The analysis and medical properties of the tepid springs of Buxton : with cases and observations.

SIR CHARLES SCUDAMORE

ON THE

TEPID SPRINGS OF BUXTON,

WITH

CASES AND OBSERVATIONS.

PRICE THREE SHILLINGS.

TO HIS GRACE

THE DUKE OF DEVONSHIRE,

K.G. &c. &c. &c.

My Lord Duke,

In publishing a third and enlarged edition of my Work on the Buxton Waters, I must naturally recur to your Grace as the high source of the numerous arrangements which afford to the invalids of every rank and station, on visiting those unrivalled springs, so much comfort and advantage.

It is therefore with peculiar satisfaction I again avail myself of the permission with which I am honored, to inscribe to your Grace the following pages.

That your Grace may long have the pleasure to witness the growing prosperity of Buxton, and the increasing fame of its healing waters, is the ardent desire of,

My Lord Duke,

Your Grace's most obliged,

And most obedient, humble Servant,

CHARLES SCUDAMORE.

Wimpole Street,
May 1839.

PRELIMINARY OBSERVATIONS.

In an extensive acceptation of the word, all water, except rain water, might be named mineral; for, of necessity, they derive from the strata through which they pass, a certain degree of impregnation. But, in a medical sense, the term is limited to those waters, which, from their degree of impregnation with saline and gaseous substances, or from their particular temperature, are found to produce some remarkable effect on the human constitution.

The first step in the examination of a mineral water, after having determined its specific gravity, is the application of certain tests or re-agents, with a view to form a general opinion of its composition.

For the information of the general reader, I shall prefix an explanation of such preliminary steps, and of the indications which belong to the respective re-agents that have been employed with the waters treated of in this volume.

The specific gravity of a water will alone enable us to form a good conjecture as to the total quantity of solid matter which it may contain.

Kirwan, in his Treatise on Mineral Waters, gives the following formula for estimating the quantity of solid matter from the specific gravity, which, he states, will generally indicate the proportion within one or two per cent.

"Deduct, from the specific gravity of the water, the number 1000, and multiply the difference by 1·4; the product will represent the quantity of solid contents. It gives the weight of the salts in their most desiccated state, and con-

sequently freed from their water of crystallization. The weight of fixed air must be also included."

Example.—Let the specific gravity of the mineral water be 1·079, and that of distilled water 1·000. Then 1079—1000 × 1·4 = 110·6, or 100 parts of water of that sp. gr. should, according to Kirwan's rule, contain 110·6 parts of saline matter. He adds, "that Brisson found a solution of two ounces of salt in 16 of water to have its specific gravity 1·079: here 18 ounces of the solution held 2 of salt. Now as 18:2::1000:111·1.

Litmus paper is employed to discover the presence of free acid in water, by which its blue colour is changed to red. This acid is usually the carbonic; but a similar effect takes place from sulphuretted hydrogen. The redness thus produced disappears after exposure to the air for some time, or, is prevented by boiling the water for a few minutes; and in this way the action of these gases may be distinguished from that of the other acids, which permanently redden litmus.

Turmeric and violet papers are delicate tests for detecting uncombined or carbonated alkalies. By these bodies the yellow color of the former is changed to a reddish-brown, and the blue of the latter to a green. A carbonated earth, as, for example, carbonate of lime, has no effect on turmeric, but gives a green hue to the violet, even when its proportion is very minute; such is the great delicacy of this test.

There are other delicate tests for uncombined alkali, of which I may have occasion to make mention.

Tincture of galls, when added to a water containing iron, produces a violet color, or dark purple, which, by standing, becomes more or less black, according to the quantity of metal contained in solution. If the change of color be produced previously to the water being boiled, but not afterwards, it is a proof that the iron has been held in solution by a volatile acid, as the carbonic. If, both before and after boiling, the same change be produced, then we infer that the iron is combined with a more fixed, or mineral acid, as it is usually denominated.

Prussiate of potash is also a delicate test for discovering iron when dissolved in a mineral water. The appearance

which it presents with this metal, as the impregnation is weak or strong, varies from a pale greenish-blue, to a dark Prussian blue color.

Lime water is rendered turbid by waters which hold carbonic acid in solution. It does also occasion a precipitate with sulphates, and more especially when either sulphate or muriate of magnesia is present. If the precipitate which is produced by this test be soluble with effervescence in muriatic or nitric acid, it may be considered as carbonate of lime, and, consequently, that it has been occasioned by the carbonic acid of the water; but if its solution take place without effervescence, it has been produced by some of the other salts just mentioned.

The same may be said if the water give a precipitate with lime water in its natural state, and fail to do this after boiling. In such cases, the precipitation is to be ascribed to the presence of carbonic acid alone; but should the water be sensibly affected by this agent both before and after being boiled, it may be considered that both carbonic acid and some of the salts just stated are contained in the water. At least, the latter may with much certainty be expected.

*Nitrate of lead** is decomposed by sulphates and muriates: by the former salts, even though their proportion be small; but not by the latter, unless they are present in considerable quantity. This test also produces a black flaky precipitate, if sulphuretted hydrogen be contained in the water.

Acetate of lead is more usually employed with a water suspected to contain sulphuretted hydrogen. The color of the precipitate produced by either of these re-agents varies from pale chocolate-brown to deep shades of black, according to the degree of the gaseous impregnation.

Solution of soap is decomposed, and produces a flaky precipitate in any water which contains a considerable proportion of any saline ingredient, and especially by an earthy muriate or a sulphate.

I may here observe, that the kinds of water which are in

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* It is to be understood that all the re-agents are to be employed in a liquid state.

domestic use are commonly divided into *hard* and *soft;* and that this distinction has been deduced from the difficulty or facility with which the respective kind forms an admixture with soap. If difficult, the inference follows that much saline matter is contained. The acid of the salt, attracting the alkali of the soap, leaves the oil detached, forming flakes or curds in the water.

Solution of barytes.—The effects of this test are, in some respects, similar to those of lime water, in discovering the presence of carbonic acid. It acts in the same manner, but is more delicate in discovering the presence of any earthy or alkaline sulphate, with the sulphuric acid of which it forms a precipitate; and this precipitate (unlike that produced by lime water) is insoluble in nitric acid.

Carbonate of soda forms a precipitate with all the earthy muriates and sulphates, provided they exist in any considerable proportion.

Muriate of lime is decomposed by carbonated alkalies, if they be present in any notable quantity. The precipitate occasioned by a carbonated alkali is soluble with effervescence in nitric or muriatic acid.

Carbonate of ammonia, and phosphate of soda.—These salts are chiefly employed in conjunction, for the purpose of discovering, in an unequivocal manner, the presence of magnesia. If a precipitate be produced by carbonate of ammonia when added in slight excess, the fluid is to be filtered; and if then, by the addition of phosphate of soda, it yield a further precipitate, of a granular appearance and adhering to the sides of the vessel, it may be considered that a magnesian salt exists in the water. The first precipitate is to be regarded as carbonate of lime; but if none take place from the carbonate of ammonia, the water is to be treated with the addition of phosphate of soda as just stated.

Nitrate of silver is a valuable and most delicate test for detecting the presence of muriatic acid, and all its compounds. A precipitate formed by any of these substances with nitrate of silver, is soluble in pure liquid ammonia.

Liquid ammonia does not decompose salts of lime; but with magnesian salts, a light white flocculent precipitate is produced.

Oxalate of ammonia is affected chiefly by salts of lime; but not (or at least not immediately) by those of magnesia. It is a most delicate test for discovering very minute quantities of lime in every state of combination. It produces a dense white precipitate.

Muriate and nitrate of barytes are excellent re-agents for the discovery of sulphuric acid, and all its compounds. They form, with the sulphuric acid of the salt, a dense precipitate of sulphate of barytes, which is insoluble in nitric acid. Of these tests, the muriate is the most delicate.

ON THE

CHEMICAL AND MEDICAL PROPERTIES OF THE TEPID SPRINGS OF BUXTON.

THE etymology of the word Buxton is very doubtful, and numerous conjectures have been offered respecting it. Pegge, in his account of the Roman road through the county of the Coritani, or County of Derby, 1779, takes the name from Boc, Fagus, or Bocca, Caper, and ꝛcan, a stone. Dr. Pearson imagines that it is derived from Bock-Stein, or Stein-Bock, which is a German word, and signifies that animal which the English call the Stein-Buck, or the wild goat.

Buxton, during many centuries famed for its medicinal springs, distant from London 159 miles, is a considerable village in the north-west part of the county of Derby, bordering upon Cheshire, from which it is separated by a chain of high mountains, intersected by deep ravines. The whole of this angle of Derbyshire constitutes what is called the Peak hundred, a wild mountainous district, thinly inhabited, and presenting a rude character of country. The following may be offered as a brief geological description.*

It is surrounded by hills, which are chiefly calcareous, and which belong to that class of rocks termed, by geologists, transition. The particular formation of limestone is known by several synonymous geological appellations, as Derbyshire limestone, mountain limestone, and carboniferous limestone :

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* For this interesting statement, I am indebted to the kindness of my friend Mr. Webster, the celebrated geologist, so well known by his Memoir on the London, Isle of Wight, and Paris Basins; published in the Transactions of the Geological Society in 1814. In my *analysis* I received the valuable assistance of Mr. Garden.

it is more ancient than the coal formation, often underlying it, and is particularly distinguished by its numerous fossil organic remains, which belong to the lowest class of animated nature, as zoophytes and testaceous animals: the remains of encrini are particularly abundant. It is remarkable that all the ancient animals, of which the vestiges are thus preserved in a petrified state, had been the inhabitants of the sea; and it follows, that these rocks, once the bed of the ocean, must have been upheaved by some subterranean force. This circumstance is deserving of notice, since it is probable that some of the fissures in the rock, which now give passage to springs of tepid water, have been the results of this agency; and to this limestone Buxton owes many of its picturesque and characteristic features.

