pharyngien mucous, in chronic angina, in the hypertrophy of the tonsils, which by a pressure on the auditory canal might cause deafness.

2. *Phthisis.*

If the epithet of incurable, which the Latin poet gave to cancer "*Irremédiable cancer*," is accepted for that disease, we cannot make up our minds to accept it for phthisis.

Particularly since in an hospital for old people, *la Salpétrière,* it has been proved by post-mortem examinations, that the isolated tubercle in the lungs may finish by cicatrisation or by chalky induration. This fact has been fully proved by Laennec Andral and Grisolle. From it, it was concluded that phthisis was curable, and efforts were made by physicians to bring the result of their investigations on the subject to bear on medical science.

Every day new remedies were proposed for the cure of this fearful plague. Gaudriot, who has just died, proposed a powerful application of a red hot iron on the chest, a painful remedy, but one I saw him employ with success. — Dr. Reinvilliers proposed phosphate of lime, and Dr. Churchill hypo-phosphate of soda, a remedy highly recommended by Dr. Polli, of Milan.

Drs. Bennett, Bouchut, Lescalmel, and many others advise arsenic, a remedy taken from veterinary practice, and long in use among the Tyrolian peasants. In England, raw meat and spirituous liquors are highly recommended for tuberculous

patients. There is, besides, a respiratory aliment, which, in spite of its nauseous taste, is constantly in use for phthisis — cod liver oil. Dr. Piorry had iodine volatised beside the patient's bed, and it was one of his excellent *petits moyens*; others recommended tar.

The balsamic air of pine trees, sea air, a station on high mountains, a residence in temperate climates during the winter, are means to which practitioners have recourse. Numerous remedies, as may be seen, have been recommended, and lately a new one was added, koumis, of Russian importation.

But of all remedies employed to combat phthisis, few are more appreciated than sulphurous waters. The important thing is to choose those waters suitable for each particular patient.

The question then is, what patients would find the Marlioz Spring beneficial, and what patients would find other springs more serviceable?

Although our spring is principally sedative, it is less successful in regular inflammatory and essential phthisis than in those of a torpid nature.

And as the Marlioz waters seem to be more adapted to cure cutaneous affections developed in a lymphatic subject, so they will have more effect on strumous phthisis depending upon a scrofulous constitution. Does not this fact afford an argument for those who are inclined to consider the origin of the tubercle to be, in general, a manifestation of the scrofulous diathesis? As it is a recognised fact that

the acurative treatment serves to ascertain the nature of diseases—*naturam morborum ostendunt curationes*—it follows that the remedies employed against scrofula succeed in cases of tubercles, and the more effectively when the two diseases exist in the same subject.

Is there such a thing as scrofolous phthisis? German authors admit the fact, but for them, it only exists when there are granulations; according to Dr. Bazin, the concomitant affections and the slower march of the disease are sufficient to form a diagnostic.

Indications for the treatment vary according to the different cases and depend on the time the tuberculous affliction exists, and on its nature and origin.

If it is a case of inflammatory phthisis, with hemoptysis, the waters of the Æsculapius spring should be taken with great circumspection, and in small doses—half a glass full, at most, mixed with milk or with some syrup * What is necessary to be done here, is to administer sedatives to the patient, and cold inhalations are the best in these cases.

In order to combat hemoptysis, revulsive douches for a few minutes, on the inferior extremity, might be taken even two or three days.

If, on the contrary, it is a case of torpid apyretic phthisis in a lymphatic patient, accompanied by chloro-anemia, the Marlioz waters, which in this case are unquestionably the best, should be taken in large doses, increased gradually. The iron and

* I prefer to use the phenicated syrup.

manganese contained in this water explain its success in such cases. We do not hesitate in declaring, say MM. Hérard and Cornil, that iron is capable of rendering real service, particularly in the apyretic form of the disease, when the anemia is evident, without any marked tendency to hemoptysis*

Dr. Cotton, of London, expresses the same opinion. Our object is not to dissolve tubercles, but to prevent their evolutions, and to disgorge the pulmonary tissue surrounding them.

