

SPA TREATMENT:

SELECTION OF PATIENTS

AND THE

CHOICE OF A SUITABLE SPA



BY

NEVILLE WOOD, M.D., M.R.C.P.

458

"Ille terrarum mihi præter omnes angulus ridet."

SOCIÉTÉ
DES
SCIENCES MÉDICALES
DE VICHY

London

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DR. NEVILLE WOOD

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Spa (Belgique) : cure thermale

Pour la Bibliothèque
des Sciences Médicales,
Hommage de l'Auteur

Amédée Wod.

SPA TREATMENT

By the same Writer.

THE TREATMENT OF CHRONIC HEART
WEAKNESS BY BATHS AND EXERCISES.

THE TREATMENT OF COLITIS AND CON-
STIPATION BY AGAR AND THE PARAFFINS.

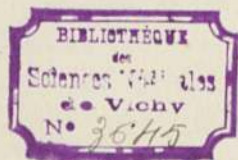
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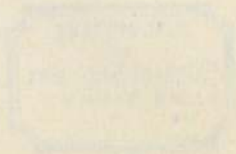
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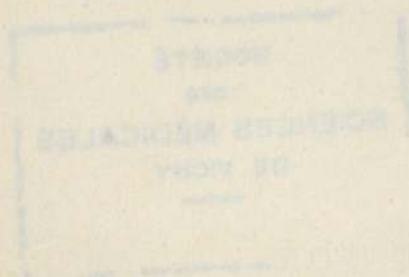
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PREFACE

THE following pages are founded on a presidential address which was read before the West London Medico-Chirurgical Society and subsequently published in its Journal, and in abstract in the *Lancet*. The new

Since the date of publication a law has been passed in France establishing a Taxe de Séjour (corresponding with the German Kurtaxe) which is likely to lead to radical changes at French spas. I have information that Vichy, whose initiative in the promotion of this measure deserves recognition, has already taken steps to raise funds for the embellishment of the town, while at the other spa adversely criticised there is some improvement in the hygienic conditions.

notable improvements at the spas, and of resources they may possess that are not shared by others.

ELVASTON PLACE,
LONDON, S.W. ;

January, 1910.

PREFACE

THE following pages are founded on a presidential address which was read before the West London Medico-Chirurgical Society and subsequently published in its Journal, and in abstract in the *Lancet*. The new sections have been supplemented, with the kind permission of the proprietors of the *Practitioner*, by a few extracts from some contributions of mine to a Special Number on health resorts and climatic treatment.

I hope, before very long, to complete a fuller treatise on balneological methods in which a more comprehensive view of the whole subject will be taken.

In the meantime, I should be glad to hear of any notable improvements at the spas, and of resources they may possess that are not shared by others.

ELVASTON PLACE,
LONDON, S.W. ;

January, 1910.

SPAS REFERRED TO BY NAME
IN THE TEXT.

Aix-la-Chapelle	Hammam R'irha	Plombières
Aix-les-Bains	Harrogate	Royat
Baden Baden	Helouan	St. Moritz
Baden Weiler	Homburg	St. Nectaire
Bagnoles-de-l'Orne	Kissingen	Schinznach
Bath	Kreuznach	Schlangenbad
Brides-les-Bains	La Bourboule	Schwalbach
Buxton	Lisdoonvarna	Soden
Caledon	Llandrindod	Spa
Cauterets	Llangammarch	Stafford
Châtel-Guyon	Luchon	Strathpeffer
Cheltenham	Marienbad	Uriage
Church Stretton	Moffat	Vernet-les-Bains
Contrexéville	Mont-Dore	Vichy
Droitwich	Mont' Estoril	Vittel
Ems	Nauheim	Wiesbaden
Evian	Nenndorf	Wildbad
Franzensbad	Neuenahr	Wildungen
Gastein	Oeynhausen	Woodhall Spa

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Are mineral waters really useful?—How to select spas—Climatic advantages of British spas—Where to lodge patients—Aims and limitations of spa treatment—Its general resources—Air, exercise, diet—Dietetic sanatoria—Thermal influences—Carbonic acid, sun and mud baths—Douches—The dissolved salts—Radio-activity in mineral springs—Domestic *versus* spa baths—Spas for winter months—Mineral waters taken internally—Origin of thermal springs—The rôle of suggestion in spa practice—Elimination by the kidney—Earthy waters—Renal spas—Stone and cystitis—Elimination by the bowel—Spas for arthritic diseases—Intensive treatment of syphilis—The mercury-sulphur synthesis—Respiratory catarrhs—Albuminuria—Nervous diseases—Chronic constipation—Colitis—Pelvic exudations—Comparative value of mineral waters in anæmia—Iron spas—Arterio-sclerosis—Precautions in the selection of grave cases for spa treatment—Obesity—Treatment of diabetes at home and at spas—Phlebitis and varicose veins—Are feebly mineralised springs equivalent to tap water?—Alkaline waters—Sulphur waters and spas—Common salt waters and spas—Comparisons between French and German spas.

SPA TREATMENT

THERE is one question which I have seldom escaped when reading papers on balneological topics before medical societies. It has generally been put as follows: "Are these waters really useful, or is not the benefit derived chiefly from the complete change in the patient's surroundings?" Such a question aptly illustrates the attitude towards spa treatment of a large body of professional—and I may add of lay opinion. And what is the answer? It is that for one well-defined group the benefit accrues entirely, and not merely in great part, from change of surroundings and habits, but that a sufficiently radical alteration in their habits could not be induced in this class of patients save by the compelling influence of the ritual associated with mineral water treatment. But it must be at once added, and with equal emphasis, that for another group of cases, as well defined and probably as large, the preponderating benefit is undoubtedly derived from the strictly balneological procedures.

Keeping these two classes sharply defined and separated in our minds, we may then, without danger of confusion, recognise a third, which derives benefit from all the resources of the spas virtually in equal proportions.

A medical man will find the preliminary part of his task in the choice of a spa much simplified by remembering this three-fold aspect; and after mastering the general principles of spa treatment, by the division of patients into two categories. First, that of those who require some type of water or some form of treatment found at its best in a limited number of spas. Here it is comparatively easy to choose a spa. The selector should first ascertain the names

and leading characteristics of the principal resorts belonging to the group required, which he may do by consulting some small work, such, for instance, as the special number of the *Practitioner* already referred to, in which none but the most accessible and best frequented spas are accorded a separate description. He should then, from every possible source, supplement his information about these particular spas. In this way he will avoid the confusion which is apt to be the result of consulting the larger manuals to begin with. But whatever the method, I must warn the reader against the view that it suffices "to just look up where the patient should be sent." No book that has been written will enable this feat to be performed with success.

The patients coming under the second category are those in whom the malady, being less well defined, may probably be benefited by the resources of a large number of spas. Here we have to determine what exactly are the unfavourable features of his present environment, and then to decide which of the resorts will best provide the required contrast. That is by no means easy, and when we are dealing with a matter of complaisance and not of necessity, the difficulty is not diminished. It is for such cases that personal knowledge of local factors may prove indispensable.

Climatic differences influence largely the choice between a British and a foreign health resort. It is difficult to forecast the weather in England, but we know that in summer it is likely to be cooler and damper than on the European mainland. These conditions favour bodily activity, so that the general principle is at once established that our spas are suited for those patients who can take active open-air exercise, whereas the higher temperatures of continental resorts are more agreeable for the sedentary. The cool English summer climate neither restrains nor over-stimulates tissue exchange, and so is adapted for cases in which no great change in body-habit is desirable. On the other hand, the absence of sufficiently high temperatures renders difficult intensive bath treatment, and when this is indicated the British balneologist works at a disadvantage.

Continental spas do not in reality compete with British, nor

British with continental—they are complementary to each other; and if the inhabitants of central Europe were as well aware of our climatic advantages as we are of theirs, there would be an interchange of visitors to the spas, instead of, as now, a movement in only one direction.

A feature of many of the continental spas is the direct supply of mineral water to some of the hotels and the grouping of others around the springs. Convenient as one arrangement or other may be for delicate patients, they entail disadvantages for the more robust. On the advice of friends, visitors generally find themselves lodged in caravanserais built near the springs, and so in the most crowded and low-lying part of the town. As a rule their court-yards or gardens are small, and the sociable Briton thus finds a ready excuse for spending much of his spare time in the lounge. As a contrast, on the outskirts of the town, where the circulation of air is freer, are to be found the foreigners, as we call them even in their own country, sitting for long hours in the pleasant gardens of their villas, built for the most part on the rising ground, and so enjoying the open air of which it is our tradition to suppose them afraid.

From which may be drawn the moral that, after the selection of a spa, we should not neglect to consider whether the patient should live near the springs for bathing facilities or go farther afield for fresh air.

There is apt to be a certain evasiveness about balneological literature, a vice which is only to be avoided by bringing the fundamental facts into close apposition. Let me, then, ask attention to a series of propositions, which, moreover, will save much repetition later on:

(1) The principal aim of spa treatment is the regulation of metabolism and the promotion of excretion.

(2) The treatment, consisting as it does of the specialised use of what are known as natural remedies, is to be considered in relation to patients who cannot, or will not, employ these means at home, or who for some reason are not amenable to drug treatment.

(3) Though spa treatment is often merely an alternative for

other methods it is pre-eminently suitable for cases on which it is desirable to concentrate a number of differing influences.

(4) Cases in the subacute or chronic stage and where there is plenty of reserve force are alone suitable for this treatment. The acute, or those which are tending to an early fatal issue, should be rigidly excluded.

(5) Spas may be used for prophylaxis, but climatic stations are to be preferred for convalescence.

(6) Whenever there is a suspicion of visceral disease a re-examination of the patient should be made immediately before his departure.

(7) For the subjects of mental impairment what are known as "nerve-spas" should be chosen, and even to them none but the slighter cases should be sent.

(8) The best results from balneotherapy are obtained in the middle-aged and in young adults, while children and old people are more benefited by climatic influences.

(9) Only by the most careful application of general principles can patients be properly selected for spa treatment, for though it has contributed much to the art of healing it has not added a single specific to the science of medicine.

(10) The maxim, "*Non curatur qui curat*," applies with especial force to those who are sent away from home. Full benefit may be only expected when the patient can leave business and domestic worries behind, and face with equanimity the cost of the treatment and of the amenities of spa life.

Bearing these propositions in mind let us pass in review the resources available and the ways in which they are turned to account, beginning with atmospheric influences.

At all spas it is considered of primary importance that the climatic conditions should permit of the enjoyment of abundance of fresh air, and that any deficiencies of Nature in this respect should be remedied by artificial means. As if, by a providential arrangement, mineral springs are usually found at a moderate altitude, in valleys clad on their slopes with sheltering trees, and shielded from the colder winds by the disposition of their

neighbouring mountains. Where natural shelter is insufficient art steps in, supplying it by the construction of embankments, the erection of shelters, and by plantations of trees. When the mountains are not of easy ascent funicular railways are usually provided to the higher elevations, where shelter, natural or artificial, is again to be found. These dispositions allow the weakly patient to stroll or repose at will in the open air for longer periods than would otherwise be possible. Another advantage of such carefully planned shelter is that the patient may return to the open air comparatively soon after taking even a very hot bath.