The numerous and extensive caverns in its vicinity well deserve a visit from the curious; of these, Pool's Hole is the chief; but, at the distance of a few miles, are the Peak cavern and Speedwell mine, which are of vast magnitude. The beautiful rocks and dales of the Wye, a few miles to the west of Buxton, afford an interesting display of this geological formation. Although Buxton itself is in a valley, its height above the sea is considerable, so much as 1020 feet; and owing to this, the quicksilver in the barometer is always an inch lower than at Derby; but, notwithstanding that this elevation produces a good deal of moisture, the surface of the ground very soon becomes dry after rain, from its absorbent nature. Some of the hills in the neighbourhood, as Mam Tor, are composed of a sandstone called the millstone grit, which is considered as the lowest bed of the coal formation, although the coal itself is wanting here. From this sandstone, at a small distance, is derived the pure water with which the houses in the Crescent are supplied for domestic purposes; that which issues from the limestone rocks generally containing more or less of carbonate of lime.

Perhaps the most striking character of the Buxton tepid water is its temperature. Warm springs abound in many parts of the world, although they are rare in England; and the cause of their elevated temperature has excited much speculation. In the last century, the origin of the heat of

thermal springs was generally attributed to certain chemical processes going on in the interior of the earth, but not far removed from the surface; such as the decomposition of pyrites, or the combustion of coal. But their remarkable uniformity of temperature, during long periods of time, is entirely at variance with such an hypothesis; and at present, geologists are more inclined to the supposition that it is connected with volcanic action, deeply seated, and sometimes, perhaps, nearly extinct; or, that it arises merely from that internal heat of the globe, of which we have so many evident proofs, but the cause of which is entirely unknown to us.

It is observed that thermal springs are most numerous in those countries where the traces of subterraneous igneous action, either recent, or of ancient date, are apparent; and likewise it is not uncommon to perceive that, in the vicinity, the rocks have suffered considerable dislocations, technically termed *faults** by miners, the fissures of which afford a passage upwards for the heated waters.

From late observations in deep mines, it has been shewn that the temperature of the earth increases as we descend, on an average about one degree of Farenheit for every 100 feet; and it is easy to calculate that, if the augmentation be progressive in that ratio, at the depth of three miles all water must be at the boiling point, and, if forced upwards, will appear of that degree of heat, as at the Geysers in Iceland; or of a lower temperature, if it be cooled, more or less, in its passage to the surface, through the channels and fissures in the rocks. It is easy to imagine that collections of steam or other elastic vapours or gases, pressing upon the surface of such water in subterranean reservoirs, may be the immediate agent in forcing it to ascend.

With respect to the saline or other substances with which such springs are always more or less impregnated, as well as the gases they contain, no direct evidence of their origin can be procured; but they may be derived from those deep-

* A fault is where a fissure nearly vertical has not only occurred across a series of rocks, but the whole mass on one side of the fissure has been elevated or depressed, so that the portions of each bed are now not on the same level.

seated, though unknown, operations still going on in the interior of our globe; or, in some cases, from the numerous and varied strata which they pass through, the heated condition of the water adding considerably to its solvent power: nor is it possible, at present, to account for these, farther than by conjecture.

The source of the water itself is equally unknown to us; if it be derived, as some imagine, from the ocean, it must undergo the process of natural distillation in the subterranean laboratories; since in no other way could salt water be converted into fresh. That salt water can be rendered fresh by filtration is an error which has been so long exploded, that it is surprising to see it still occasionally retained as a fact.

Dr. Short, in his History of Mineral Waters, remarks, that Buxton has long been celebrated for its warm springs, and that they appear to have enjoyed considerable reputation in the cure of various diseases, for a longer period, without interruption, than almost any mineral water in the kingdom. As early as 1572, a Treatise* was written on the virtues of this spring by a Dr. Jones, of Derby; and it appears at that time to have been a place of great resort from all the neighbouring counties. Several remains of Roman antiquity have also been discovered at or near this spot; and it is stated that records have been found, from which it is collected that the Romans made use of the tepid waters of Buxton as baths.

The water of which I am about to give the chemical and medical description, rises very freely by numerous fissures through the limestone, as may be distinctly seen in the large public bath when it has been nearly emptied. The well of St. Anne†, appropriated for drinking, was many years ago removed, for the sake of convenience, several yards from its former situation. The water is conducted from the spring

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* Its title, "The benefit of the ancient bath of Buckstones, which cureth most grievous sickness."

† Leland and Jones (see Camden's Political Survey) mention, that near to St. Anne's well, "the Romans had erected their noble works, and that here was the ancient chapel dedicated to St. Anne, by which Buxton was preserved in reputation."

head through an artificial sandstone channel*: it falls into a large marble basin (called the well), which is enclosed in a handsome stone building, conveniently constructed for the protection of the invalid; open to the air in front, and secured from intrusion, after the regular hours of resort, by an iron gate.

In its passage from the spring it loses five degrees of temperature; being at the head of the large bath 82°, but in the basin, 77°†. It also loses a considerable portion of free azotic gas.

CHEMICAL HISTORY.

The water is perfectly transparent, and free from air-bubbles. It is destitute of odor, and has no other taste than that of common spring water heated to the same temperature. It does not affect either litmus or turmeric paper. The temperature in the well is 77° Fahrt. As the water falls from the pipe into the basin, large bubbles appear, which, upon examination, were found to be occasioned entirely by the mechanical action of the water; atmospherical air becoming entangled, chiefly, during its fall. The specific gravity of the water, at 60°, is 1.0006; but immediately from the spring, at 77°, is 999.

Effect of Re-agents.

Pure ammonia produces an immediate slight opalescence, and, after a short time, a slight flocculent precipitate.

Oxalate of ammonia immediately renders the water milky, and soon a dense precipitate appears.

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* Dr. Pearson mentions that the diameter of this artificial semi-cylindrical channel is about four inches. The rate of supply of the water is a gallon in a minute.

† The same author remarks, p. 155, vol. 1, that the temperature of St. Anne's well is 81° to 81¼°. I more than once examined the temperature of the water as it flowed immediately from the pipe, and found it exactly 77°.

Lime water, and a solution of pure barytes, render the water slightly milky. The lime water has no apparent effect on the boiled water, and the barytic solution only a slight effect.

Solution of subcarbonate of soda immediately produces a slight opalescence.

Solution of carbonate of ammonia, a similar appearance.

Muriate of barytes, a slight cloud.

Nitrate of silver, a precipitate more dense.

Solution of soap, an opalescence, but no immediate flakes.

Nitrate of lead, an immediate dense cloud.

Muriate of lime, no change.

Phosphate of soda produces an immediate slightly milky appearance; and, with the addition of carbonate of ammonia, a minute granular precipitate.

Tincture of galls, no immediate change; but, after some hours, the water darkens, and a dense shining pellicle appears on the surface. This effect is most probably produced by the union of some principle in the galls with the lime contained in the water.

Prussiate of potash, no change.

The action of these re-agents leads to the conclusion, that this water contains muriatic and sulphuric salts with bases of lime and magnesia, in small proportions.

ANALYSIS OF THE WATER.

Of the gaseous contents.—Twenty-one and a half cubic inches of water, from St. Anne's Well, were introduced into a glass flask furnished with a bent glass tube, its extremity terminating under a jar filled with mercury, standing in a pneumatic apparatus. The water was made to boil gently for about fifteen minutes; during which time a quantity of gas was collected, amounting to ·9 of a cubic inch. By treatment with lime water, it was reduced to ·76; and the residuary gas, after deducting ·33 of a cubic inch for the volume of atmospheric air contained in the tube and neck of the flask at the commencement of the process, was found to con-

sist entirely of azote* ; since it was neither itself combustible nor capable of supporting combustion. It amounted to ·43 of a cubic inch.

Of the solid ingredients.—(A.) A wine gallon of the water was evaporated in a glazed earthen vessel to dryness. The saline mass, dried at the temperature of 212°†, weighed fifteen grains.

(B.) The soluble salts were taken up by digesting the mass in cold distilled water, and the remaining insoluble matter, dried at 219°, weighed 10·2 grains.

(C.) The solution in distilled water was evaporated to dryness, and the dry mass digested in alcohol of the specific gravity ·815, with a view to separate the earthy muriates, if any existed in the water. The alcoholic solution, when evaporated to dryness, afforded a saline mass, which deliquesced in a considerable degree by free exposure to the atmosphere.

(D.) The deliquescent saline mass obtained in the last process was dissolved in distilled water, and decomposed at a boiling heat by a solution of subcarbonate of soda.