The cure of phthisis by sulphurous ioda bromurated waters can be explained, by saying that the sulphurous element, which, by its pathogenitic effects congests the lungs, which are the organs through which it is principally eliminated and cures by a substitutive inflammation. It improves the caarrhal state of the bronchial mucous, and disgorges the circular point of the lung around the tubercles, whilst, at the same time, the anti-scrofulous elements, iodine, bromine and chloride, come to prevent the production of new turbercles.

If it is useful, as Dr. Tiedmann stated at the Medical Congress of Florence (1869), for the consumptive patient to exercise his lungs, by breathing the mountain air and the sea air alternately every year, would it not be well then to advise consumptive patients to acclimatise themselves to the sulphurated air, in a moderately elevated station, like Marlioz (260 metres), and the following year

* "Traité de la Phthisie Pulmonaire."

send them to one of greater altitude, such as Bonnes (800 metres), on which they would be enabled to have the double advantage of mountain air and sulphurous treatment ? If the Eaux Bonnes by themselves congest the lungs, they are more disposed to produce that effect assisted by a lower atmospheric pressure. This one, increasing the functionary action of the lungs, forces the healthy portion of them to greater efforts, which causes a congestion and hemoptysis, which in a lower station would have been less to be apprehended.

3. *Asthma.*

Ought Marlioz to be recommended to asthmatic patients ? Except in a few cases, the others are not conclusive. The only thing certain is that asthmatic patients find a marked relief in the sulphudricated atmosphere of Marlioz.

A priori, I am inclined to think if asthma be connected with a chronic bronchitis or with bronchorea, or if it followed the disappearance of skin disease, there is every chance of obtaining a cure, but this chance is much less if the case is that pulmonary nevrose, so capricious in its manifestations, and which may be considered as essential asthma.

Persuaded that asthma is most frequently connected with viceral herpetism, and considering that arsenic is the specific for herpetis, Dr. Bazin would send, in preference, asthmatic patients to arsenical waters.

CHAPTER X.

OTHER CASES CURABLE AT MARLIOZ.

"The mineral waters of Marlioz, on account of the iron and the manganese they contain, appear to us," say Petrequin and Soquet, "to be more particularly adapted to the cure of intermittent fever in a cachetic state, by assisting considerably in the regeneration of the globules of the blood."

The Marlioz waters do not combat, I think, in a more special manner the anemia consecutive on paludal fevers than they do spontaneous anemia, or that caused by other diathesis.

The impoverishment of the blood, whatever may be its cause, will always find in the Æusculapius Spring an excellent restorative which makes it efficacious in long and tedious convalescence.

When one has at his disposal the thermal waters of Aix, those of Marlioz are not necessary to combat gout and rheumatism, except as an additional remedy to neutralise, by their alkaline ingredients, the excess of acid in the gouty and rheumatic patient.

Recourse may be had, however, according to Dr. Vidal, to this spring, when the rheumatic patient will stand in need of a sedative medication, rather than a perturbating one, when he would require to be saturated rather than stimulated.

It is a fact well known that people have left their crutches at Aix; it is not yet proved that women

have left their pessaries at Marlioz;. there are cases, however, which would seem to prove the beneficial influence of this spring in affections of the uterus. Dr. Bernutz, of the hospitals of Paris, communicated to Dr. Berthier, Junior, a most interesting observation on a case of fungus of the uterus by which a young woman was affected, seven months after her delivery, accompanied with continual loss of blood. Nelaton several times cauterised those fungous granulations, without obtaining any permanent improvement, and the patient was successively sent to the ferruginous waters of Luxeuil and to St. Sauveur (Haute-Pyrenees), without any good result.

In fine, Dr. Bernutz advised her to take the Marlioz waters in baths and in drinks (in gradual doses up to a litre a-day), which triumphed entirely over this obstinate affection.*

A fact worthy of observation: the patient was lymphatic.

Leuchorrea is very often connected with chlorosis and lymphatism, and there is consequently nothing astonishing in the fact that the Marlioz Spring cures this infirmity by modifying the general state of the system, which is its cause.

Obstinate diarrhœa, chronic dysentery, and worms, it is said, may be successfully treated at this spring, but I am yet unable to ascertain anything reliable on that subject.

* Thèse du Dr. F. Bertier, p. 40.

CHAPTER XI.

MINERAL WATERS WITHIN EVERYBODY'S REACH.