Next with regard to exercise. At most continental health resorts many miles of splendid walks have been laid out. Directions, distances and gradients are so plainly indicated that regulated walking exercise is easily planned and carried out. Further, to meet the needs of those who will not exert themselves, except, so to speak, under the eye of a ganger, there are nearly always Zander gymnastic institutes, where every muscle can be brought into play, while, in addition, manually given movements are available for those who may require them. In any case, the custom of promenading while drinking the waters induces the patient almost unconsciously to take walking exercise to a fair extent.

Diet at the spas is a ticklish subject to handle, and in print we find it treated with a reserve which, though prudent, is uninforming. In former days the diet was governed by the name of the disease, or was influenced by the supposition that some of the articles of every-day consumption would clash with the action of the mineral waters. Physicians handed to the patient a stereotyped diet sheet, and adherence to its restrictions was demanded. These printed lists are now seldom seen, and it is the fashion to say that the diet is ordered according to the constitution of each individual. In practice, however, what often happens is this. The forbidden and the permitted articles are written out in parallel columns, but when any of those allowed are distasteful to the patient, or any of those banned are acceptable, an interchange of the items is effected !

Now, used with discretion, that is by no means a bad way of arriving at a suitable diet for some invalids. But, when stringent restrictions are necessary, restraint must be exercised not only over the desires of the patient, but over the actions of the autocrat of the kitchen. In such cases, even if the patient is strictly obedient, the attempt to control hotel cookery often becomes a farce.

Doubtless many doctors are well versed in the theory of dietetics, and not a few of them possess cookery books; but one who prescribes dishes by book formulæ and fondly expects his patients to be served with a repast in strict accordance is reckoning without his cook; while if dishes are ordered merely by name their actual composition will be equally uncertain. It too often happens that the invalid cookery book is compiled by an amateur cook, with the assistance of a medical man, or under his patronage. In reviewing one of these composite manuals published in his country a famous French culinary expert states explicitly that the directions given in most of the recipes could not possibly be carried out, a dictum which Dr. Sternberg quotes with approval, adding that it applies with equal validity to many of the most recent German publications of similar origin.

Whenever diet is of importance (and when is it not of importance to the invalid?) the best of cooks is indispensable. As it is not to be expected, any more than it is desirable, that a culinary artist should lower his professional dignity by trying to comply with ill-conceived directions, the outcome is confusion and disorder—confusion to the mind of the prescriber, disorder to the digestion of the patient.

So we are forced to the conclusion that the doctor can seldom count upon knowing the exact composition of his patient's repasts, at any rate, as served in most of the cosmopolitan hotels. At Homburg and some other spas commendable and partially successful attempts have been made to solve the problem of hotel cookery for invalids. Nevertheless, my present information leads me to believe that a patient sent away from home for a cure dependent chiefly on diet should be placed in a dietetic sanatorium, where the

kitchen is under the direct supervision of a medical expert, and where whatever is ingested is controlled in accordance with the results of a scientific investigation, both of secretions and of excretions.

It is my conviction that to the sanatorium will belong, in the near future, the practical application of scientific principles in an increasing number of maladies. Every year these institutions are increasing in number, in efficiency, and in magnificence. They have already nearly completed the conquest of Mayfair and Belgravia; the attitude of Harley Street is more conservative.

As with all that is human, sanatorium treatment lends itself to abuse. To anyone who can find profit or pleasure in acquainting himself with the seamy side, I commend the picture, overdrawn though it is, presented by Maartens in his somewhat gloomy novel, "The New Religion."

At most German health-resorts preparations of modified milk are in use. The oldest of them (milk soured by lactic acid fermentation) is still the best, and I feel sure that many of the cures ascribed to the various airs and waters should properly be placed to the credit of that health-giving fluid.

The next, and of course in many instances principal, resource is the bath.

Baths at different temperatures stimulate the eliminatory function of the skin, further general and local tissue exchange, relieve congestion of internal organs by directing a portion of the blood-stream to the surface, and promote the resolution of inflammatory products.

Of chief importance in balneotherapy is the thermal factor—the foundation stone, in fact, of the whole superstructure. Baths given between 93° and 95° F. are said to be at the point of thermal indifference. They give rise to no change in the distribution of the blood-stream, or in the heat-regulating mechanism; but, sub-jectively, they have a sedative influence on the nervous system.

If the temperature of the bath is slightly lowered a slight chill is felt, the vessels of the skin contract, and an increased volume of blood passes through the deeper part of the body, with a consequent

increase of nutritional activity in that situation ; at the same time the heart beats with less frequency but with greater force.

If, on the other hand, the temperature of the water is slightly raised, the normal loss of body-heat is checked, the vessels of the skin dilate, and congestion of the deeper parts is relieved by a diversion of the blood-stream to the periphery. The heart beats considerably faster, and for a time with greater force, but owing to the vascular dilatation blood-pressure is only a little raised. Since the peripheral parts of the body are now better supplied with blood, nutrition takes place there with increased activity, and the absorption of morbid products is favoured.

If the temperature of the bath is further raised respiration quickens, the heart beats with much greater force and frequency, vascular dilatation becomes general, and blood-pressure rises, with a consequent stimulation of general metabolism. When such a bath is continued too long the heart loses its power, and general exhaustion ensues. If, instead, the bather is removed and suitably covered with blankets cooling is gradual, and the influence of the original thermal stimulus is greatly prolonged.

The action of the thermal factor is believed to be practically unchanged when highly mineralised waters are employed. Its incidence, however, is modified in a remarkable manner by the presence of free carbonic acid. In a bath freely charged with this gas the body of the bather is coated with a layer of bubbles, touching each other, but leaving between them tiny spaces, where, of course, the water comes into direct contact with the skin. Compared with water carbonic acid is of low conductivity, and is itself a chemical irritant. As the bubbles burst and re-form the gas-covered and the water-covered spots are continually changing places. It is, then, as if a vast number of closely apposed cool and warm points were alternately applied to and withdrawn from the surface of the body. These rapidly alternating stimuli permit the employment of a comparatively cool bath, and while neutralising the disagreeable effects of a low temperature they add an exhilarating effect of their own.

There are many devices for charging baths with carbonic acid,

but in those that I have tried the bubbles did not cling to the skin so well as when natural gaseous water was employed.

Other agents besides mineral-water baths are employed for bringing thermal and chemical stimuli to bear on the skin. Of these we may dismiss vapour baths as belonging rather to hydrology than to balneology; while sand baths and dry gas baths are falling into disuse.

For sun baths, so much in vogue where generous sunshine prevails, the ideal situation is on a sandy soil, by the side of a river. A fenced enclosure should be provided, furnished with seats, shelters and gymnastic appliances. Such a bath, and one of the best arranged of the kind, is to be found at Kissingen, where it is held in high estimation for its fortifying action against chills, and on account of its tonic influence, in neurasthenia accompanied by torpor.

Of more definite therapeutic value, as well as of wider sphere of action, are mud and peat applications, which, employed as they have been for centuries, continue to gain in favour.

There is undoubtedly something repulsive about the idea of peat and mud baths, and a strong conviction of the benefit likely to be received is generally required to nerve the intending bather for the ordeal. I have myself only once tried a peat bath. For years I could not summon courage to step into a mixture out of which one comes, at any rate on the first occasion, disgusted at the tarry coat and wondering whether it will ever wash off. It may have been that I was not a suitable subject and the bath too far above the point of thermal indifference, but the delightful sensations described by so many bathers were certainly absent.

The principal action of peat, as of other baths, is due to thermal stimuli, which are, however, somewhat modified by the chemical constituents of the peat, while the greater density of the mixture, by lowering conductivity, permits the use of a wider range of temperatures than would be possible with water. At indifferent temperatures the baths are valuable for the reduction of vascular tension, and are sometimes beneficial for cardiac irritability; while in neuritis, rheumatism, and occasionally in gout, they are given

at higher temperatures in substitution for hot air or hot water. In these morbid states, as well as in cases of pelvic exudation and of dermatitis with vascular engorgement, the facility with which the thick paste can be applied to limited areas is an important advantage.

For the treatment of such maladies these agents may be regarded as substitutes for baths or poultices, which, in many instances, might just as well be employed at home.

For the alleviation, however, of hyperæsthesia with mental irritability, associated as it is sometimes with morbid self-consciousness, there is no satisfactory substitute for full peat or mud baths; but it is essential that the patient should be sent to a resort where they are thoroughly understood, such as Buxton, Spa, Franzensbad or Kissingen.

If there are any members of our profession whose memory requires that every fact should be fitted with a formula, I would suggest that the peat or mud bath be mentally labelled "the balneological rest cure."

Next in importance to the thermal factor comes, perhaps, the dynamic—that is, the influence of water in motion.

This is brought to bear in several different ways. At Plombières a stream of water from a submerged pipe plays upon the abdomen while the patient lies in the bath. At Mont-Dore, the bather stands or sits while a jet of very hot water under considerable pressure falls upon him from above. At Aix-les-Bains, the douche is projected from a short distance, massage being given at the same time. At Vichy, the water falls on the recumbent patient from perforated roses, as from a series of watering pots. While the Vichy douche produces greater exhilaration, the Aix and Mont-Dore douches are superior for treatment of local affections.

The mineralisation of a bath is of importance quantitatively rather than qualitatively. By this I mean that the action of the dissolved salts depends chiefly on their concentration. The mineral elements act by conveying a stimulus to the cutaneous nerves primarily, and through them to the general nervous system.

They also render the skin hygroscopic, and, thus modify its evaporative function. It is now universally admitted that these salts do not penetrate the skin and enter the blood-stream. Hence, if sedation follow a bath containing a salt such as potassium bromide, the explanation must be sought, not in the specific action of the drug, but in the proportion of the total salts, in the temperature and duration of the bath, and possibly in some extraneous influence, such as suggestion.

It is a curious fact that, when a natural mineral water bath is taken containing from about 5 to 2 parts per mille of neutral or alkaline salts, a sedative effect is noticed by many sensitive but not imaginative persons. I believe that this may be ascribed to the specific action of hypotonic solutions of the strength mentioned. It has been suggested that it is due to the radio-active emanations which are so often abundant in these waters of low mineralisation.

A few words on radio-activity may not be out of place. Of the radio-active elements present in mineral waters, a gas-like substance, known technically as "emanation," is that which is believed to possess the chief therapeutic potency. When the body is immersed in a bath charged with radium emanation, but little of it penetrates the skin, though a considerable amount is inhaled as it escapes from the surface of the water. As originally pointed out by the Curies, and subsequently confirmed by others, radium emanation exercises no perceptible physiological influence on healthy subjects. It has, however, been found that in some morbid conditions an emanation bath is followed by a definite reaction. Joints affected by chronic rheumatism become additionally painful and swollen for a time, while there is a diminution in the original pain and swelling later on. This is the exact sequence frequently observed in rheumatic patients during a course of natural mineral water baths. These so-called "thermal crises" were, at first, accounted for on the supposition that they were induced by the saline constituents of the water. When it was found that some of the most feebly mineralised waters gave rise to the sharpest reaction this explanation had to be abandoned.