(E.) The precipitate thus procured was treated with dilute sulphuric acid, and a solution was obtained, which, by

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* Dr. Thomson, in his article on Mineral Waters, in the Cyclopædia of Medicine, raises a doubt as to the correctness of this analysis, in regard to the separate existence of azote; and I confess myself surprised that he should offer the objection without the opportunity of examining the water. Dr. Robertson made the experiment which he himself recommends, and obtained the result which Dr. Thomson accepts as a proof of the absence of oxygen, viz. "a precipitate of a dirty green color, by mixing with a glass of Buxton water, a drop or two of newly dissolved sulphate of iron, and afterwards adding a drop of caustic potash." Dr. Daubeny, in his "Report on Mineral and Thermal Waters," states, "I have since estimated the amount of azotic gas emitted from the thermal springs of Buxton, at about 50 cubic inches per minute." I was present, and witnessed the careful examination which he made.

† This appears to be the more suitable temperature for the drying of precipitates. It is very important, in the analysis of mineral waters, that uniformity of temperature should be observed in this particular. From inattention to it, we have occasion to see that chemists of character have given widely different results in analyses of the same waters. It is however to be observed, that, in spring, a mineral water, unless coming from a great depth, and remarkably insulated in its course, will be found much more diluted than in autumn, by the admixture of communicating springs; and hence certainly some explanation presents itself of the fact in question.

spontaneous evaporation, yielded distinct crystals of sulphate of magnesia. These crystals were dissolved in water ; and the solution, on being decomposed by carbonate of soda, gave a precipitate, which, after ignition on a piece of platina foil, weighed ·2 of a grain ; equal to ·7 of muriate of magnesia.

(F.) The liquid of process (d.) from which the magnesia was separated, was saturated with nitric acid, and a solution of nitrate of silver was dropped in so long as any precipitate continued to be produced. A quantity of chloride of silver was thus obtained, rather more than equivalent to the proportion of muriatic acid requisite to neutralize the magnesia obtained in the last process, and hence it must be referred to a portion of muriate of soda, which had been taken up by the alcohol.

(G.) The saline residue left after the action of alcohol in process (c.) was dissolved in distilled water, and the solution divided into two equal parts.

(H.) One of the portions was concentrated by evaporation, and decomposed by a boiling solution of carbonate of soda. A minute quantity of precipitate was obtained, which, by treatment with sulphuric acid, yielded ·30 of sulphate of lime.

(I.) The other portion of aqueous solution was treated by solution of nitrate of silver, with which it yielded a precipitate of muriate of silver, amounting to 2·25 grains, equivalent to 1·05 of muriate of soda.

(J.) The 10·9 grs. of insoluble matter left in process (b.) were digested in acetic acid, and the solution, when assayed by oxalate of ammonia and pure ammonia, appeared to consist entirely of acetate of lime. It was decomposed by a solution of subcarbonate of soda ; and the precipitate, when dried, weighed 10·4 grs. The remaining half grain was found to be insoluble both in acid and alkaline menstrua. It was converted into charcoal by the action of heat, and therefore may be considered as entirely consisting of vegetable and extractive matter.

From this analysis, the composition of the water appears to be, in one gallon,

Of gaseous contents,

	Cubic Inch.
Carbonic acid....	1·50
Azote.....	4·64
	6·14

Of solid contents,

	Grains.
Muriate of magnesia. ...	·58
———— soda...	2·40
Sulphate of lime..... ...	·60
Carbonate of lime	10·40
Extractive matter, and a minute quantity of vegetable fibres...	·50
(Loss).....	·52
	15·00

Such, then, are the results of the direct method of analysis by evaporation; but I must not omit to offer a statement of the composition of this water, according to the ingenious and original views of Dr. Murray*. The chemical reader will remember, that his theory requires us to consider that the saline principles of a water really exist in that state of combination which forms the most soluble salts; and not in the condition of salts very little soluble as ordinary analysis represents, and which is to be explained by the re-action of the elements of acid and base, which takes place during the process of evaporation.

According, therefore, to this mode of estimation, the constituents of the water in a gallon will appear to be as follows:

	Grains.
Sulphate of soda.	·63
Muriate of lime.....	·57
Muriate of soda.....	1·80
Muriate of magnesia. ...	·58
Carbonate of lime.....	10·40
Extractive matter and loss	1·20
	15·00

* Trans. R. S. Edin. vol. viii.

Dr. Pearson's analysis gave the following results. From a gallon of the water he procured fifteen grains and three quarters of solid contents, consisting of

	Grains.
Carbonate of lime..	11½
Sulphate of lime...	2½
Muriate of soda...	1¾
	15¾

Dr. Pearson found that the proportion of carbonic acid, in the Buxton Water, did not exceed the half of what is found in many common springs. He had the merit of discovering the separate existence of azote in this water, a principle which had never been detected by any preceding chemist in any water. In the imperfect state of chemistry, thirty-six years ago, the nature of azote was unknown, and he described it "as being a permanent vapour, composed probably of air and phlogiston." The present analysis gave about one-fifth more of azote in a gallon, than appears from Dr. Pearson's conclusions.

MEDICAL HISTORY.

The properties of this water as an internal remedy are certainly of inferior importance to those of the baths, but yet they are valuable and deserve attention. Some, even medical persons, have imagined, from the simplicity of the water in its taste and known composition, that in a medicinal point of view it could not possibly deserve much, if any, regard. Such notions, however, are too lightly entertained, and are not founded on experience or truth.

I may remark, generally, that we ought not to estimate the power of any mineral water merely in reference to the weakness of its impregnation with metallic, saline, or gaseous ingredients. The Bath water contains only one sixth of a grain, in a gallon, of the oxide of iron, held in solution by carbonic acid; and yet no one will call in question its efficacy as a stimulating chalybeate.

In judging of the activity of any medicinal ingredient in a water, we are to consider that it exerts its influence under the most favorable circumstances for its operation; and the following explanation may be offered. The substance is in a state of the most minute division; its fluid vehicle is received into the stomach when free from food, so that it acts readily upon the whole surface of this sensible organ, in the first instance; and not requiring any stay in the stomach, as every kind of food does, for digestion, it becomes quickly absorbed into the circulation, and imparts some certain effects to the blood itself.

The active material substances in a wine gallon of the Buxton water are, according to Dr. Murray's views, sulphate of soda, muriate of lime, and muriate of magnesia; but look at the exceedingly small proportion of either ingredient, not so much as a grain of either salt in the gallon. Thames water, according to the analysis of Mr. Garden*, contains, of solid ingredients, the following quantity in a wine gallon:

	Grains.
Muriate of magnesia.....	0·28
———— soda.....	1·40
Sulphate of lime.....	1·44
Carbonate of lime.....	11·80
Silica and carbonaceous matter.	0·30
	14·22
Loss.....	·28

We see here a very close resemblance in the constitution of Buxton and Thames water, as to the solid ingredients; and the only important difference is in the gaseous impregnation and the temperature of the Buxton spring.

Sea water, which is so often taken as an aperient, with perfect impunity, and by some persons with advantage, contains, in the gallon, 284 grains of muriate of magnesia, and rather more than 45 grains of muriate of lime.

I am therefore disposed to attribute the utility of the Buxton water to its purity, its tepid temperature presented

* See Report of the Commissioners on the supply of water in the metropolis.

by the hand of Nature, and, above all, to its gaseous impregnation. I believe that the influence of azote, taken into the stomach in a state of solution in water, is very considerable.

In every case, in coming to a final judgment of the medical character due to a mineral water, we must be chiefly governed by experience; by the record and consequent judgment of the medical practitioners who, by daily observation on the spot, are enabled to correct their opinions from time to time, and verify their conclusions by means of their actual experience; and hence it follows that their authority must always be of superior value, regarding the particular spring whose qualities they have the opportunity of studying, to that of others at a distance, however deservedly eminent in their profession they may be.

The chemical analysis of a water constitutes an important source of information, and is a material step in first conducting us to a scientific acquaintance with its properties; yet the crowning work of our real knowledge of the merits of the spring, must be derived from actual and unprejudiced observation. But even chemistry does not reveal its truths all at once, and new information springs forth every day from the fresh labors of science. Dr. Daubeny has discovered, in the waters of Cheltenham and Leamington, iodine or bromine in some, and both in others; when previously their whole virtues were often attributed to their purgative ingredients, in combination with a small proportion of iron; and some theorists have been bold enough to argue that the invalid might drink, at home, an artificial solution of saline ingredients, such as are contained in the water, with as much advantage as at the native springs.

The water of Ashby de la Zouche, formerly supposed to be merely impregnated very strongly with common salt, was found by the same scientific chemist, to contain a large proportion of that active principle, bromine.*

With regard to the Buxton water, the subject of my present enquiry, it certainly happens that, simple as it appears

* This substance was discovered by M. Balard, of Montpelier, in August 1836.

in composition, it does prove inconveniently stimulating to some persons of full habit and of the sanguineous temperament. They complain of flushing, head-ache, and slight giddiness, and are deterred, by such symptoms, from proceeding in the course of drinking it. Many instances have come under my observation in which the exciting power of the water has been proved in the gouty patient; symptoms of a paroxysm having occurred in a few days after its commencement; subsiding, also, upon its being discontinued, and from the aid of medicine.