Questioned on the use of mineral waters, Trousseau answered : " I believe them efficacious, but I dare not say it too loud, lest it should come to the ears of the poor." In this answer there is something eminently philanthropic and generous ; but to go no further would be merely a kind of platonic philanthrophy. Let us therefore declare publicly the efficacity of mineral waters, and use our best efforts to bring them within the reach of the indigent.

In a memoir crowned by the Academy of the department of the Loire-Inférieure, and treating the question proposed : " What are the most rational means for giving medical assistance to the poor ? ' I gave my views on the way by which the poor classes could be benefitted by the hydro-mineral medical treatment. It is not by giving artificial mineral baths, taken on the spot, that the problem would be solved, for it has been justly said that artificial mineral waters resemble natural ones as a corpse does to a living body. And whenever chemists tried to make artificial mineral waters, they were as unsuccessful as when they endeavoured to make wine without grapes. It is consequently with

waters taken at the springs that the treatment must be made. To solve that problem, we have two apparatus, the Hydrofère, of Mathieu de la Drome, which for some time back has enabled us to take far from the springs a bath of pure mineral water, and Carre's freezing apparatus, by which we can have, at a distance, and at a low price, concentrated mineral water.

Unable to transport the indigent to the mineral waters, an effort should be made to bring the waters to them.

This is possible, if advantage is taken of a discovery made by Mr. O. Henry, and which was suggested to him by a memoir presented to the Academy of Medecine by the celebrated chemist, Robinet.

In this memoir, Mr. Robinet shows that congelation applied to plain drinking water separates from it the purely aqueous portion, leaving intact the salts remaining in the non-congealed water.

This fact, long known, was put into practice in the north of Europe, for the extraction of salts from sea water. Acting on this, Mr. O. Henry endeavoured to concentrate, with Mr. Carre's freezing apparatus, the salts of the different mineral springs, by placing them in a state of congelation.

The experiment succeeded, and the learned chemist proved that a mineral water concentrated by this process, preserves intact its elementary composition, and only acquires a higher degree of mineralisation. Thus congealed by Mr. O. Henry, the mineral waters lost no gas and left no deposit.

In bringing back to their primitive state the parts frozen, says the author, we observed neither dregs nor deposit; they only retained some traces of mineral waters which remained in the slits of the ice. As for the concentrated water (*eau mère*), that is to say, the portion which remained liquid, it represented, except that slight deficit, all the mineral ingredients it possessed before being concentrated.

Ferruginous waters, which can scarcely be exported without having deposits of red streaks of sesquioxide of iron, are the only ones that cannot be congealed with success. The idea of concentrated mineral waters is not new: a century ago Dr. Daybac concentrated by evaporation the waters of the Lerminac Spring, St. Die (Vosges), and the Germans, in imitating us, manufactured the *Bitterwasser*. But water evaporated by heat runs a great risk of being altered.

There is, first, inevitably loss of gas. If the experiment is made on sulphydricated water, it will lose at once its sulphurated hydrogen. There is, besides, the risk of bringing on new combinations in the elements composing the mineralisation. With congelation, those inconveniences are avoided, and a real extract of mineral water is obtained.

Less expensive carriage, much more facility in administering the medecine, as the water may be concentrated so that a glass may contain the mineral substance of a bottle: Such are the advantages of this process, which places mineral waters within everybody's reach. Certain German springs which

give concentrated water (*eau mère*) had until lately the advantage of attracting our scrofulous patients.

The late war had for result to make us better appreciate the resources of our mineral waters. Salins, which Melier called a warm sea, was brought out of oblivion, thanks to the efforts of Dr. Laissus; and that station, as well as Salies, competed successfully with Kreusnach, Nauheim, Soden, and others.

By making use of the ingenious freezing apparatus of Mr. Carré, which is working on a large scale in the Saline of Giraud, in Camargue, to extract sulphate of soda and potash from sea waters, several of our springs could give us concentrated water; and those who employ this apparatus would find a double profit, as ice coming from the congelation of mineral water, being very pure, might be used by the bathers for cooling drinks.

CHAPTER XII.

CHOICE OF A WATERING PLACE—IMPORTANT MATTER TO DECIDE.

It would be as great an error to say that any particular water is the best, as it would be to affirm that guano is the best of all kinds of manure—their respective value depends entirely on circumstances.