As time went on, the belief arose that the causative factor must be physical rather than chemical.

To this theory Baron Liebig was the first to give authoritative expression. Much against his will, that famous chemist was induced to take a thermal course at Gastein. Greatly to his surprise—for he demonstrated by analysis that the waters contained no chemical constituent of adequate therapeutic potency—he nevertheless derived considerable benefit. He was driven to the conclusion that the missing explanation must be sought in some undiscovered physical property. This physical property is now supposed to consist in radio-activity—a quality in which it is interesting to note the waters of Gastein surpass those of any other spa.

It has been mentioned that rheumatic joints react both to artificial emanation water and to natural radio-active water in the same way. To this there is the interesting but by no means surprising corollary that no such reaction is, as a rule, obtained from the use of the natural or the artificial product in typical cases of rheumatoid arthritis. This agreement of the negative with the positive evidence favours the conclusion that radio-activity will hold its ground as one, at least, of the factors demanding consideration in any explanation of the action of mineral springs. Again, it has been shown that muriated waters lessen the activity of the peptic ferment, but when naturally radio-active they have no such effect. When it is pointed out that peptic activity is increased by emanation gas, that this is the factor neutralising the inhibitory influence of the chlorides would seem to be a justifiable inference. It is of interest to note that among some of the Homburg springs, of otherwise nearly similar composition, the order in efficiency which tradition has established corresponds with the gradation of their radio-activity as recently ascertained.

In balneology inferences from experiment are often alloyed with doubt, while it is the fate of mere speculation to be purely provisional. It is only fair, therefore, to admit that the evidence I have quoted is by no means universally accepted as decisive regarding the rôle played by radio-activity in natural mineral waters.

A machine for the production of emanation is now procurable from a German firm, and anyone who desires may indulge in experiments with that elusive gas.

Here may fitly be discussed the claim of most hydrologists, that baths at a spa are much more efficacious than those given at home, even though the solutions employed, the temperature and the duration of immersion are the same. The problem is in itself a difficult one, and a sufficient number of experiments under test conditions for its satisfactory solution have not yet been carried out, while some of the factors are imponderable. We cannot entirely dissociate the effects of the bath from those attributable to other concurrently used therapeutic agents, and as to the baths themselves, we can seldom be sure that they are given in exactly the same manner at home and at the spas. The bath in an ordinary private house seldom contains as much water as that at a bathing establishment, and though the initial temperature may be identical in both cases, in the domestic bath it is seldom maintained throughout the immersion, as in a spa bath, which is walled in to prevent heat loss. Though apparently trivial these two factors are considered by Professor Weintraud, of Wiesbaden, sufficient in themselves to account for the difference in the results obtained. To me they do not seem adequate, and there are others I would take into consideration.

In English private houses the bath-room is seldom sufficiently warmed, hot towels are forgotten, and the necessity for the immediate transference of the bather to a suitable cooling chamber is too often neglected. There is also the curious fact that, owing, perhaps, to some difference in climate, the warm reclining bath must usually be given in England at a slightly higher temperature than in central Europe.

In whatever way the value of these factors may be separately assessed, it must be admitted that the balance of advantage rests with baths given at properly equipped health resorts.

In the famous spas of Central Europe baths can be taken with advantage only during a short period in the summer. Most of them are closed for seven months of the year, and but little fre-

quented during May and September, the first and last months of their season. In Europe, the best resorts for a thermal cure in winter are Vernet-les-Bains in the Eastern Pyrenees and Mont Estoril in Portugal. In Northern Africa, Hamman Rihra and Helouan are the best known, while in South Africa, owing to the reversal of the seasons, the bathing time at Caledon corresponds with our winter months.

Passing now to the uses of mineral water taken internally, some springs are so richly mineralised that an ordinary glass, 9 oz., represents a tangible pharmaceutical dose of their salts. Hence their primary action requires no explanation. Such springs are the Choussy Perrière of La Bourboule, the alkaline springs of Vichy, and the Marienbad Kreuzbrunnen.

Many, perhaps the majority of cases in which arsenic, sodium bicarbonate and sulphate are indicated, can be treated just as well at home by these agents given in the conventional 6 oz. mixture. There are instances, however, in which the natural water answers better than the pharmaceutical product, a fact of which we are impelled to seek for an explanation.

Some impute the difference partly to the imagination and partly to the change in the patient's whole manner of life. Others, among whom are, of course, the spa practitioners, assume that the products of Nature's laboratory are always superior to those of the chemist, that minimal quantities of other salts contained in these waters are important adjuvants, or that there exist in them unknown elements of high therapeutic potency. These last suggestions are not to be dismissed with contempt. There are springs of extremely feeble mineralisation containing only salts considered pharmacologically inert, yet the waters of which have been drunk by thousands of patients for hundreds of years, and still maintain their popularity. Of them and the credit they still enjoy may be said in President Lincoln's phrase, that "though you may fool some of the people part of the time, you can't fool all of the people all of the time."

For centuries it has been believed that the thermal are of higher therapeutic potency than cold springs of like mineralisation,

and now Armand Gautier has advanced the hypothesis that their origin is totally dissimilar. Gautier reminds us that cold springs are derived originally from surface waters, which, after percolating through the underlying strata, have collected into subterranean reservoirs. Returning to the surface, they are taken up by evaporation into the atmosphere, again precipitated as rain or dew, and so on in an unending cycle.

This theory of origin he challenges as applied to thermal springs. In certain primitive granitic rocks he has found the elements of water in stable forms of combination. One kilo of this granite heated to redness yielded him 2700 c.c. of gas in which hydrogen predominated. This hydrogen, which is continually distilled from granitic rocks at great depths, he believes to unite with the oxygen of the metallic oxides also found there, to form what he calls nascent or "virgin" water, whereas by comparison cold springs may be regarded as consisting of already used or exhausted water.

These views are confidently advanced. Should they receive confirmation the study of the properties of thermal waters will be invested with a new interest.

I have now outlined the way in which are used the therapeutic resources common to all the spas—air, exercise, diet and waters. I think it will be recognised how wide must be the range of their influence when thus mobilised and used in combination, for harmonised co-operation is the key-note of successful spa treatment. It would be superfluous to describe in detail how they assist metabolism, or how excretion by the skin is promoted.

Before passing on to methods more special in character and more limited in their range of application, it seems to me desirable to comment on the subject of suggestion in its relation to spa practice. There are sceptics who contend that suggestion is its alpha and omega. In their view the waters merely supersede as polarising agents the polished disc of the early mesmerists. This, of course, is an exaggeration. The plain fact is, that under the conditions of spa treatment suggestion can be more boldly

used, and consequently is used with more frequent success than in the ordinary consulting room.

Take it arithmetically. Let us suppose a doctor in an important town employing suggestion in a thousand cases, out of which one in every ten failed to show striking benefit. Of the community to which his practice is confined, there will be one hundred members ready to inform all concerned that Dr. Blank's assurances are not to be relied on. The conditions are radically different at a spa. There the doctor need not have so much as an unpleasant leave-taking to face, even if the patient is apparently worse. He sends the sufferer home, or to a climatic station for an after-cure, and in the accepted formula confidently affirms that the seeds have been sown and the harvest of good health will assuredly be reaped in the near future.

Should this last happy suggestion fail the patient is not likely to re-visit the same place. If, on the other hand, he has been cured during or after his stay there, it is not unlikely that he will have established the "cure habit." He will then return again and again, to add one more to the band of true believers found at every professional health resort, who are such potent auxiliaries to the local high priest of suggestion.

Returning from this digression, I come now to the consideration of cases in which elimination by the kidneys or bowels is indicated. In these we find that pharmacy supplies us with a great variety of agents, which may successfully compete with the products of the mineral springs.

In deciding, therefore, whether or not to send the patients to them, we have to consider the general and specific resources of the spas, while laying more stress on the former.

Vichy and Neuenahr are the chief spas at which elimination by the renal route is promoted by the use of the alkaline waters to be found there. The Vichy water is much the stronger and this spa has a splendid bathing establishment, the best in France, and the only one fully equal in equipment to the corresponding institutions in Germany. The situation of Vichy, however, is unfortunate. It is much shut in, and in July and August the heat is

apt to be well-nigh intolerable to English people, and I must add with regret that it is one of the worst kept of French inland watering places. Neuenahr is hot, but not stuffy. It does not attract many English patients, so that those who visit it will find it rather dull unless they have some familiarity with the German language.

20 More recently waters of a different type have been advocated for renal elimination. The features they have in common are, besides the presence of lime, the small percentage of dissolved salts, which in some instances amount to less than '5 parts per mille. It is believed that these minimal quantities are just sufficient to stimulate the renal epithelium, and that the waters pick up waste products and pass through this membrane with great ease. A special point is made of their poverty in chlorides, a quality of great importance for those who accept Widal's chloride deprivation theory.

The stronger of these waters are found at Vittel, Contrexéville and Wildungen, the weaker at Evian and Aix-les-Bains.

Aix-les-Bains, one of the gayest spas, is extraordinarily picturesque. It is splendidly kept, and except that the period of waiting for a bath is likely to be much longer than that of immersion in it, well managed. The persistent heat, however, though rendering it typically suitable for some arthritic cases, is a disadvantage when elimination by the renal route is desired.

Vittel is free from this drawback, the warm days there being always followed by cool nights. Vittel has the initial advantage of a very open situation, and the spa town, well planned originally, can never be spoilt by the speculative builder, because the surrounding land is held by the central administration. Expenditure on luxuries, as well as on essentials, has been as lavish as it has been discriminating, and I did not find lacking any really important improvement which was not under consideration or already in hand. Honour where honour is due, and as I am unable to avoid saying harsh things of some of the French spas it is with all the greater satisfaction that I find myself able to praise others, and to praise this one without reserve.

I cannot, however, abstain from some expression of regret that

there should have been sent to us printed and illustrated matter, such as we are not accustomed to receive from a health resort offering serious treatment for serious maladies, and which does Vittel less than justice.

A stronger appeal to our attention would be made by a plain and matter-of-fact recital of the general advantages of the station, and still more by a reasoned account of the action of the mineral springs corroborated by the testimony of independent observers. As to this last I should anticipate no difficulty, for I have found that the best professional opinion in France sets high store by the waters of Vittel. If my remarks should result in eliciting from the other side of the Channel information of this kind, which would stimulate interest and inquiry in medical circles at home, my present purpose will have been largely fulfilled. Here I can find space only for a bare characterisation, in a form designed to avoid taxing the memory and to serve as a peg on which may be hung more detailed information.

I suggest, then, that these five adjectives may suitably be linked with the name of Vittel—airy, tidy, dry, lively, sanitary; while another, gouty, indicates the group of patients to be sent there.

For gouty conditions the order in importance runs :

Gouty dyspepsia, gouty kidney, gouty arterial degeneration, gouty arthritis, gouty cystitis, gouty calculosis.