Others, and those especially who have a weakened condition of the nervous energy and of the muscular power of the stomach, complain that the water is felt as a dead weight on the stomach, that it is slow in passing off, and that, until it does so, they are much oppressed and inconvenienced.

These, however, are the exceptions, and not the rule; for, in general, the water agrees remarkably well, and is drunk freely without any unpleasant result; but, on the contrary, with benefit and satisfaction.

In regard to the influence of the water on the bowels, I have received very opposite statements from different patients; some describing it as restringent, others as aperient. Perhaps the following theory may reconcile this contradiction. Although the proportion of carbonate of lime in the water, and held in solution by carbonic acid, is not considerable, yet it may serve, in a slight degree, to increase the disposition to inertia of the bowels, where that exists; and, in the contrary example, if there be a tendency to relaxation, aqueous dilution may have the most prevailing influence, and thus promote the intestinal discharge. The effects of change of air must not be lost sight of, in reasoning upon the condition of the digestive functions; and, add to this, also, the influence of a probable alteration in diet.

Indeed I must consider that the azotic gas is the only constituent in the water, to which a positive medical property can be fairly allowed; but, that this is energetic, I am well persuaded. The action of the water on the kidneys is sufficiently remarkable, and, in general, is promptly shown. In delicate cases of dyspepsia, or indigestion, the good effects on

the stomach are often experienced very quickly, and shown in the improvement of the appetite and digestion. I view the remedy, altogether, as a very useful stimulant aqueous diluent; and always admissible, unless the inflammatory diathesis be present, or a plethoric state of vessels forbidding any physical cause of excitement.

It will be expected that I should point out the method of using the water of St. Anne's well; but I can only do so in a very general manner; for every individual case must so much require more or less variation of management, that it would be impossible to lay down any exact rules of proceeding.

The first dose of the water should be taken before breakfast, so as to leave at least an interval of half-an-hour. At the commencement, half-a-pint may be mentioned as the total daily quantity, taken at twice; the second quarter-of-pint at one or two, or other hour if more convenient, a reference being had to the period of taking meals. Whatever may be the quantity drunk at the allotted times, I advise that the dose be subdivided into two draughts; walking exercise, if possible, for a quarter or half-an-hour being used between.

It is to be considered that this water does not quit the stomach so quickly as saline aperient waters, or those highly carbonated; and therefore if a large quantity be taken at once, a sense of oppression is felt, and very probably of fulness of the head, with giddiness, and attendant flushing. The utmost total quantity, per diem, that I have seen useful, has been a pint and a half; and a pint is the average. As the full doses are used, it will often be expedient to visit the well thrice, instead of twice, for the purpose. I am sure of the advantage of not drinking much at once. Those can drink the largest quantity without the inconveniences I have mentioned, upon whom the water exerts an active diuretic effect.

It is my decided opinion, that it is for the most part desirable to avoid the mixture of a medicine with the water, and to give it, if it be necessary, separately and at another time; unless, indeed, so simple an article as the tincture of ginger, or the compound tincture of cardamoms in small quantities, which a stomach of unusually languid powers may sometimes require.

With respect to the diuretic property of the water, its effects are found very useful in the painful complaints of the kidneys and bladder, arising from gravel; and, in this class of cases, it may be used advantageously with more freedom than in any other.

The same remark also applies to those instances of indigestion, and of which gouty persons are so frequently the example, where the lateritious sediment in the urine is abundantly formed.

The sympathy which the stomach exerts with every part of the body, is so well known, that the study to improve its functions, and to regulate also those of the whole alimentary canal, is well deserving of the best care of the physician and the patient; and will be rewarded by the happiest consequences to the general health of the body, the cheerfulness of the spirits, and energy of the mind.

For the same reason that many persons speak of this water as being too simple in its composition, too much like common water to claim any reliance upon it as a medicine, do I think favorably of its qualities; namely, from its purity, owing to the remarkably small proportion of its solid ingredients, and from its gaseous impregnation with azote, qualifying it in so eminent a degree to fulfil the valuable purposes of a stimulating diluent; and which, taken on an empty stomach, or scarcely occupied with any food, acts favorably, in the first instance, on this delicate organ, and quickly finds its way into the circulation, producing ulterior good effects. In diluting, and assisting towards the removal of any acrimonious secretions which may be delayed in the stomach and duodenum, this aqueous diluent may have much more useful effect than may be at first sight imagined; particularly by those who see a remedy only in what is very potent in its nature and composition.

It is unquestionably true that many complaints are aggravated, and doubtless some induced, by the use of impure water, or such as is strongly impregnated with the earthy salts, the sulphate and the carbonate of lime; and in gravel, gout, and confirmed indigestion, much advantage would often, I am sure, be derived from exchanging the beverage in question

for distilled water ; and, which, for the dinner use, might be impregnated with carbonic acid gas, in order to render it more agreeable as well as more useful. Patients frequently, and I must even add their medical advisers, sometimes neglect what appear to be the minor circumstances of management. What benefit can be expected to arise from draughts of Buxton water, when, at the dinner meal, the Buxton *ale*, as the more tempting beverage, is drunk with as much regularity ; and other errors at the table too probably indulged in ! The sanctity of the well is no protection for such indiscretion, nor should any blessing on its effects be looked for, unless the cardinal virtue of temperance, and a careful general regimen, be steadily exercised and observed.

Those who visit Buxton from motives of pleasure only, or as the friends of the invalid, themselves enjoying health, do not come under my present criticism. I leave them to their own enjoyment, with such discretion as they may possess.

Before I conclude the present section of my subject, I should notice that all the houses in the Crescent and the Square are supplied from a very pure spring of water, a mile distant on the Manchester road ; and hence the observation made by the late Dr. Saunders, many years ago, of the water of St. Anne's well being used very generally for culinary purposes, if applicable then, is not so at the present period.

I find, however, that the inhabitants of the Hall Bank do chiefly make use of the water from the tepid pump near St. Anne's well. The question will naturally be asked, is this water improper for habitual use ? Unquestionably, after boiling, it must be brought to the condition of a simple pure water. If used fresh from the pump, it will contain a small portion of azotic gas in solution ; and, therefore, as a beverage to be freely drunk in its natural state, it is not to be recommended.

After long exposure to the atmosphere, it would part with the gas, and then be fit for drinking. For culinary purposes, no fair objection can be offered to it. Of the qualities of the Manchester road spring, and of those of the Angel pump, I shall insert a concise report at the conclusion of my work.

OF THE BATHS,

AND THE RULES OF BATHING.

There are five distinct natural baths appropriated to the use of the visitors and invalids, three for gentlemen, and two for ladies; besides which, there are, at the opposite end of the Crescent, several excellent marble baths for the purpose of warm bathing; well-constructed shower baths; and also a vapor bath, which is very well administered. Lastly, there are the two charity baths for the Infirmary patients, who are always accommodated with a warm bath when it may be required; and there is an excellent plunging bath of the temperature of 60°, therefore called the cold bath, situate about a third of a mile from the Crescent, by an agreeable walk across the fields.

The gentlemen's public bath measures in length 25 feet 4 inches; in width, 17 feet 11 inches; in depth, 4 feet 9½ inches.

The gentlemen's new bath measures in length 20 feet 11 inches; in width, 10 feet 11 inches; in depth, 4 feet 8½ inches.

The gentlemen's private bath measures in length 20 feet 6 inches; in width, 6 feet 2 inches; in depth, 4 feet 9 inches.

The ladies' public bath measures in length 22 feet; in width, 12 feet 8 inches; in depth, 4 feet 5½ inches. The ladies' private bath measures in length 11 feet 6 inches; in width, 4 feet 6 inches; in depth, 4 feet 5½ inches.

The baths are furnished with an excellent pumping apparatus, by means of which water is projected with any degree of force upon particular parts of the body affected with disease; and there is a chair for the convenience of those infirm invalids who are deprived of the use of their limbs, with such machinery attached to it, that the patient can be lowered into the water, and raised, with great facility.

The bathing rooms are well ventilated, and the passages are now kept at an agreeable and suitable temperature by means of warm air introduced from an adjoining apartment, in which there is a stove constructed for the purpose of yielding a free supply of heated air. Large and small air bubbles are constantly rising up through the water, which expand and burst as they arrive at the surface. These bubbles are the most numerous in the large bath, which is situated over the spring; for the smaller baths are supplied from the reservoir of this spring on the gentlemen's side.

The temperature of the gentlemen's public bath is 82°, and of the apartment 72°. It contains 8612 gallons. After being completely emptied, it fills again in rather less than two hours and a half. It changes itself at the computed rate of 60 gallons in a minute. The water is so beautifully transparent, that the sandstone bottom is seen with the greatest accuracy. The pump in this bath is the strongest.

The temperature of the private bath is 81½°, and of the contiguous dressing room, 74°. This bath is supplied from the reservoir of the public bath. It contains 1550 gallons, and fills again, after being entirely emptied, in twenty minutes. It may be supposed to change itself in about an hour.