Plants, for instance, affected with what may be called vegetable chlorosis, will require, as Eusebe Gris informs us, a ferruginous solution. Those requiring the calcareous element, such as peas and trefoil, will naturally find in lime the best manure.

To give to the soil the mineral elements taken from it by the growth of the plant, constitutes the great rule for agriculturists, according to Liebig. An analagous rule is applicable to the hydro-mineral therapeutic.

The human body may also be considered as containing the most complicated collection of mineral substances, which must remain with regard to each other in certain proportions, without which the equilibrium ceases to exist, and disease is the result. The agricultural chemist, by analysing the ashes of the plants, and the soil, knows what mineral substances are deficient in the latter. The physician, too

possesses the means of discovering what mineral elements would be useful to introduce into the human body.

The urine being the chief outlet by which the human body expulses the mineral matter, the hydrocarbonate substance, and a modified portion of the azotic substance of the food, the analysis of the urine will be important to be known. When there is found in it an excess of albumen, then ferruginous and alkaline waters are necessary.

When oxalic acid, principally composed of carbon and oxygen, takes the place of uric acid in which azote predominates, a spring containing the latter element is requisite. If sugar is found in the urine it is well known that alkaline waters are the best for diabetics. If red gravel is found, Vichy or Vals waters will be prescribed. They should be carefully avoided by patients affected with white or alkaline gravel.

When the calcareous element is deficient, as in cases of rachitis, the spring best suited will be one containing lime.

The paleness of the skin, and of the mucous membranes of the lips, eyes, and nostrils, shows that iron is wanting in the system.

From the fact that some diathesic diseases are cured by the most heterogeneous waters, it must not be concluded that the choice of a watering place is an indifferent matter, and it is most important to remember that if certain springs act in a general way on the system, increasing the vitality, others

act principally on a certain organ. The ignorance of this fact might lead to most serious results.

The waters of Marlioz in Savoy and Weilbach, in the duchy of Nassau, seem to be of a similar nature. They contain the same gas: azote, sulphydric and carbonic acid; the same solid matter, combined with soda and lime, and their temperature is exactly the same, 57 F. (14 cent.), and yet the two springs do not at all suit the same class of patients. Marlioz is efficacious for lymphatic patients, or those affected with anemia, and Weilbach, injurious to those patients, is beneficial to phlethoric ones, diminishing the quantity of the blood.

By the improper choice of a spring, lives that might have been prolonged were brought to a close.

Patients affected with erethic phthisis often go to the Eaux-Bonnes, when Ems or Mont Doré, or any other sedative spring would be beneficial; others affected by torpid phthisis, with anemia, who would bave been benefitted by the stimulant action of the Eaux-Bonnes, if they go to alkaline springs, shorten their lives by a further impoverishment of the blood.

As the Eaux-Bonnes congests the blood, so does Carlsbad the brain; from which it follows that the latter waters are dangerous for plethoric subjects, as may be seen in the following case:—

An English gentleman, of plethoric habits and ruddy countenance, went to Carlsbad, and, contrary to the positive orders of his physician, drank every morning a glass of mineral water, stimulated with

brandy. Ten days after he died suddenly, and science was but too cruelly avenged.

A lady from Genoa who, after taking three or four warm sulphurous inhalations at Aix, had an attack of hemoptisy, went to the cold inhalations of Marlioz, and the spitting of blood ceased.

On the other hand, an English gentleman, sent by his medical adviser to Marlioz for an excess of secretion of the mucous membranes, consulted me. I also thought that the waters of the Æsculapius Spring would be the best suited for his case, but it was quite the contrary. The Marlioz inhalations, usually sedative, produced on his pulmonary mucous a rapid irritation. Every second day during a fortnight he tried inhalations of from 20 to 25 minutes, and each time the same accidents were renewed. Obliged to leave Marlioz, he took some strong revulsive douches at Aix, which were much more successful.

The latter fact proves that the choice of a mineral spring should be made only after experimental trials.