Whether this order would meet with universal approval at Vittel I very much question, but my own view is that however useful these waters may be for the alleviation of symptoms, they are more so for their influence on the underlying causes.

Though bathing is a subordinate part of the treatment, baths are remarkably well given, and I found there some kinds that I have not met with elsewhere.

Contrexéville is much older and has unfortunately considerable hygienic disadvantages. It was formerly described as "a dirty town on a dirty stream." The stream is now a little cleaner. The waters contain 1·5 parts per thousand of sulphate of lime, which salt is there highly prized for its alleged stimulating action on the unstripped muscular fibres of the ureter, by which calculi are driven

along that tube. Enormous doses of the water are ingested, so that in the opinion of some, the miniature uric acid sand-heaps and the quarries of gravel passed by patients there, are really expelled by hydraulic action. However this may be, it is generally held in England that Contrexéville water is most efficient in cases of renal calculus, but that it is not so useful when elimination of toxins by the renal route is desired. At Evian the water is very feebly mineralised, and it is frankly stated there that the principle of treatment is the elimination of toxins from the blood by dilution and diuresis, and the expulsion of gravel by a flushing action. Only those who prefer Germany to France will select Wildungen. An actual visit is the less necessary, as it appears that bottling and exportation do not diminish the power of the waters. For centuries cystitis has been treated by these waters of the earthy type as well as by those of the alkaline group, but probably in the future both sets of water will be used mostly as adjuvants, since Sir Almroth Wright has shown us how to deal with the causative bacterial infections.

The spas whose speciality is elimination by the bowel are those with waters containing sodium sulphate, as Marienbad, Karlsbad, Brides-les-Bains, and Cheltenham.

It is, of course, claimed that the fresh natural salt is more powerful in its action than the artificial pharmaceutical preparation. I have not been able to satisfy myself that this is the case, and I believe that if merely an aperient action is desired there is no special advantage in these waters. If, however, we look a little further ahead to the restoration of the normal functions of the bowel, they are of the greatest possible value. The simplest explanation seems to be that they act, so to speak, as bowel lotions, and that they contain something which, as it passes along the intestinal tract, has a more beneficial influence locally than any corresponding pharmaceutical preparation.

A curious point in connection with sulphate waters is that in Germany and Austria it is believed that the cold waters have a much stronger aperient action than the hot, and that the function of the hot Karlsbad water is rather the treatment of

diarrhoea. This is of practical importance, for if you happen to send to some of the Karlsbad physicians a patient suffering from constipation, he is not unlikely to be told that the selection has been faulty, and sent on to Marienbad where the waters are cold.

Marienbad is more bracing than Karlsbad, and consequently more suitable for patients whose physical powers are unimpaired. Karlsbad is apt to be close in July and August. Its reputation for the treatment of severe cases is so great that these are in the majority there. The inevitable consequence is that it is a somewhat gloomy place of sojourn for the sensitive. Brides-les-Bains is very much smaller than either of these places, much quieter, and less expensive. The waters are not very strong, and are so held suitable for cases not requiring drastic treatment.

Cheltenham deserves better appreciation than it receives. For many Anglo-Indians requiring eliminatory treatment it is superior to Karlsbad in all but prestige and hotel accommodation. The climate is mild and well suited all the year round for those who have lived in the tropics, while, if the patient requires bracing, a short tram ride takes him to a hill where the air, though soft, is invigorating. In addition to the sulphate spring there is an alkaline water akin to that of Vichy. Cheltenham has, in being available at all seasons, an important advantage over its Continental competitors, which are at their best only in the early part of the summer.

From the purely eliminatory standpoint the sulphur waters are not very important. Though it has been shown experimentally that they increase biliary secretion, their aperient action generally requires to be reinforced by some other means.

Amongst the sulphur spas may be mentioned Aix-les-Bains, Aix-la-Chapelle (both dealt with under different headings), Cauterets, Harrogate, Strathpeffer and Lisdoonvarna, the last a not very well-known Irish spa. Cauterets is one of the least enervating of the Pyrenean spas, but is, nevertheless, terribly hot in summer. Harrogate and Strathpeffer I shall describe later, while Lisdoonvarna is so embryonic that only persons who are

satisfied with primitive accommodation can suitably be sent there. Beware of sending your patients to Harrogate in a cold summer, to Strathpeffer in a rainy one, or, if I am correctly informed by an Irish friend, to Lisdoonvarna without wading boots.

It is universally admitted that the arthritic group of diseases—gout, rheumatism, and rheumatoid arthritis—are typically suitable for balneotherapy. These affections are placed in the list of indications by almost every watering-place in Europe, but the only sound method of selection is to regard, not the name of the disease, but the associated constitutional condition, which must be essentially one of disordered metabolism, generally coupled with defective elimination.

At Aix-les-Bains local treatment by baths and massage has been brought to greater perfection than elsewhere, and the heat of this place, lasting well on into the evening, is of much advantage to patients taking frequent baths at high temperatures. For the same reason the mild climate of Bath makes it the best spa in England for the more delicate arthritics. Moderately robust invalids may suitably be sent to Droitwich for treatment by the strong brine found there, or to Harrogate, where there is a considerable variety of waters. The waters of Buxton are so feebly mineralised that it is difficult to explain the good results obtained there. Woodhall Spa may be described as a quiet place for quiet people, or a sleepy place for sleepless people; but do not send patients to whom the brightness of Continental spas appeals to Woodhall, unless you are prepared to have them upbraid you for dooming them to a foretaste of the Buddhist Nirvana.

Perhaps one of the most interesting problems in practical balneology is that as to the value of the treatment of heart-weakness, by salt and carbonated baths, initiated by the late Professor Benecke of Nauheim.

In a special number of the *Practitioner* of July, 1908, on climate and health resorts, which I edited, the subject is discussed in some of its aspects by Dr. James Mackenzie, late of Burnley, and now fortunately of London, by Dr. Groedel of Nauheim, and under the head of "Salt Waters" by myself.

It is admitted that by the use of the warmer baths the arterioles are dilated, and that thus the load of the heart is lightened, and that under the influence of cooler baths the heart may beat with greater power, slowness, and regularity. Thus by the use of differently graded baths the heart may be stimulated or soothed, blood-pressure raised or lowered, and in some cases the heart slowed and regularised. These effects, however, are of brief duration, and according to the well-known physiological law, there follows a reaction which is equal and opposite. If this, as was formerly supposed, were their sole action, it would be difficult to imagine how five baths a week, of twenty minutes' duration each, could effect any lasting beneficial influence.

The most important part of the action of these baths is not immediate but remote. Its adequate discussion, however, would require more time than is now at my disposal. When good results are obtained, I believe they are to be ascribed chiefly to an improvement in general metabolism in which the cardio-vascular system shares.

It is an error to suppose that "Nauheim treatment" and treatment at Nauheim are convertible terms. Physicians there do not consider themselves restricted to the employment of baths and scheduled exercises. They treat the patient in fact according to his condition, whether this implies simply inspiring him with hope and arranging for the supply of plenty of fresh air with suitable diet, keeping him in bed and administering drugs of the digitalis group, or the use in combination of modern physico-chemical methods.

If it were desired to draw comparisons between drugs and physical methods it might be claimed for the latter that they conform more closely to Nature's methods, that they do not produce digestive disorder and so afford some of the advantages of digitalis without its chief drawback, and in favour of drugs that their action is more continuous, more varied, and capable of finer adjustment.

Early cases of dilatation associated with malnutrition furnish the most striking of the examples of genuine success under

kinesi-balneotherapy. The neuroses, tachycardia and arrhythmia, often do exceedingly well. Cases of recent arterio-sclerosis may be accepted for the treatment, but those with symptoms of angina are to be dealt with cautiously. Among elderly persons there have been many instances of failure, and some of calamity. Patients in whom the trouble is due to the imagination alone are to be declined; their acceptance has certainly detracted from the reputation of this treatment. Nevertheless, psychic impressions are not to be disregarded. Cardiac invalids assembled at their "Mecca" are influenced beneficially by the current enthusiasm. They submit cheerfully to orders and restrictions, displaying limitless faith and hope when they are doing well, and a surprising degree of charity even when they are not!

It might be remembered against me if I omitted to mention the barium chloride waters of Llangammarch with their digitalis-like action, and that in France the refinement is recognised that the rheumatic cardiopathies are claimed by Bourbon-Lancy, and the gouty by Royat. Of all the current baths that I have tried the Eugénie at the last-named spa was the most exhilarating.

The spa treatment of syphilis was for many years almost a monopoly of Aix-la-Chapelle. Now Aix-trained rubbers are to be found in London and other large cities, while at many spas Aix methods have been successfully copied. In Germany the chief alternative spa is Wiesbaden, and in France, Uriage.

Aix-la-Chapelle is a large town. It has luxuriously equipped baths, but otherwise has no special attraction. The disadvantage in sending a patient there is that he is thereby practically labelled as suffering from a loathsome disease. This is well recognised at Aix, and strenuous attempts are made to attract arthritic and other patients, for whom sulphur water is commonly prescribed, but as over 60 per cent. of all the patients, and over 80 per cent. of the English patients, who go there are the subjects of specific disease, the stigma, whether deserved or not, is not an easy one to efface.

The conditions of life at Uriage are such as to render it an ideal place for the treatment of syphilis. The composition of the water is exactly that which theoretically is required, and what is

more important, the results obtained are excellent. It has been shown that in syphilis the body suffers a considerable loss in iron and in lime and soda salts, and a still greater loss in the element sulphur, which last must be of importance since there is in the blood twice as much sulphur as iron. Now it is precisely these substances which are contained in Uriage water, which, be it also noted, is isotonic with the blood. It is therefore reasonable to suppose that this water is ideally adapted to effect a correct re-mineralisation.

It is, however, still generally believed that, useful as is the co-operation of general medicinal and hygienic measures, the one and only well-proved antidote to the syphilitic virus is mercury. Hence, unless sulphur directly assists the action of mercury its rôle is of small importance. But there is evidence that it does so assist. The modern view is that mercury shortly after its ingestion is in part converted into an insoluble albuminate, and consequently is stored in the tissues unduly long as a semi-inert body. The sulphuretted hydrogen of the mineral water, however, unites with this compound, and converts it into an active soluble sulphate, which circulates freely and is easily eliminated. For this reason mercury can be used boldly without fear of accumulation, and the facility with which the metal is eliminated is shown by the amount that is recoverable from the urine, and by the fact that even where very large doses are given mercurial stomatitis does not occur. One mercurial accident is sometimes met with—mercurial enteritis. This is probably due to the fact that sulphur as well as mercury is an intestinal irritant.

The practical point to be remembered in connection with this is, that the one contra-indication to the use of the mixed mercury and sulphur treatment is irritability of the bowel.

Though it cannot be claimed as a fresh specific, the mercury-sulphur synthesis is, I believe, the most effective method known for the destruction of the syphilitic virus.