The new bath is also supplied from the reservoir, and, being farther removed from it than the private bath, loses more temperature. It varies, according to circumstances, from 80° to 81°; the temperature of the apartment is usually 70°. It contains 6291 gallons. It fills again, after being quite emptied, in two hours and a half, and it is calculated that it changes itself in three hours.

The large bath on the ladies' side, over the spring, is 82°; but the private bath, which is supplied from the reservoir, is 81°, losing a degree in its course.

There is one charity bath for the use of the men, and another appropriated to the female patients. The men's bath is 10 feet 8 inches by 10 feet; the depth, 4 feet 8 inches. Its temperature is usually 81°.

The women's bath is about the same dimensions; but, being farther removed from the reservoir (that of the ladies' public bath), it varies in temperature from 77° to 80°.

The temperature of the cold bath of which I have just spoken, I have tried at different times, and found to be 60°. Formerly, this bath was divided into two parts, the one for gentlemen, and the other for ladies: but they have been laid into one. The bath therefore differs in depth, being in one part 4 feet 9 inches, in the other 3 feet 11 inches.

Returning to the subject of the tepid natural baths, I have to observe that the experiments which I have detailed, were made on the water of the reservoir on the gentlemen's side. Its specific gravity at its natural temperature, 82°, was 998·4; but, at 60°, 1·0004.

The gas which rises in the form of bubbles through the public bath is incapable of supporting combustion. A lighted taper immersed in it was instantly extinguished. With a portion of this gas, no change of volume was produced either by lime water or barytic water; and, although mixed with an equal volume of atmospheric air, it almost instantly extinguished a lighted taper without the least explosion.

The composition of the water of the reservoir is similar to that of St. Anne's well, as indeed must be expected, the waters being derived from the same spring. We have no reason to believe that the water of the well contains less of azotic gas in chemical solution, than that of the reservoir. The difference therefore will be in the temperature, as already stated, and in the circumstance of a considerable proportion of free azotic gas appearing in bubbles.

The most important part of my subject, the medical use of the baths, is now to be considered. The eminent claim of the Buxton bath, as possessing highly tonic and restorative qualities, will not be disputed by those who have had the opportunity of putting its powers to the test; and the opinion of those who are unacquainted with it, either from observation or trial, is not worthy of regard. Neither in this country nor in Germany is a similar bath to be met with, so happily intermediate in its temperature (82°), between the warm and the cold. One obvious and important advantage derived from a spacious natural bath of this temperature, over a confined one at the same degree of heat, consists in the opportunity which it allows of free motion, and which materially assists to keep up that force of the circulation consequent to the

heart's re-action which ensues to the shock from the first immersion. It is indeed that very desirable medium of temperature between the warm and cold bath, neither exciting by too much stimulus of heat, nor depressing by too much sedative influence of cold, which renders it so favorable a tonic to weakened limbs, and also to the whole body. The uniformity of temperature, never varying either in the hottest day of summer, or the coldest in winter, in so large a body of water, could not be imitated in an artificial bath; besides which, the qualities of the water itself must not be overlooked. The skin is not only a very extensive surface, but highly sentient; and an entirely different impression is made upon it by a sea-water bath, by one of sulphuretted hydrogen, by one highly charged with carbonic acid, by saline water, and by others which might be mentioned.

Not only upon the skin as an extensive sentient surface, but upon its very important secreting functions, we have to consider the influence of a bath, especially one of elevated temperature. The cuticle is constantly undergoing re-generation. When it is hard and dry, it forms a mechanical impediment to free transpiration. This error will be corrected by bathing and repeated frictions; and the consequently amended function will be influential on the state of all the internal mucous membranes, between which and the skin so active a sympathy always exists.

Dr. Granville, in his very interesting and valuable work, the Spas of Germany, describes the delightful sensations which he experienced from immersion in the baths of Wildbad. I shall first observe, that this water, like the Buxton, is constantly changing itself by influx and efflux. The author pronounces it as probably one of the simplest in nature. Of its qualities as a bath, he expresses himself in the following lively and certainly poetical language.

"The soothing effect of the water, as it came over me, up to the throat, transparent like the brightest gem or aquamarine, soft, genially warm, and gently murmuring, I shall never forget. Millions of bubbles of gas arose from the sand, and played around me, quivering through the lucid water as they ascended, and bursting at the surface, to be succeeded by others! The sensation produced by these, as many

of them with their tremulous motions just *effleuraient* the surface of the body, like the much vaunted effects of titillation in animal magnetism, is not to be described. It partakes at once of tranquillity and exhilaration ; of the ecstatic state of a devotee with the repose of an opium-eater. The head is calm, the heart is calm, every sense is calm ; yet there is neither drowsiness, stupefaction, nor numbness ; for every feeling is freshened, and the memory of worldly pleasures keen and sharp. It is the human tempest lulled into all the delicious playings of the tempest's after-waves."

Dr. Saunders remarks of the Buxton bath, "that the slight shock of cold felt on the first immersion is almost immediately succeeded by a highly soothing and pleasurable glow over the whole body, which persons often express to be as if the skin was anointed with warm cream."

The latter part of this description is too fanciful, and such as I have not heard from any one who has used the baths. We never add to the good character of a remedy by mistaken panegyric, nor by endowing it with qualities which it does not possess. Dr. Robertson remarks that "chiefly owing to the alkaline properties of the water, the skin is speedily cleared of all scurfiness and impurities, and is rendered most singularly and delightfully smooth." It is here to be considered, that, in order for the water to be a detergent to the skin, it should contain carbonate of soda, instead of carbonate of lime, which, in reality, rather unfits it than otherwise for this particular office. Carbonate of soda is not one of its constituents. The Buxton bath does not belong to the class of alkaline waters. I trust I shall not appear guilty of want of courtesy in canvassing the opinions of others in the course of this little work ; for it is by the freedom of discussion that truth becomes elicited, and the cause of science advanced. The same author who has displayed a large share of ingenuity and judgment in his recent work on "Buxton and its Waters," when reasoning on their modus operandi, observes, "It may be that a portion of the saline, and calcareous, and gaseous impregnation is absorbed through the skin during the immersion in the waters;—it may be that the effect is merely mechanical or merely chemical." The question of absorption of water by the skin during immersion in water,

has been the subject of much controversy. It was denied by Dr. Currie and by Seguin ; and although contended for by Dr. Edwards, he admits that, in order for absorption to exceed transudation, there must be several circumstances to favor the latter function by the skin when in contact with water, which are, chiefly, temperature, and the greater or less fulness of the body. "The greater the fulness of the body," says Edwards, "the less is the absorption ; and the lower the temperature of the water, the less the exudation." Mr. Mayo, in his excellent comments on the results of the different experimentalists, observes that "the cuticle appears to be the main impediment to cutaneous absorption ;" and, "if the water hold a salt of mercury in solution, it very rarely happens that any evidence of the absorption of the mineral manifests itself even after long and repeated immersion." We may safely conclude that the composition of the water is too little stimulating to excite the absorbents of the skin to take up the water itself ; and I cannot, in any point of view, impute the especial agency of the water to such chemical operation as appears to be suggested in the quotation just now given. It is undoubtedly one physical and physiological. The medium temperature of the water is, in my opinion, the chief key to explain the peculiar influence of the Buxton bath ; and upon this point I have already sufficiently dwelt.

It is also reasonable to believe that some influence on the skin may be allowed to the impregnation of the water with azotic gas ; and which, added to its purity and peculiar temperature, give it a power and quality of its own, as a bath ; for the familiar language in which it is spoken of by bathers, is, that it is singularly pleasing and grateful to the skin, and so buoyant as to render the whole body elastic, and the limbs, perhaps quite helpless on *terra firma*, capable of free movement ; therefore creating almost an unwillingness in the mind of the patient to return to his native element, and quit the bath in which he is not conscious of his real state of infirmity.

On the first entrance into the bath, almost every one experiences a slight sense of chill, which indeed might be expected when the difference between the temperature of the bath and that of the internal animal heat of the human body,

viz. 98°, is considered; but this is very momentary in every case in which there is sufficient energy of constitution for the producing of a favorable re-action, and which gives rise to a feeling of slight warmth that is just comfortable; and, in some, this is increased to an agreeable glow. To explain this in physiological terms, the sentient surface of the skin, on the sudden contact with a medium so much cooler than itself, receives that impression which from its extent is called a shock. Thus, the cutaneous vessels are thrown into a state of contraction, and much of their blood recedes into the deeper-seated vessels. Their anastomosis, or mutual communication, is so free that this interchange is readily effected without creating congestion in the internal viscera, unless the patient be in a state of organic disease, or morbid plethora, which would render the use of the bath improper. It is by nervous sympathy that the heart is for the first half-minute embarrassed in its action; is excited to more frequent contractions, and even may beat with irregularity. But, in favorable circumstances, it quickly regains its power and regularity, while also the capillary vessels on the surface, which were checked in their function by the sudden and sedative influence of the cold, resume their natural calibre, and their powers of action; the nervous energy of the system being at the same time restored. The comfortable feelings which are now experienced, are agreeably kept up by freedom of motion in the bath, and they do indeed often induce the patient to remain in it longer than is proper, which error leads to exhaustion of the nervous power, and a consequent depression of the strength, instead of that invigoration which would certainly follow from a more judicious use of the bath.