A water which generally succeeds in certain affections may not do so when some peculiarities of constitution exist. The choice made between the mineral springs depends often on the proximity to the residence of the patient, or of the amusements to be found in one watering place rather than in another. If Marlioz is advised, and the patient knows that he will meet friends at a similar spring, let him go there. For amusement, we proclaim loudly, is an important

element in the hydro-mineral treatment, as valuable as sulpherous hydrogen or calcareous bicarbonate, and Alibert very justly said, "It is not enough to send a patient to a watering-place; it is requisite that he should there avoid being low-spirited."

There, above all, it is necessary to find the sum of daily happiness made, as once charmingly said to me a lady patient, of the little odds and ends of daily comfort. It is not to be concluded from the foregoing that the hydro-mineral cure is an imaginary one to a certain extent. By curing horses at a sulphurous spring, Bordeu contradicted such a statement. Even were I to be considered partial, I cannot help saying that Marlioz, compared with stations of equal value, remains superior on account of the mineral springs which surround it, of the vicinity of Brides, Evian, Moutiers, La Bauche, of the neighbourhood of Challes, Aix and St. Simon; besides the mutual help those waters give to each other, Aix, for instance, affording the external remedy for the cure of scrofula, whilst Marlioz furnishes the internal one. Then what an invaluable advantage for a family not to be obliged to separate, and to find in that little corner of Savoy various remedies for different diseases. While the father is under treatment for rheumatism at Aix, the mother can take her lympathic or anemic child to restore its constitution at Marlioz.

The Casino is also a great attraction to Aix. Whether it is to tradition, or to the tact and ability of the administrators that it is due, the fact is well

known that those saloons are frequented by the best society.

By its topographical situation, Savoy, the true line of intersection between France, Italy and Switzerland, seems to be the rendez-vous of tourists, idlers and sufferers. The mineral waters, so efficacious and numerous, cause that country to be for France what the Duchy of Nasseau is for Germany. On the other hand, by its geological nature, its lakes, its mountains, its vegetation, and even by the character of its inhabitants, Savoy seems like a part of Switzerland continued into France; but in Savoy the beauty of detail is more often combined than elsewhere with the splendid aspects of mountain scenery, and it was this which made Victor Hugo say: "*La Savoie est la grâce alpestre.*" The several advantages afforded by this charming country justify, too, the words of A. Achard: "Savoy dear to its natives, becomes so to the traveller."

END.

INFORMATION FOR VISITORS

TO

AIX AND MARLIOZ.

Marlioz being on the road to Italy, travellers will have to take the Lyons Terminus in Paris.

There is only one direct train daily from Paris to Aix, the night train leaving at 8, p.m., and reaching Macon at 5.45 a.m., and Aix at 10 a.m., without changing carriage.

Aix is 370 miles distant from Paris ; the journey is therefore 14 hours from Paris to Aix.

An express leaves Paris at 11 a.m. and reaches Macon at 8.30 p.m. The traveller can sleep at Macon, and proceed next morning at 5.20 a.m.

An ordinary train, with 1st, 2nd and 3rd class carriages, leaves Paris at 10.40 p.m., stops at Macon next day from 12.50 to 3.5 p.m., and reaches Aix at 8 p.m., the journey lasting 22 hours.

The invalids who intend coming to Aix or Marlioz from San Remo, Menton, Nice, Cannes, Yères, have to pass through Marseilles.

They can then choose viâ Lyon or Grenoble ; by the first way they have an express train, and come from Marseilles to Aix, by Amberien and Culoz, in 12 hours ; by the other way, which is more pic-

turesque, the journey will be a little longer, travellers being obliged to stop and sleep either at Valence or at Grenoble.

Those who come from Cannes, Nice, Menton, San Remo, Bordighera, may take the "*route de la corniche,*" so renowned, go to Genoa and Turin, and reach Aix and Marlioz almost in the same time as viâ Marseilles.

The season lasts from the 1st of May until October. It begins sooner and terminates later, according to the weather.

Marlioz is 10 miuutes distant from Alx.

Every quarter of an hour an omnibus starts from Aix to Marlioz ; the return ticket costs 0f. 60c.

In the park at Marlioz there are to be found chalets and apartments for families.

TARIF.

	fr.	c.
Bath with pure mineral water	2	50
Mitigated bath	1	50
Ordinary bath	1	25
Half bath	2	«
Pharyngien douch	2	«
Cold hydrotherapic douch	1	25
Douch for infection	1	«
Ascendant douch	1	«
Inhalation	1	50

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