Until lately it has been fully realised only at the sulphur spas and in a few great continental cities that inunction treatment is nothing if not intensive, and as such should be conducted by

medical men versed in the technique, and having at their command trustworthy assistants. During the last few months arrangements have been completed by which the Aix treatment in all its details is carried out in London, and, if necessary, in the patient's own home.

Dyspepsia being of course a symptom, very many spas deal with the varying causative factors.

Marienbad, Karlsbad, and Brides waters act chiefly by depletion, those of Vichy by alkalisisation, of La Bourboule and Royat by their arsenic, of Ems by lavage with a mild sedative alkaline and salt solution, of Baden Baden by a weak, of Wiesbaden and Homburg by a stronger salt solution, and of Gastein possibly by radio-activity. At Wiesbaden there is a famous private clinic for diseases of the stomach.

Chronic nasal and laryngeal catarrhs are treated by means of ingeniously devised sprays and inhalations, most of them invented at Ems, which as the parent spa is probably still the best. The treatment is also among the specialities of Mont-Dore, but is carried out there with less elaboration.

The spa treatment of chronic bronchitis and asthma is conducted with considerable success at Mont-Dore and at Ems. At both of these vaporised water is inhaled in specially constructed rooms in which the patients sit for hours, while at Ems the pneumatic chamber is an additional speciality.

The slighter cases of chronic albuminuria are claimed by the renal spas before referred to, while there is a spring at St. Nectaire which is said to be specially beneficial when there is an associated phosphaturia. It need scarcely be said that in nephritis a suitable *régime* is of greater service than the use of any mineral water, and hence no permanent improvement is to be expected from a sojourn at these spas; but if you desire to send a patient for a holiday to a place where his condition will be understood it is well to bear them in mind.

Almost every conceivable disease of the nervous system, including even syringomyelia, is found among the official indications for Oeynhausen. Everything is provided for making

sufferers from nerve-diseases comfortable, so that even the most sceptical must admit any such patient may as well spend the summer there as elsewhere. Bodily nutrition is no doubt improved by Oeynhausens's saline effervescing waters, and it must be remembered that much may be done in this way for the amelioration even of somewhat hopeless-looking cases. Nor should it be forgotten that the labelling of a disease as incurable does not necessarily make it so. The re-education of the muscles in tabes is practised with success at Oeynhausens and also at Wiesbaden.

Schlangenbad is pre-eminently the rest-cure spa of Germany. Cases of nervous irritability, as at the menopause, do remarkably well there. It is also said to be particularly suited for soothing the ill-tempered. One of the local physicians reports, quaintly enough, that he has among his patients many very near relations of medical men, so perhaps the profession at large has a shrewder insight in the selection of spas than is generally supposed. Men in search of rest with slight recreation do better at Wildbad. Recently Church Stretton has come into vogue for the treatment of neurasthenia. It has been called the English Schlangenbad.

When chronic constipation has resisted carefully considered treatment at home it is but seldom that it will yield to spa methods, and this because it is a symptom for dealing with which the pharmacopœia is richer in resources than the mineral springs, while it is unlikely that the spa practitioner will find out in three weeks more about the underlying conditions than the family doctor has done in as many months, or, it may be, years.

There is too general a tendency to send these patients indiscriminately to the sodium and magnesium sulphate springs, due apparently to the fact that those salts are the only ones commonly used at home which happen to be contained in mineral waters. Cases in which atony of the bowel is the chief causative factor do badly at these spas and still worse on their return, for the muscular coat is weakened, and it is not easy to leave off the Glauber salt habit. For such cases muriated waters of medium strength are more suitable, the difficulty of discontinuance being

less. It is only when constipation is associated with plethora that sulphated waters are indicated, and only when there is catarrh of the mucous membrane or insufficient glandular secretion that muriated waters are of very great service. When the catarrh is low down the methods of Châtel-Guyon and Plombières should be considered.

The remaining cases suitable for spa treatment are those in which the doctor has been unable sufficiently to control the exercise or diet of the patient. To meet the former difficulty, as I have already pointed out, the spas have resources seldom found elsewhere, among them being the Zander institutes, of which, however, unfortunately, we have only one in England. Should the trouble arise from obstinate perseverance in an improper diet it is best to insist on a sojourn in one of the dietetic sanatoria.

The same principles apply, *mutatis mutandis*, to the management of chronic diarrhoea.

The treatment of colitis is the leading speciality of Plombières and of Châtel-Guyon. At the former, intestinal lavage is the method chiefly relied on, while at the latter, some of the physicians lay greater stress on ingestion of the water by the mouth. With regard to the local treatment of colitis, which has provoked so much discussion, I think it enough to say that just as few of us would willingly renounce lavage of other mucous membranes in suitable cases, so also we shall find a field for the employment of these intestinal irrigations. Early cases of colitis yield, no doubt, to simpler remedies, but for those of long standing the methods of these spas demand our consideration.

Châtel is the more suitable spa when there is atony of the colon, while the waters of Plombières are to be preferred when there is spasm with irritability. For the relief of the latter condition the under-water douche, which, to give due credit to the inventor, should be called the "douche Bottentuit," is of much greater service than anyone could realise who has not experienced personally its soothing effect when applied to any part of the body.

Plombières has been dubbed by a lady "a duck of a place"—

many lines would be required to improve on that characterisation of this quaint little town, whose narrow, terraced streets, and huddled-together houses, remind the traveller of an eastern city.

Châtel-Guyon, clearly intended by Nature for a first-rate health resort, is gradually obtaining due recognition. The progress would be more rapid if to the members of our profession practising there were given that control in municipal matters to which their knowledge entitles them.

Pelvic exudations are claimed by Kreuznach, Franzensbad, and Kissingen (the last also having a long-standing reputation for the cure of sterility), and also by numerous other spas, having at their disposal strong brine or mud baths. Many experienced gynaecologists, especially those of the older school, entertain no doubt as to the practical value of these remedies for cases uncomplicated by suppuration. Brine is applied by means of sitz baths, compresses, and by local irrigations. One observer, Dr. Freund, who, now at any rate, has no reason to over-praise these particular methods, goes so far as to say that by their use the diagnosis between the neoplastic or inflammatory origin of a peri-uterine mass may be rapidly cleared up, for if inflammatory, the swelling will speedily disappear.

The next subject to claim attention is the treatment of the curable anæmias, that is to say, chlorosis, and the secondary anæmias due to general under-nutrition or to loss from hæmorrhage or suppuration. For primary anæmia the carbonated iron springs, as those of Schwalbach, Spa, and St. Moritz, are usually given the preference; while for the secondary anæmias, alkaline sodium chloride, and iron waters, are held to be indicated on account of a certain resemblance in their composition to the serum of the blood. The most suitable spas for anæmias of the latter type are, perhaps, Royat, La Bourboule, Uriage, and, in our island, Harrogate and Llandrindod.

It is my opinion that for the treatment of these affections natural iron waters are seldom more effective than pharmaceutical preparations. I emphasise the personal character of this statement, because a previous paper on this subject has given rise to the only

sharp disagreement with a serious spa physician which has so far fallen to my lot. First with regard to chlorosis, for it is here that I have been taken to task. It has been asserted, and the statement copied from book to book, that the natural bicarbonate of iron waters are specially indicated where there is a difficulty in assimilating the ordinary inorganic salts. It is my conviction that there is no foundation for this claim, since a short course of careful diet, with perhaps some simple gastric sedative, will prepare anyone capable of taking iron at all for the ingestion of the milder metallic preparations, especially if they are given in aerated water.

Nevertheless, if a chlorotic patient, coming under our observation in summer, desires to visit the continent, we may with confidence advise her to go to Schwalbach, Spa, or St. Moritz, all of which possess very pleasant effervescing iron waters. We may be sure that the case will be thoroughly well treated there, for the local physicians are expert in the employment of accessory means whenever they are necessary. At Spa the cure is much accelerated by the use of arsenic hypodermically; while at St. Moritz and Schwalbach pharmaceutically prepared organic or inorganic iron is by no means disdained.

Owing to their moderate altitude Spa and Schwalbach are very suitable for chlorotics with weakness of the heart muscle. In situation and in climate they have much in common, but for various reasons British invalids have more commonly been advised to go to the German resort. The Belgian watering place has, however, advantages which should lead to its regaining a lost popularity. It is decidedly more lively than Schwalbach, and the beautiful Ardennes country reminds the visitor of the most picturesque woodland and meadow scenery of our island; while by the opening last year of a tram line to an elevated plateau above the town a fresh resource of the greatest value has been added.

Uriage is a pleasant little place rather off the beaten track of British invalids. La Bourboule is typically French, and might with advantage be better kept. The waters, however, contain so

much arsenic that they have to be considered when that metal is indicated.

Royat, though having waters which can also be turned to profitable account in other disorders, and in many ways itself a delightful place, is, nevertheless, one of the number of French spas formerly in favour with British physicians but now almost forgotten. Owing to their failure to keep pace with the times, our friends and nearest neighbours have largely lost Anglo-American patronage; but the loss has only recently been felt, because made up by the French people themselves, who for a considerable period ceased to frequent some of the foreign health resorts formerly popular with them. Lately, however, there has been an increasing tendency for them to spend their summer months in other lands. Should this exodus remain unchecked, and Ibero-Americans, who now furnish a large contingent of visitors, find that they can deal better elsewhere, a serious crisis may arise. There are many things said at the spas, but seldom written about them—these are among the number.

Since we are invited to select for spa treatment all cases of arterio-sclerosis, irrespective of origin, let us see to what extent we can respond to the invitation. To begin with, it must be admitted that all the cases traceable to gout may suitably be sent, for the multifarious resources of these watering places provide means for checking the progress of that disease at an early stage and for the elimination of its poison later on. In the early or preventable stage a bathing course is often of greater service than a drinking course, and baths are no doubt much better given at spas than at home. In England the bathing establishment at Harrogate takes the lead, closely followed by Bath and Buxton, while on the continent there is little to choose between some thirty of the spas.

When the gout is at such an advanced stage that we have only elimination in view, bathing sinks in importance and a water of the Buxton or Evian type should be selected for internal use. Some of these waters seem to lose their valuable properties by storage, while others do not. Buxton water, for example,

should be drunk at its source, but the Evian Cachat may quite well be taken anywhere.

It is during the intermediate stage, when prevention and elimination should go hand in hand, that the use in combination both of bathing and drinking is of paramount importance; but in the choice of a spa for this purpose the more important factor is the influence of the water which is to be taken internally. For this mixed treatment Ems or Homburg is usually given the preference in Germany, and in France, Vichy, Vittel, or Aix-les-Bains. In England (with internal action chiefly in view) I should give the order thus: Llandrindod, Buxton, Harrogate, Cheltenham, Bath. Conditions of climate and environment, however, often over-ride all other considerations, and for these factors I must refer the reader to the remarks I have made elsewhere.

Should the arterial disease be simply a manifestation of premature senility spa methods are not indicated.

There remains a group of cases in which the origin of the malady is uncertain. If treatment at home does not yield good results it is better to try at least one formal spa course than to stand by as an unenlightened onlooker watching the patient drift downhill.