When the constitution has from any cause become much debilitated, and more especially when there is great depression of the nervous energy, the shock on the first immersion is distressingly great, and the sense of cold is painful, and not followed by any of that favorable re-action which I have just now described. It is here at once rendered evident that a bath of this medium temperature is unsuitable, and that a higher degree of temperature must be employed.

But, in instances of this kind, a different management might be adopted, and which might have the effect of causing the bath to agree. The patient should be recruited by some

light food, with a little wine, about an hour before entering the bath ; the whole surface of the body should be rendered pleasantly warm by exercise or friction* ; and, immediately on quitting the bath, a stimulating draught of carbonate of ammonia with camphor mixture and compound cardamom tincture, might probably be taken with advantage. If, notwithstanding these expedients, the desired re-action do not take place, the bathing attempt is manifestly a failure.

It is surprising to find how great a difference to the sensations—and, what is still more important, in the medical effects also—is produced by one or two degrees of temperature. Those who are in vigour, who plunge boldly into the bath, and incessantly move about or swim, are not conscious of the nice distinction of a little more or a little less heat of the water ; but the delicate invalid has a very nice perception of it. Thus the difference is sensibly felt between the temperature of the public bath and the gentlemen's new bath, the first of which is 82°, the last usually 80°. The difference between the public and the private bath is only half a degree, but this is sometimes perceived. In prescribing the bathing, therefore, to those who are much invalided, all these circumstances are to be considered.

The mode of entering the bath is a point of some importance. It is necessary to make the immersion as quickly as possible, in order that the shock and the consequent re-action may be instantaneous. When there is no infirmity to prevent it, the patient should, with the least delay after descending the steps, fall forward, so as to receive entire immersion ; and, at the first time, be contented with this, leaving the bath immediately. The stay in the bath is to be gradually increased afterwards, and the maximum duration will vary in different cases ; this averages from four to fifteen minutes.

It is the fault of many to remain too long ; in doing which, they are deceived in expecting the tonic effects of the bath. Those who are vigorous enough, and become accustomed to the bath, may make their plunge from the side of the bath, taking care, as I have known some very imprudently do, not

* Such friction might be rendered more efficacious by means of a rough woollen glove ; but hand-rubbing simply is very useful.

to dive as it were with the head downwards. The gravitation of the blood in this mode might create serious mischief.

It is sometimes recommended, as a rule, in the use of the bath, first to affuse water over the head, under the idea, as it is stated, of preventing an unfavorable determination of blood to the vessels of the brain. The question admits of argument. The heart, the forcing-pump as it were of the circulation, may certainly be supposed to send more blood than usual upwards, if the vessels of the lower parts of the body should be in a condition incapable of receiving their accustomed supply; in which case, the balance of circulation becomes disturbed, the left side of the heart may be surcharged with blood in the first instance, and by consequence the right side also. The pulmonary circulation becomes embarrassed, and the returning vessels from the brain not finding the right cavity of the heart in a free state for the full reception of its ordinary supply, the proper return of the blood from the brain is delayed, and congestion is the consequence. But I do not consider that such an accidental occurrence can be the ground of a *rule* for the practice in question. If the patient, from timidity or other cause, delay making the proper instantaneous immersion, so that the lower extremities would be chilled by coming into the first slow communication with the water, the equilibrium of the general circulation would be disturbed; a delay of the returning circulation of the blood from the brain might be produced, and in this case an affusion of water on the head, operating as a gentle shock, might excite the vessels to return their contents more immediately, and so be useful.

I repeat, however, that when the immersion in the bath is properly made, and under fit circumstances as to the state of the patient, I do not consider that a previous affusion of the head is necessary or useful. A bathing cap is never necessary for gentlemen in these days of little hair without powder, or wigs which are so conveniently exchanged for a bald head; but ladies, who cultivate the ornament of a profusion of fine hair, would be seriously inconvenienced by not being allowed the use of a bathing cap; and, not only so in regard to their comfort, but they would be rendered liable to incur rheumatism or cold in the head, as we familiarly express it, by a long con-

tinuance of so cool a covering of the scalp as the hair in its state of dampness, for one or more hours. Although, if it were equally convenient for ladies as for gentlemen to omit the bathing cap, I should prefer it. I cannot assert that there is any positive evil attending the use of it; without it, I think that the bath renders a greater sense of refreshment to the head.

In regard to the time of day, an hour or two before dinner, and after the usual measure of exercise, appears to be the best, the skin being pleasantly and universally warm, and never in a state of perspiration. The weak should take a little repose on the sofa after the bath; the strong may please themselves with some more exercise, if they desire it. When the bath has been persevered with for some time, and is found perfectly to agree, the time of using it may with the greatest propriety be changed for the early hour of the morning, before the breakfast.

In order to the proper and advantageous use of the bath, every one should be so far prepared by medical treatment, as that the stomach is not disorded, and that the bowels are free from confinement. No one having any degree of congestion in any of the important viscera of the body, should dare to use the natural bath. I have known fatal apoplexy produced by the plunge into the bath when the vessels of the brain were overcharged.

It calls for very serious reprehension that invalids every now and then enter precipitately on the use of the natural bath, wholly ignorant of its fitness or unfitness for their case; and without undergoing any preparatory treatment whatever. Some will rush to the bath instantly on arrival after a long journey; and the imprudence is occasionally carried so far as to bathe in the evening after having taken a hearty dinner. Were such proceeding free from danger, it would be amusing to witness this zeal not to lose a moment in fulfilling the object of the journey to Buxton, as if health were to be seized and possessed by a coup de main!

The class of patients resorting to the Buxton bath comprise, for the most part, those who have suffered from either gout or rheumatism. But it is by no means equally proper for the gouty and the rheumatic invalid under circumstances

apparently similar. The pains of chronic gout imply a state of the system which requires particular treatment by medicine, before the use of the bath should be considered admissible. This may often be necessary also in chronic rheumatism, but the condition is not so positive.

The bathing will be a valuable remedy to relieve that debility of limbs, and of the whole constitution, which is a frequent sequel to chronic gout, and which seems to partake very much of the nature of rheumatism. But as there is no such thing as a universal remedy, so it will not unfrequently happen that, when the frame has become enfeebled by the often repeated attacks of gout, the re-action in the natural bath is insufficient, and the immersion is followed by chilliness, nervous depression, and languor, and discomfort, throughout the day. It is obvious that in these instances the warm bath must be chosen, so graduated, that either the patient may be brought back to the use of the natural bath, or continue the artificial, in order that it may act as a tonic to the body, and not as a relaxant.

Till about twenty-five years ago, the warm baths had not been introduced at Buxton, and therefore it was not a matter of choice whether they should have the preference. But now it is a general rule, and one I think pursued with great propriety, that from one to three or four warm baths should be used as a preliminary to the natural bath; if one only, the temperature may be 95°; if in a series of three or four bathings, the first may be 95° or 96°, and the succeeding a degree less each time, the stay in the bath being also proportionably shortened. During the immersion it is useful to employ diligently a good flesh-brush all over the body, but especially over the most affected parts.

The water which is appropriated to the purpose of the warm baths is derived from the reservoir of the natural bath, is conducted by pipes, and heated to the necessary temperature by means of a steam apparatus. It is therefore unquestionably still containing azotic gas in solution; and, difficult as it may be to argue the point satisfactorily in theory, why it should act with any important difference on the system from a warm bath prepared with ordinary water, I confidently declare that very many sensible and intelligent patients, free

from all prejudice, have tried, in succession, warm baths in London, sea-water warm baths at Brighton, and lastly the warm baths at Buxton, with a difference of result so remarkable, and so surprisingly in favour of the latter, that, from the happiest conviction, they have been the willing heralds of its fame.

I have met with several cases in which the exclusive use of the artificial warm bath has been found necessary, the natural bath not agreeing with the individual; but the result has been quite satisfactory, and all the desired improvement has been derived. In these examples to which I allude, gout has been the constitutional disorder, in a much greater comparison than rheumatism. It is here very desirable that the temperature of the water should not be in the least degree higher than is necessary to the comfortable feelings of the patient. The bath could not prove beneficial if it were productive of a sense of chilliness and discomfort; but, on the other hand, it would fail altogether in its tonic influence, if used at a high temperature; in other words, if employed as a hot bath instead of a tepid one.

With respect to rheumatism, if it partake of the acute character, the use of the natural bath is improper. There is usually, in this case, an irritation in the system so closely allied to the inflammatory diathesis, that the excitement of the bath is found to be very unfavorable. I have witnessed many instances of the injudicious use of the bath too soon in the first convalescence from acute rheumatism, the patient thinking, and perhaps his medical adviser at a distance, also, that the Buxton water is so sure a specific remedy for rheumatism, that it can scarcely be misemployed for its relief, when there is not actual fever; but I have seen a severe return of acute rheumatism so produced; and even when this serious consequence has not followed, there has been a revival of aches and pains, and manifest general indisposition, instead of the fondly expected relief.

It is essential that this rheumatic state of the system, attended with febrile irritation, should be removed by the medical treatment commonly called antiphlogistic; and perhaps one or two bleedings from the arm may be required.

This preliminary object being fulfilled, the use of the tepid bath, as preceding that of the natural, will come in order; and by judicious management in the whole plan of bathing, of diet, exercise, &c. a final cure may be confidently expected.