It is for such cases that saline carbonated baths are so often of service. First used extensively at Nauheim under the inspiration chiefly of Dr. Groedel, the practice has spread to many other spas, and is now one of the chief specialities of Kissingen. As none of the detailed explanations of the rationale appear to me satisfactory, I range myself on the side of those writers who believe that any benefit received is due to the improvement in nutrition and elimination following a properly conducted "Bade-Kur," using that term in its extended sense.

Just as in cardiac dilatation carbo-gaseous baths yield their best results only when applied at an early stage, so will these applications be of little service for cases of arterial disease unless employed before that condition is fully established.

A form of diplomacy not favoured by many physicians—the exaction of payment in advance for the whole course of treatment

—is the one royal road to success in the management of obesity; while for a permanent cure the requisite is that the patient should exercise prolonged self-restraint. It is, then, not really necessary to send these patients to any special place, but should they find it convenient to make a beginning of their abstinence during the summer holiday a visit to a spa may safely be recommended.

The "Entfettungskur" or thinning treatment occupies the first place among the indications for Marienbad, but, as I have said elsewhere, a writer who omitted to mention the others would do well to preserve his incognito on re-visiting that versatile health resort. According to a semi-official publication this place may justly be considered a "family spa," that is to say, one in which whole families may "enjoy" the cure without leaving any member behind, for, as the writer points out: "The corpulent husband the subject of gout or perhaps rheumatism, his wife afflicted with chronic metritis, and their daughter suffering from chlorosis, all find that Nature there has provided them with the means for recovery."

The writer alluded to exhibits, indeed, a modesty very rare in spa apologists, for the resources supplied by Nature are, in fact, even more numerous than he has suggested, and I may extend as well as confirm the application of his remarks as follows: Marienbad has ferruginous peat said to be richer in iron than that at Franzensbad; a carbonate of iron spring stronger than those of Schwalbach or Spa; a carbonate of calcium and magnesium spring stronger than the famous Georg-Viktor Quelle at Wildungen; an alkaline saline carbonated water resembling the Oberbrunnen at Salzbrunn; springs so rich in free carbonic acid that they might compete with Nauheim and Oeynhausen for diseases of the heart or nervous system; a spring of such low mineralisation that it may, at will, be claimed as a table water, or (by those who lay stress on the potency induced by ionic dissociation) as one of the highest therapeutic value; and, finally, by warming and diluting the Kreuz- or Ferdinandsbrunnen, there seems to be no reason why they should not fulfil the sixteen official indications of Karlsbad.

Such, compressed to the utmost, are the balneological potenti-

alities of this wonderful place, not much larger than an Alpine village. Well may the impatient reader formulate for himself the maxim, "When in doubt send a patient to Marienbad."

One of the best-known physicians at Karlsbad told me that the only advantages of his spa over Marienbad were the greater experience of the doctors in dealing with cases of grave disease, the more willing acceptance by patients of a severe regimen, and, for oriental peoples, the greater number of their compatriots dwelling there. Regarding Karlsbad, then, as a resort for serious cases, it seems to me unwise to attempt here to lay down rules for their selection. That is a problem to be solved by the application of special knowledge to individual conditions; but certainly cases suitable only for the home or the nursing home should not be sent there, or to any other spa.

It was the knowledge of the calamities occurring at Karlsbad that led me earlier to say, that whenever there is suspicion of organic disease the patient should be re-examined shortly before his departure. In not a few instances the diagnosis of malignant disease of one of the abdominal viscera has been established at Karlsbad within forty-eight hours after the arrival of the patient.

One cannot but feel surprised at the frequency with which diabetes is included in the list of indications given in the pamphlets published at the spas, when one considers how totally dissimilar in type are the waters at the various resorts, ranging as they do from those of indifference to those of very high mineralisation. Confining ourselves to the less severe cases, which alone it is wise to send from home, and which, it must be admitted, do very well at these watering places, let us consider the factors bearing on selection. Though easy to state them it is often difficult to apply them in practice.

It is a well-ascertained fact that natural mineral waters exercise no greater control over the excretion of sugar than artificial solutions of similar salts. So that, change of surroundings apart, the advantage or disadvantage of treatment by a specialist at a spa differ in no degree from those derived from similar treatment anywhere else, as the specialist in either case will presumably know

much as to the evolution of the disease, but little regarding the constitution of the patient. To treatment in sanatoria, whether at spas or elsewhere, this remark does not apply, as in these institutions observations are made which yield information not generally procurable by the family doctor.

Dismissing then from our minds the name of the disease, we have to consider in their bearing on selection, first, the climate and general resources of the spa, then, what mineral water is most likely to benefit the complications. Or, approaching the problem from the drug point of view, if the patient is already deriving benefit from, say, solutions of iron or arsenic, or from a sodium salt, we should in such case ascertain where waters of approximately the same composition are to be found and send the patient there.

We shall at least be assured of the intelligent application of these remedies ; for the use of its springs, and so of their mineral contents, are best understood by the medical men at each particular spa. If, when called upon to decide on a spa for a drinking course, practitioners of limited personal experience would apply these principles, and would limit their investigations to the claims of the best-known resorts, some of the worst, at any rate, of the errors now made in selection might be avoided.

Much experience in dealing with patients suffering from diabetes has been accumulated at the following watering places, not to mention others : Karlsbad and Brides, with alkaline sulphated waters ; Neuenahr, with alkaline muriated ; Vichy, alkaline ; Vittel, earthy ; Royat, alkaline ferro-arseniated ; Buxton, Gastein, and Evian, with waters of very low mineralisation ; and finally St. Moritz. This last, in my opinion, is the place of election for the fairly robust, not on account of the mineral waters, but because such cases, as first pointed out by Dr. Christie, do remarkably well at high altitudes.

As somewhat of a curiosity it may be mentioned that one spa, Bagnoles-de-l'Orne, specialises in the treatment of varicose veins and phlebitis. Baths and douches are given, and the affected parts are swathed in compresses soaked in the mineral water.

These measures no doubt allay inflammation, while the massage also employed promotes circulation in the vasa vasorum. Whether for this latter purpose mechanical vibrations are also used, as in other French spas, does not appear from the published descriptions of the treatment.

French physicians, we are told, "think of phlebitis only to couple it with the name of Bagnoles." The Gallic predilection for these neat formulæ of expression is so great that it has doubtless long been productive of a supply of cases so abundant that the physicians of the place have attained the proficiency of experience in the employment of its special remedies. Thus a treatment of perhaps somewhat fanciful origin may develop ultimately into one of the greatest practical utility. Such has been the evolution of many successful balneological methods.

The practical lesson to be drawn is that when a spa has long maintained a reputation for the treatment of a given disorder, its medical men will probably be expert in dealing with that disorder whether or not the waters are of real therapeutic potency.

Some inadequacy of the springs may even serve as a stimulus to their professional sponsors. Thus, some time ago, at a spa famed for the speedy cure of rheumatism I found prescribed a drug which was then unknown in London.

The addition to the waters of salts and even of drugs entirely foreign to them is a curious feature of the treatment at Bath, for such frank jogging of Nature's elbow is regarded at most other spas with strong disfavour.

Concerning the action of waters of very low mineralisation, the so-called indifferent waters, there is still much controversy. Writers at a distance from the spas, as might be expected, are disposed to compare them with tap-water. On the other hand, those who are under the necessity of employing them grasp, for explanation of the high therapeutic potency with which they credit these waters, at the latest theory, now that of potentiation by ionic dissociation. That ionisation places these weak waters in a position of superiority to the stronger ones is not a tenable proposition, for in the stronger the sum of the dissociated ions is

greater than in the weaker, though the percentage of dissociation is lower.

As was inevitable, radio-activity has been pressed into the service, and some continental writers have even suggested that stimulation of the thyroid gland by radium emanation supplies the key to the riddle of the action of these and all other mineral waters. Now, thyroid secretion, as we are reminded by Dr. Harry Campbell, "plays the part of a bellows, causing the vital fires to burn more brightly." But, unfortunately for writers who would make all diseases amenable to spa treatment revolve round a thyroid axis, and whose horizon in therapeutics is bounded by radio-activity, the principal action of some of the most highly radio-active waters is said by those who employ them daily to be that of sedation, not stimulation; and, moreover, it may appropriately be pointed out that many springs of admitted potency are notably poor in radium emanation. At Wiesbaden, for example, according to Max Roloff, the official mineral springs are less radio-active than the ordinary city tap-water.

Thus, I believe that no explanation which has hitherto been advanced, couched in the terms of science, is invulnerable to destructive criticism. We can, then, offer nothing better than conjecture, frankly admitting it to be such, unless we assent to the proposition that these waters are equivalent to tap-water used *secundum artem*.

I have seen enough of the effects of these indifferent waters when taken internally to convince me that they have a different action from the same bulk of tap-water, but that action is so slight in degree and so complex that it seems to me to elude definition in the present state of our knowledge.

What is it that makes the water of a mountain stream so exhilarating? Is it the fatigue of our climb when we quaff it, or the mountain air we are breathing, or simply—aëration? All these, I think, and something more; but *what* more I do not know. My own belief is that this unknown quality—let us call it freshness—is a substantial factor in the benefit derived by patients from drinking mineral waters at their source.

I will even carry my conjecture further. If a suitable dose of properly selected salts, such as those we commonly employ in medical practice, were dissolved in fresh spring water and drunk by the side of the spring, I think that in all likelihood more benefit would accrue than from the same salts dissolved in the distilled water of the chemist's shop, or in microbe-laden city tap-water. Often much more, I may add, than from drinking some of the stronger mineral waters, as Nature will not graduate her doses, while some of the best of our mineral salts are but sparsely represented in her waters.

Since this plan is not likely as yet to be tried on any large scale, we must make the best possible use of the natural mineral-water springs which now hold the field as remedies.

Of the resorts where warm, indifferent springs are to be found, the most suitable for British invalids are, Schlangenbad, Wildbad, Baden Weiler, Gastein, and Buxton. All of them claim as within their domain cases of gout, rheumatism, osteo-arthritis, dyspepsia, and functional diseases of the nervous system. In all of them bathing is considered of more importance than drinking, while such are the advantages in situation of the four continental spas that, apart from any possible merit of the waters, they take high rank as climatic stations. Wildbad and Schlangenbad are referred to elsewhere.

The climate of Baden Weiler is at its best in the late spring and early autumn; it may therefore be recommended to patients who require acclimatisation to continental conditions before taking a summer course at a more strenuous spa, and as a resting place after the termination of such a course. It is in fact a station for a "fore-cure" as well as for an "after-cure." Order and system must surely reign supreme at Baden Weiler, for the very trees are conspicuously numbered.

The splendidly picturesque situation of Gastein, and its invigorating but somewhat humid climate, are eminently suitable for the statesmen, savants, and other elderly dignitaries, who, according to tradition, are attracted to this mountain health-resort. Since greater potency has been consistently attributed to its

waters than to any others of the same type, it is probable that at Gastein will be ultimately fought out the vexed question of the real value of the waters of very low mineralisation.