The state of the gouty patient also requires to be well considered before permission is given for the use of the natural bath. If the diathesis of gout be at all considerable, the production of more or less of a paroxysm would be a sure consequence from a few plunges; and although no serious mischief might occur from this result, yet disappointment would be experienced, and the loss of time would be regretted. In all doubtful cases, the tepid bath should alone be the chosen remedy; and, in conjunction with it, such medical treatment as may prepare the constitution favorably for the best effects of the natural bath.

Some persons having suffered much misery and discomfort from various obscure symptoms, which commonly receive the name of suppressed gout, have resorted to Buxton with a view to elicit the disease in a definite form, and fix its action. For them, the warm bath is obviously the remedy; and indeed in cases of this nature, which are rare amongst the visitors of Buxton, it is right to say that, for the most part, a still more appropriate remedy might probably be found in the waters and baths at Bath; which, although not so fashionably resorted to as half a century or more ago, cannot have lost any part of their admirable medical powers.

Even when the gouty patient does appear in a fit state to use the natural bath, it will sometimes happen that in a short time from its commencement, an attack of gout will unexpectedly take place; yet I have rarely seen it happen severely, and never really to be injurious. It is desirable that it should be brought out rather than lurk in the system; and when such paroxysm has been treated judiciously by medicines appropriate to the gout, the use of the bath may be resumed, and will most probably be quite successful.

Both gout and rheumatism affect various textures of the body, as the synovial membranes, those immediate to the joints, and the bursæ mucosæ and the sheaths of tendons;

the aponeurosis or tendinous expansions of muscles, tendons, ligaments, and nerves ; and cellular membrane rather secondarily than primarily. Sometimes, yet very rarely, the belly of a muscle is affected by rheumatism, being swollen and tender ; far more commonly, the seat of the disease is in its expansion into tendon, and its tendinous insertion. In general, the synovial textures and the ligaments are affected in common ; occasionally, much more in the one kind of structure than the other, but seldom exclusively. The Buxton bath will be a very proper remedy for trial in all these morbid states, but it will not prove equally efficacious in all.

In rheumatism of the ligaments, its remedial powers are the most quickly shown ; and, next, when the disorder affects the bursæ. The cases most unyielding, are old affections of the sciatic nerves ; yet I can state, with truth, that I have had the satisfaction of witnessing very great relief afforded by the bath in some chronic cases of sciatica of very long standing, and which had resisted the ordinary means of treatment.

Neuralgic disease embraces a very important class of cases. Its most frequent form is neuralgia rheumatica, or that painful state of nerves, acute or chronic, which has evidently been induced, like ordinary rheumatism, by exposure to wet and cold, when the nervous system has been in a morbidly susceptible state. Most frequently it appears as sciatica ; but any other of the nerves of the extremities may be similarly affected. The branches of the femoral nerve are not unfrequently in this way disordered ; occasionally, those of the brachial nerve, and other muscular and subcutaneous branches.

The bath and the use of the pump will be proper in all cases of this description, when the nervous painful irritation is not attended with inflammatory action ; or with some evident disorder of the internal functions, requiring appropriate medical treatment as preparatory to the bath.

Neuralgia spasmodica, or tic douloureux, cannot be treated specifically by the bath ; nor will it be proper in this severely distressing complaint, except as an occasional refreshment and source of invigoration, and provided that there are no contra-indications for its use. It can only be recommended as an adjunct to other treatment, and under great regulation, and medical guidance.

In that infirm state of the lower limbs which almost amounts to complete paralysis, and which is always to be referred to a disease in the spinal column, the use of the bath and of the pump is admissible, and I have seen it prove useful in such cases; but we must not expect more than slight benefit; and indeed all other means that can be devised are too commonly of little avail towards a cure. Great alleviation, however, of suffering and inconvenience may be rendered to the afflicted patient. It is not the reproach of the medical art, that every case of disease does not allow the possibility of cure.

A very valuable part of the Buxton treatment consists in the use of the forcing pump, which is a remedy of considerable power; and being so, its administration requires more exercise of discretion than I think it commonly receives. Some persons think they cannot have too much of it, either as to its strength, or duration, or repetition; and again, and again, have I seen inflammatory irritation produced by the violence of its employment.

It is particularly useful in reducing enlargements of the bursæ, and in restoring tone to weakened ligaments.

It is always proper to commence the use of the pump with moderation; for example, from ten to twenty strokes on the particular part affected, and to be moderately given. According to the effects produced, it is to be increased, both in the force with which it is applied, and in the number of the strokes. When the patient, throughout the day afterwards, feels more or less sensible benefit, and does not experience nervous irritation unusually after getting to bed, it may be received as a proof with regard to the pump, as to the bath, that the treatment agrees, and that it has been correctly used.

In particular cases, it may be desirable to use the pump on the days of omitting the bath.

I am convinced that the advantages of the Buxton bath are most materially increased, when proper friction and *shampooing** are used in conjunction with it. I think the early part of the day is the fittest time; although, in some cases, it is not very material when it is used. When the cir-

* There are, at Buxton, appointed persons always attending in the season, well qualified by their experience to render all the benefits which can be derived from this auxiliary mode of treatment.

culation in the lower extremities is languid, and there is a disposition to œdema, this treatment would be very suitable soon after the quitting the bath; provided that the invalid is not fatigued, and requiring rather some repose on the sofa than further excitement of any kind.

By such treatment the circulation of blood in the weak muscles is actively promoted, without the least fatigue to the patient; and other good effects upon the infirm limbs are by degrees produced. I may briefly define the advantages of this treatment to consist in the influence which it may possess, to relieve the parts from the effects of preceding effusion by exciting the absorbents to unload the cellular membrane; to assist in restoring the lost freedom of motion in the tendons and ligaments; to renovate the capability of proper contraction and relaxation in the muscular fibres; to improve the circulation as above stated; and conduce to a more perfect transmission of the nervous influence.

It will be asked in what other kinds of disorder, besides gout and rheumatism, may the Buxton bath be looked upon as a remedy.

Since so much can be justly said of its restorative tonic powers, it would naturally occur to the minds of most persons, that paralysis would be a very fit occasion for its useful influence; the natural association being, in the view taken of the question, debility of nerves and muscles, and a soothing tonic bath. But there is no kind of disease more requiring cautious consideration in the treatment. It is true that many cases of paralysis owe their origin to some disordered condition of the spinal marrow; but, in most cases, and especially the recent, there is prevailing an attendant ready susceptibility in the vessels of the brain to be unfavorably excited; so that if the general circulation be over stimulated by errors in diet, strong liquors, or disturbed in its balance by the influence of a plunging bath, of any temperature, causing a re-action, and a consequent forcing of the circulation, if I may so express it, apoplexy, or a condition bordering upon it, might be produced; and, indeed, I have witnessed, more than once, such a result to happen from the imprudent use of the Buxton natural bath.

In old cases of paralysis of the limbs, which, from their

origin, have been clearly referrible to the spinal marrow, and not to the brain, the use of the natural bath and of the pump is very admissible, and I have known such patients use both with perfect agreement; yet cases of this unfortunate description so little admit of curative treatment, that any great benefit is not to be expected.

In every case of paralysis arising from disorder of the brain, it must be highly improper to make use of a plunging bath; nor should a hot bath of high temperature be permitted, for the obvious reason of its being dangerous to excite the circulation in a sudden and great degree.

In cases of this nature, it is very difficult to do good by any active medical interposition, but very easy indeed to do harm; and a prudent physician is therefore more inclined to use passive than active measures; to employ, chiefly, *la médecine expectante*, and to lay down rules of general management in the diet, exercise, conduct of the mind, and every moral circumstance which can be under the control of the patient himself, or his friends.

In cases of paralytic weakness of a limb, the consequence of gout, rheumatism, the introduction of lead into the system, inveterate disorder of the digestive organs, and bodily accident, the use of the natural bath and the pump will be unquestionably proper;—I may add also, for the effects of strains.

It is very common for persons in health, staying at Buxton, to make use of the natural bath as a matter of enjoyment; and, so that it is used with discreet frequency, and under proper regulations, I see no objection to it; nor am I aware of having seen any ill consequence resulting from it, where the prudence for which I stipulate has been observed. I must here, however, remark that it will not invariably agree with persons who call themselves well; so true is it that, from idiosyncrasy of constitution, there are individuals who find rather disadvantage than benefit from persisting in the use of any kind of bath whatever.

The season of the year the most favorable for resorting to Buxton, and the period of time which may be considered to constitute a fit course of the bath, are points to be considered.

As the temperature of the natural bath is the same in the

coldest day of winter as in the hottest day of summer, it is obvious that in itself it must always possess the same properties; but we are taught, by constant observation, that the invalid receives much greater benefit from bathing in mild fine weather, when the atmosphere is dry, than when it is cold and wet.

It happens, as might naturally be expected, that in a genial atmosphere the important functions of the skin can be more favorably maintained, and its sentient nerves be placed in better harmony with the rest of the system, than when it is cold and damp; added to which, the inducement to take exercise is so much the greater; and this aid to the general health, always so important, can be obtained with more regularity. Therefore it may be stated in general terms that the Buxton season begins with the "merry month of May," and concludes with the shortening days of the end of October; and in this range of time, the one month will claim the preference of the other, accordingly as the season of good weather may be, which, in the variable climate of this country, is without any rule. Some invalids remain with advantage through the month of November.