Buxton desires to be known as a "mountain spa," though, according to Continental nomenclature, the altitude, 1000 ft., would be insufficient to bring it into the category of resorts of medium elevation. It is picturesquely situated and is notably well kept, while, if the town-planning scheme initiated some years ago had been consistently carried out, it would now be a very model of a spa town. The brilliant green of the turf in the public garden is a reminder that mountain climates bring mountain rains.

Visiting the mineral water hospital on several occasions, I questioned closely the patients afflicted with that most stubborn of maladies, rheumatoid arthritis, and always came away astonished at the results obtained, which I was assured were not due to any employment of accessory therapeutic agencies; but the physiological theories offered in explanation were to me quite unintelligible. One of my friends at Buxton informs me that "an immersion in the current-bath of more than ten to fifteen minutes produces a degree of lassitude which is never seen after bathing in ordinary or sea-water at the same temperature." Though on several successive days I have remained in the current-bath at Buxton for more than twenty minutes I have not had that unpleasant experience. At Wildbad, however, an immersion of ten minutes in a similar bath sufficed to produce lassitude, or, more properly, a sense of oppression, which my German companions confidently attributed to the action of the waters, but as it passed off immediately on quitting the hot and badly ventilated bath-cell a simpler explanation is not far to seek.

Some writers place the hot springs of Bath in the category of which I am speaking. Chemically this is not justifiable, clinically it is; for here we have waters containing elements which are believed to be nearly inert pharmacologically, yielding admirable clinical results. This historic spa is too well known to require description here, and, moreover, it appears to attract as many

invalids as can be conveniently dealt with. I will content myself by correcting one current misconception. The stuffiness commonly attributed to Bath is felt only in the lower part of the town. On the higher ground, now reached easily by tramcar, the air, though soft, is sufficiently fresh for delicate arthritics who are taking a thermal course. One more point; the question of coal-smoke abatement is nearly as urgent for Bath as for London.

The principal action of the best known alkaline waters is no doubt due to sodium bicarbonate, carbonic acid, and to the temperature at which they are taken. As we do not often prescribe bicarbonate of soda dissolved in hot aerated water, we are scarcely in a position to say whether such a solution would be equally effective; but I am disposed to think that with the two to choose from we should generally be right in preferring the natural warm alkaline carbonated water.

At Vichy, to five of the springs of almost identical composition the following indications are ascribed: Hôpital, diseases of the stomach and bowel; Grande Grille, those of the liver; Chomel, respiratory catarrhs; Lucas, gouty dermatoses; Celestins, affections of the kidneys.

I take it that we may read the story thus: All of these alkaline waters on first ingestion neutralise acidity in the stomach and bowel. Passing first through the portal circulation they liquefy bile; continuing their course through the general circulation they benefit gout, bronchitis, and especially gouty bronchitis; and leaving the body finally by the renal route, they stimulate mildly the renal epithelium.

As to sulphur waters, I am only more reluctant to taste them than to attempt any systematic account of their uses. The one is a matter of mere disinclination, the other, my sense of the difficulty of the task. In the literature of the subject, so far as I have investigated it, conclusions are arrived at by one writer only to be refuted by the next; nor can the action which theorists would attribute to the ions and the combined salts be made to tally with observed therapeutic results.

There are practical physicians who, without offering any satis-

factory rationale of these results, are content to ascribe them to the element sulphur, while others maintain that the really active ingredients in these waters are the calcium and sodium salts. To both of these contentions a deaf ear is turned by the modernist, who will hear of no explanation but that of a flushing action for the effect of each and every mineral water. This strikes me as little better than indolence, under the guise of twentieth century shrewdness.

My own conviction is that the chief action of every mineral water is the resultant of its known components, and that the strength of that action is in proportion to the degree of their concentration. While holding to this view, I believe that many of the springs possess, in addition, certain unknown properties, and that it would be better to seek the nature of these than merely to deny their existence.

Regarding their external use, I have satisfied myself that in some cases natural sulphur waters are of more service than their imitations, or than the lotions of dermatologists. So far, however, I have failed to observe any very striking benefit which can be ascribed solely to their internal use, and I am inclined to attribute the cures credited to them rather to the general resources of the particular spa, in which I would include those personal to the medical men by whom these repellent beverages are prescribed or not as they see fit.

It was of certain sulphur springs that Taine so wittily wrote: "In the time of Francis the First they were known as arquebusade waters: wounded soldiers were sent there. Now they cure ailments of the throat and chest. In a hundred years they will be curing something else. Every century medicine takes a step in advance!"

Conjectures and epigram aside, let me briefly summarise the most authoritative opinion on the action of these springs.

Just as muriated waters by allaying catarrh of the digestive tract are of service in conditions associated with that disorder, so sulphur waters, by reducing hyperæmia of the liver, are of benefit in congestive disorders of the portal and biliary systems, and

consequently exercise a favourable influence even in diseases apparently so remote as gout, rheumatism, and rheumatoid arthritis, when there is hepatic plethora.

In atomisation these waters are of service in chronic catarrhs of the respiratory tract, including bronchial asthma. As baths or sprays they are very useful in scaly and seborrhœic eczema, acne vulgaris and rosacea, psoriasis, and to a smaller extent in prurigo, pruritus, and furunculosis. Such, at any rate, are some of the complaints which do well under the care of the physicians at sulphur spas.

There is a substratum of truth in the stories circulated at the spas as to the troubles which may befall invalids who drink the waters without orthodox medical prescription. Of all the waters I know of none which require more careful handling than those which contain a heavy charge of the sulphides, for the damage that they may do is insidious.

Some of the sulphur spas have here been sufficiently characterised. To mention others there are Luchon, with a splendid bathing establishment, the gayest and most expensive of the great Pyrenean group, but a place to be avoided at midsummer, and Schinznach, a secluded spot with hotel accommodation of the boarding-house type at a fairly reasonable rate. Both of them are well known for the treatment of skin diseases, and Luchon also for the mercury-sulphur treatment of syphilis. An advantage of Schinznach is that the baths are in the Hôtel, and for English people another is that they are sure to meet many of their compatriots there.

Contrary to the advice of one of the well-known manuals of balneological treatment, cases of syphilis should not be sent to Schinznach.

Harrogate, where there is a "Kursaal" surpassing in grandeur all others in Great Britain, copied in style as well as in name from the Fatherland. Harrogate can boast of an amazing number of springs—saline, sulphuretted, and iron. It possesses also an unusual variety of balneological appliances, for which all Europe would seem to have been ransacked. I noticed there baths and

apparatus bearing the following names : Aix—Berthe—Berthollet—d'Arsonval—Homburg—Marlioz—Nauheim—Plombières—Schwalbach—Scotch—Vichy—Turkish.

There are, then, not many disorders, those of the respiratory tract excepted, for which this "general practitioner" among spas is not able to offer balneological aid. The extensive commons, and the cambered asphalted walks so useful in wet weather, are much appreciated by the "robust invalids" with whom we are taught mentally to associate Harrogate, and who find it the most delightful of spas ; but in this bracing and wind-swept place shelter, both natural and artificial, is sadly lacking.

Cauterets, already mentioned in a different connection, attracts French actors and singers who are suffering from affections of the throat. These maladies are very well handled there, and if a warmer place even than Ems is desired the claims of the Pyrenean spa should be considered.

Nenndorf, a small town with the strongest sulphur water in Germany, specialises in the use of dry sulphuretted hydrogen and of sulphur mud baths ; in fact, of the total number of baths taken, about one third belong to the latter category. All the morbid conditions amenable to sulphur treatment are sent there.

Strathpeffer, the only spa of first-rate importance in Scotland, has the advantage that even very short walks in several different directions lead to spots of great natural beauty. Dr. Charteris writes of the strong well as follows : "It resembles Moffat in that it only possesses a comparatively small saline content, whereas Harrogate contains relatively much more saline material, notably in the form of magnesium chloride, which confers on the water its purging character. Despite its strength in sulphates the action of Strathpeffer water is not at all purging. In Strathpeffer it is often found advisable to add magnesium sulphate to the water."

In diseases of the skin, as in other affections, the more acute the manifestations the weaker must be the water selected, and in this connection must be remembered the stimulating or irritant action of the chlorides in waters of the muriated sulphur group.

Before closing this short account of the uses of mineral waters

it is desirable to make some reference to muriated springs, or those in which sodium chloride is the chief ingredient. These waters have been attacked by one school of French writers and extravagantly lauded by another, while to the tyro in balneology they are a constant source of perplexity. At first sight it seems curious that waters dependent in great part for their action on so common an article of consumption should be held in such high esteem that they are prescribed more frequently than those of any other type. The reason is that, taken, as at the spas, early in the morning, their effect is other than that of a condiment.

The stomach after the night's rest has become sensitive, and the fluid with which it is first charged leaves it rapidly, passes along the bowel, and thus cleanses and stimulates both viscera. A further effect in the bowel of a solution of moderate strength is to produce an increase of glandular secretion and a slight excitation of peristalsis, but as the greater part is absorbed high up, purgation need not follow. To realise the efficacy of saline solutions in chronic catarrh of any of the mucous membranes we have only to call to mind their cleansing and stimulating action in nasal catarrh. In the early stages of a saline course there is an increased excretion of uric acid, together with a slight loss of weight, which is succeeded later by a gain, due to improved appetite and assimilation.

Stated in tabular form the chief indications for muriated waters are :

- (1) Chronic gastric catarrh with hypo-acidity ; (2) Gastric neurosis with hyperacidity ; (3) Chronic constipation or diarrhoea (by local action on the mucosa) ; (4) Chronic catarrh of the air-passages (in atomisations) ; (5) Cervical catarrh (by injections) ; (6) Pelvic exudations (by baths, compresses, and injections) ; (7) Chronic atypical gout (when associated with digestive disturbance) ; (8) The scrofulous diathesis.

Contra-indications are :

- (1) Gastric hyperacidity (except as above) ; (2) Acute congestion or inflammation of mucous membranes ; (3) Gastric dilatation with pyloric stenosis ; (4) Diarrhoea from ulcerative lesions ;

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(5) Severe forms of anæmia ; (6) Nephritis and cystitis ; (7) Renal inadequacy (as insisted on by Widal).

To comment on this table : In the first five of the indications the action is local, in the sixth both local and derivative. In the last two benefit arises chiefly from improvement in digestion, coupled with an activation of the processes of assimilation. The inclusion of both hypo- and hyperchlorhydria is justified by the experiments of Unger and others, in which the same saline waters were found to act curatively in both these opposite morbid conditions.

It will be observed that the list of contra-indications is composed of diseases in which stimulation or irritation is undesirable.

The greater the irritability of the stomach the weaker should be the water selected, while in states of simple atony of the stomach or bowel springs of moderate or of great concentration are likely to be more serviceable. This is a principle which should always be borne in mind in the selection of spas, for their physicians often object strongly either to dilute or to strengthen the waters, even when common sense suggests the desirability of such a procedure.

Last year I came across a typical instance of this inflexibility. A lady had been sent by her medical adviser in England to a spa, the waters of which were, in the opinion of a local practitioner, too strong for the phase of her disease at the moment. This gentleman, in preference to diluting the waters or having recourse for a time to some other remedy, must needs hint at once that the selection made by his *confrère* had not been of the happiest. The "Kur" was not a cure ! The patient lost confidence in both her physicians and they in each other.

An expert in the use of these waters informed me that in all probability the difficulty might have been surmounted either by dilution or by the initial employment of very small doses. All of which confronts us with the possibility that in addition to the condition of the patient and the relative strength of the waters, it may be incumbent on us to consider as well the psychology of the spa physician.

Muriated waters do not greatly stimulate metabolism, using that term in the strictly technical sense. They do, however, assist in washing out the tissues and they give energy to enfeebled organs. To the excellence of the results obtained from their use we have sufficient testimony in the world-wide reputation of such spas as Wiesbaden, Kissingen, and Baden Baden, as well as in the vogue of the saline springs of Harrogate and Llandrindod and the wells of Woodhall Spa.

Whether or not a simple solution of sodium chloride taken at home would answer equally well we as yet lack sufficient evidence to determine; nor are we likely to ascertain whether the complex mineral waters can be successfully imitated by synthesis, as the artificial would be more expensive than the natural product. Among other reasons why saline treatment yields better results at spas than at home must doubtless be counted the facts that the appliances are more perfect and the medical supervision more constant.

Familiar as we all are with the immediate stimulation effected by a salt bath, it may not be so well known that by penetrating the epidermic clefts and lodging there, the saline particles add to the original brief thermal stimulus a prolonged chemical irritation. The result is that determination of blood to the surface with de-congestion of internal organs is to some extent maintained between the immersions. This, I think, explains why hot salt water, in comparison with hot tap-water, is of superior efficacy in removing muscular stiffness. As recently pointed out by Frankenhäuser another action is that these hygroscopic salts lessen evaporation from the skin and so retard heat loss—obviously a valuable service to patients whose powers of combustion are impaired.

In England we have some excellent saline waters: Llandrindod with about 1·5 to 4·5 parts of sodium chloride per mille; Llangammarch 2 to 6; Cheltenham about 7; Harrogate from ·04 upwards; and Woodhall Spa, a brine with 19. In Germany the muriated springs of Baden Baden, Kissingen, Wiesbaden, Homburg, and Soden, ranging from about 2 to 14 parts of NaCl per thousand, are perhaps the best for internal use.

The leading spa of mid-Wales is still insufficiently appreciated beyond the bounds of the Principality, despite the commendations of that German physician upon whom it continues to confer posthumous honour.

Yet in situation and climate Llandrindod has features not, as far as I know, shared by any other spa. The winds from the west reaching the elevated plateau on which the town stands seem to retain the softness and purity of Atlantic air, while perhaps from a partial loss of moisture they acquire a more exhilarating character. Some observers who have noted the temperature at which they usually begin to be conscious of a sense of chill, have found that their "chill point" is perceptibly lower at Llandrindod. To this peculiarity, as well as to the positive warmth, may be ascribed the fact that the bathing season at this resort lasts in reality, and not merely by courtesy, from May to October.

When selecting a spa at which a thermal course may safely be taken during the treacherous spring and autumn months, or even in a rainy summer, appreciation of the revulsive effects on the skin of unfavourable climatic influences lends special anxiety to the physician's choice. It is worthy of note, therefore, that such a course may, at Llandrindod, be begun somewhat earlier and continued a little later than at most of those spas which also have their official season during the summer months. Here, too, we have the further assurance that there is little likelihood throughout this season of any interruption to the course by sudden spells of cold.

I should like to persuade Llandrindod to lead the way among British inland health resorts in providing adequate open-air rain-shelter. In Wales the visitor is apt to be driven indoors by the prospect of a drenching rather than by cold, and thus to be cheated of the open air when perhaps at its sweetest.

I would also strongly urge the erection of an inhalatorium, for we find here the two features necessary for its success—suitable air and suitable waters. There is, moreover, as far as I know, no fully equipped institution of that kind in the United Kingdom.

The balneological equipment, though on a small scale, suffices for present requirements. As for the waters, very long experience has proved that the saline fulfil the indications which I have described in the preceding section; while patients who are condemned as an atonement for past dietetic indiscretions to imbibe sulphur-bearing waters, will find in those of the sulphuretted group a mitigated form of penance.

One of the springs, though quaintly named the "radium sulphur," has not been proved to contain more radium than its neighbours, while sulphur exists only in the evanescent form of sulphuretted hydrogen. It is, however, a spring of considerable interest; for although among the anions Cl greatly predominates, the promotion of free diuresis is said to be the chief physiological action. This quality of the water has not yet received recognition in the manuals of balneology, but should the results so far reported be confirmed, Llandrindod may acquire a considerable reputation for the treatment of calculous disorders.

At the same time, I must demur to the opinion not infrequently expressed that the springs form the main asset of Llandrindod as a health resort. In these days of speedy transit, the decisive factor in the selection of a spa will certainly be some distinctive quality in which that spa excels, rather than resources which it has in common with others. Granting the utility of these springs, one cannot but recognise that waters of the same type are to be found in many different places, and in very great variety. In its climate, on the other hand, Llandrindod may justly claim characteristics which, if not unique, are, to say the least, exceedingly uncommon.

It is therefore to be hoped that its development will follow the lines best calculated to conserve those advantages of atmosphere with which it has been endowed by Nature. Some of the famous Continental spas, built of necessity in valleys hemmed in by overhanging hills, have perforce, narrow streets with insufficient ventilation. But Llandrindod's area for expansion is practically boundless. Its wide plateau, sheltered, but not shut in, by distant hills, seems to invite the creation, not of a modest

"garden city," but of a generously proportioned town in a landscape-gardened park.

Wiesbaden, most splendid of spa towns, is to be avoided in hot weather, a caution which applies also to Baden Baden, so famous for sport that its waters, the best I think in Europe of their type, are apt to be forgotten.

Kissingen, primitive and reposeful, is idyllic in situation. Though actually growing in importance it has a curiously "gone-down" aspect, while there is a remarkable diversity in the quality of its balneological resources. On the one hand, the installation of the official bath houses is decidedly primitive, whereas the Neues Kurmittelhaus is probably unsurpassed in Europe in its equipment, and there is, too, a private sanatorium which may well excite the envy of every nation. It is a standing grievance that this Bavarian health resort is not now visited by members of the Royal house. Perhaps, as with our own spas, that is the cachet lacking.

Woodhall Spa has strong salt waters which are used with great benefit in the affections tributary to them. Sir John Williams used to send cases of pelvic exudation there. It is a very suitable spa for patients who require unbroken rest, mental and physical, and not the slightest temptation to extravagance. The golf links and croquet lawns are good; but the expenditure of a vast sum of money would be required to render this village so attractive artificially that the dreariness of the surrounding country might be forgotten.

The best brine baths that I have seen in England are, oddly enough, at Stafford. But "Stafford Spa" sounds almost like a joke.

In conclusion, I propose to draw a few comparisons between French and German spas, and in doing so I intend to avail myself, as, indeed, I have already done here and there, of that freedom which is the privilege of a writer addressing himself solely to his professional colleagues.

In France the spa towns seem to have grown up naturally as do English towns, the comparatively wide village main road

developing into the principal street by the erection of the finest buildings, and minor streets shaping themselves as requirements have grown, without any prevision that when the town increased in importance their narrowness would cramp its grandeur.

In Germany, whether this foresight has been actually exercised I do not know, but towns when fully developed look as if they had originally been laid out with a view to their ultimate expansion. The result is that German spas have better planned and more spacious public recreation grounds, and that the streets present an air of greater dignity.

In France *some* of the spas are shamefully kept, the banks of lovely little streams are strewn with ordure, and along the roads there are sights so disgusting that they are best left undescribed.

In Germany, on the other hand, we find a cleanliness so scrupulous that it is reminiscent of the deck of a man-of-war.

In France the tendency is for each spa to specialise in the class of cases it seeks to attract. We are given a list of the diseases considered to be amenable to the treatment, and also those which on no account should be sent. Both in selection and rejection, but chiefly in the latter, these lists sometimes seem to be quite arbitrary. As an example, it is stated of one of the springs that the water has no influence above the diaphragm!

In Germany, on the other hand, many resorts claim nearly the whole list of the diseases, and this because, less regard being had to the specific nature of the disease than to underlying constitutional conditions, it is held that these can be beneficially influenced in one way or another by totally dissimilar therapeutic agents. In general balneological equipment the Germans hold a decisive lead. The *personnel* of the bath-houses is under better discipline, and to secure proper attention incessant tipping is not required, as is so frequently the case in France.

The personal and social aspect of spa life from an international standpoint is a more delicate subject to handle, but I may give it as the generally accepted impression that taken collectively the French are more pleasing neighbours than the Teutons. The Germans display ceremonious politeness, but the French add a

charming grace. In dealing with individuals, however, there is this difference, that in our little worries the Frenchman will help us out only if he sees his way to do so at once and with little difficulty, but a German, even a complete stranger, will take a considerable amount of trouble on our behalf.

Neither of them understand the matter-of-course hospitality of the Briton. They will treat you like an emperor on the doorstep, but they will seldom let you cross the threshold of their dwellings.

It is frequently said that in France there are more distractions, but I think that if villages and towns of the same size are compared in the two countries there will be found only one difference. In Germany public gambling is forbidden; whereas in France even quite tiny spas provide this form of amusement, if that is the proper name to give to games which steadily and inevitably transfer bullion from the pockets of the players to those of the managers of the casinos. As M. Blanc, of Monte Carlo, remarked: "Rouge wins sometimes, Noir sometimes, but Blanc always."

For a short time during and after the Boer War Englishmen were liable to insult in either country. That is a thing of the past, but I have not been able to notice that the recent Anglo-French *entente* or Anglo-German recriminations have made the attitude of the French more friendly or that of the Germans more unfriendly. There is, however, a peculiarity which has a practical bearing on the selection of a health-resort or of a district in a health-resort for English patients. English visitors, though they get on sufficiently well with Germans in Germany, will not, when they meet them on neutral ground, as in Italy, consent to remain in an hotel, or even in the same quarter of a town, where large numbers of them flock in. Formerly the foreign colony in San Remo was almost entirely English, but now, owing to the influx of Germans, this place is divided into two distinct quarters, each dominated by one of the nationalities. At Nervi, as there is not room for both, the English have disappeared. The only town I know of in Germany, where, owing to slightly strained relations, there are now fewer English, is Homburg. These, though

minor issues, are worth bearing in mind when sending your patient abroad, and it is well to ascertain to what extent those with whom you are dealing are likely to be affected by these racial considerations. They are, however, of greater importance in purely climatic stations than at spas, where the more intensive treatment occupies to a greater extent both time and attention.

My reason for making these remarks is that in the choice of a health-resort the environment and general resources, regarded in connection with the temperament of the patient, are often more important than the analysis of the water with reference to the name of the disease.

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