No stated time can with propriety be mentioned for the course of bathing, since it must vary in almost every case. Most invalids allow too short a period, and fall into the error of expecting an immediate cure from the baths, forgetting that, whatever may be the remedy used, the evils of chronic disease can only be overcome by slow degrees. It must be a slight case indeed, for which one week's bathing could prove sufficient. The usual full period is from five to six weeks; and the utmost that need be mentioned, from ten to twelve. It is important that the patient, who can find it convenient to make a protracted stay, should occasionally intermit the use of the bath for a week or more; and he might derive pleasure and advantage from changing the air and the scene by a little excursion, and so return to resume the bathing under the most favorable circumstances.

I have before adverted to the nature of the limestone soil of Buxton, as being remarkably adapted for the quick disappearance of moisture. Hence, although from its hilly si-

tuation it is much visited by rain, the atmosphere is seldom very humid, and may be pronounced as usually bracing and invigorating. Change of air alone is a remedy of great importance; and the favorable influence of the elevated* situation of Buxton is often most happily shewn upon the debilitated invalid. Celsus well describes the occasional value of making any change of air in the following words. "Pessimum ægro est cælum, quod ægrum fecit; adeo ut in id quoque genus, quod naturâ pejus est, in hoc statu salubris mutatio sit."

The vicinity of Buxton abounds in interesting scenery, and affords the opportunity of many agreeable excursions, which will particularly gratify the lover of Nature in her rude attire. The most interesting objects are emphatically styled the Seven Wonders of the Peak; but for all particulars of this kind, I must refer the reader to the information contained in the Buxton Guide.

The noble range of buildings called the Crescent, erected at the expense of the late Duke of Devonshire, furnishes, in its hotels, every elegant and comfortable accommodation; there are also other hotels and inns of the best description: and for those who prefer to live entirely in private, convenient lodgings are readily procured.

It may, I hope, be instructing and interesting, that I should offer some Cases in illustration of the principles I have stated for the use of the waters—in agreement with the sentiment of Seneca, "Longum iter est per precepta; breve et efficax per exempla."

CASE I.

A gentleman, aged 50, of the nervous temperament, formerly a free liver, had suffered long and severely from acute gout, but latterly from the chronic form of the complaint. He was reduced in flesh, and weak. He was affected with

* "The mountain, Ax-Edge, in which is the source of the Dove and the Wye, is about 1100 feet above the level of the ground at Buxton Hall; and Buxton Hall is 1000 feet, or thereabouts, higher than Derby: so that the column of quicksilver in the tube of the barometer is always one inch lower at Buxton than at Derby, at the same time and under similar circumstances." Dr. Pearson quotes this statement from Mr. Whitehurst.

alternating pains in the head and limbs, so much increased by change of weather that he considered them to be rheumatic, and under this impression visited Buxton, for the purpose of using the natural bath. Neglecting all preparatory treatment, he bathed three times, within five days, in the public bath. On each occasion he felt chilled at the time of immersion, and did not receive comfortable warmth afterwards. His head was constantly painful, and the limbs in no degree relieved. On the day following the last bathing, I was consulted, and found him suffering from many urgent symptoms. He described his head to feel as if too full of blood, and he had great confusion of thought. Gout had fixed in one foot and one knee, with much pain, but only slight signs of inflammation. He had general pains over the body, with frequent nervous shiverings. I found the strongest indications of error in the digestive organs, and prescribed active aperients and alteratives, in conjunction with the moderate use of the acetum colchici. Leeches were applied to the temples, and a very small blister to the neck.

By these means all the active symptoms of complaint were in a short time removed, and I then directed the use of the warm bath, beginning at the temperature 96°, and gradually reducing it to 90° ; after which he returned to the natural bath with perfect success. He continued it for six weeks, under strict regulation, and obtained a very satisfactory recovery. He also derived benefit from drinking the water of St. Anne's well.

Observations.—This example strikingly shows the folly and impropriety of using the natural bath unadvisedly, and when the constitution requires preliminary treatment, as essential not only to any good result from bathing, but to the prevention of positive injury. The too-anxious patient also loses, instead of gaining, time ; a miscalculation, indeed, very frequently made in any of the means employed for the recovery of health.

CASE II.

An elderly lady, having long suffered from a mixture of gout and rheumatism, in the chronic form, attended with

great derangement of the digestive organs, head-ache, much weariness, and great irregularity of the circulation, as indicated by sensations of coldness of the head and feet, and heat about the stomach, right side, and the back, had for a considerable time desisted from medical treatment, and visited Buxton for the purpose of bathing, without using any preparation. She made trial of the natural bath. Immediately on immersing herself, she felt a sense of rushing of blood to the head, with pain and confusion, and thought she should faint in the bath ; the head and feet remained singularly cold for some time. She next used a bath at 94°, but had not power of re-action to oppose the feelings of coldness and discomfort arising from this temperature of the water ; for it should always be borne in mind how great is the difference between stepping into a bath and continuing in it at rest, and making a sudden immersion and keeping up a constant action of the body.

This lady derived great benefit from a course of bathing, first at 97°, and afterwards 96°, in conjunction with medical treatment.

Observations.—This case affords the same rule of caution as the last—the absolute necessity of weighing well the state of the constitution before venturing on the use of so powerful a remedy, for good or evil, according to the management of it, as the natural bath.

CASE III.

A gentleman, aged 50, originally of robust constitution, subject to acute gout since the age of 25, had suffered in an unusual degree from a continuation of painful symptoms during two months ; for he had felt himself so much injured by the taking of Wilson's tincture, Revnolds' specific, and the wine of colchicum to a great extent, that he left this fit to its own course, and visited Buxton in his state of convalescence, being much affected in the upper and lower extremities, with frequent aching or shooting pains, lameness, and debility ; and so sensitive to changes of weather that there was a strong

character of rheumatism in his disorder. This view of the complaint was confirmed by his suffering occasionally from lumbago.

He had lived in so sparing a manner that he did not require much preparation from medicine. He used four warm baths, beginning at 96°, and each time lessening a degree, and shortening his stay in the bath accordingly. He then had recourse to the natural bath, which he used with prudence and steadiness for six weeks; at first, two days in succession, omitting the third; and then for three days, omitting the fourth; never remaining in the bath more than seven minutes. The pump was applied to the loins and to the weakened joints. Friction and shampooing were employed daily. I never witnessed a more striking example of the utility of the Buxton bath. This gentleman was quite renovated in the active and comfortable use of his limbs, and gained equally in constitutional strength and nervous energy. He drank the water at intervals, a pint daily, without any disagreement, and with much seeming benefit.

Observations.—In this instance a right method was adopted from the first, and the case prospered altogether. The pumping was very useful, and it is important to observe that the daily use of friction, with shampooing, had a very material influence towards restoring the healthy circulation in the limbs, the tone and elasticity of the muscles and ligaments, and, in a word, enabling the lame man to walk again with power and comfort.

CASE IV.

A gentleman, subject to rheumatism, was seized with gout in the great toe only, in the first fit. In subsequent attacks, both toes and both ankles were affected. He had also sciatica on one side, and rheumatism in various parts, at the time of the last paroxysm. All inflammation had passed away; but, harassed with continual pains, and such weakness in the joints, that he had the apprehension of losing the use of his limbs, he made trial of the common warm bath: it did not afford relief, and served only to increase the weakness of his limbs. He then went to Buxton and remained seven weeks,

omitting the bath during the sixth week, and using it only each other day in the last week. At the expiration of the five weeks, he was beginning to feel some depression of strength, and symptoms of nervous irritation.

Observations.—This case shews the propriety of lessening, instead of increasing, the frequency of bathing at the conclusion of the course, and of observing an entire interval of time, when a protracted stay at Buxton can be made convevenient. Patients are often prone to reverse this principle of prudence, and at the last to force the treatment, and bathe every day, happy to think of the large number of baths they may have used; and without any better reason for such conduct than their diligence and perseverance. This is indeed the abuse, and not the proper use, of a good remedy.

CASE V.

Another gentleman, much crippled from chronic gout, and also affected with rheumatic pains, received a cure at Buxton in five weeks. He relates that he was not sensible of any material advantage until about the fifteenth time of bathing.

Observations.—We here see not only the necessity of steady perseverance, but that the patient should not withhold his confidence in the bath, because it may not always operate instantly with miraculous charm.

CASE VI.

A gentleman, aged 46, had suffered severe gout in both feet, in the toes, instep, and ankles. He had applied leeches freely to the inflamed parts, with only slight relief; and considers that they had tended to produce the very serious weakness and swelling which ensued for a long time. At a distant period from the paroxysm, he was unable to walk for more than a quarter of an hour, without producing swelling of the feet, much fatigue, and excessive aching. In this state he visited Buxton; and, by regular bathing, and by the use of the pump, in rather less than five weeks he received a cure.

Observations.—This case forms one of the many examples which I have seen of the permanent disadvantage produced by the use of leeches as a local remedy in gout. I do not

desire to offer my objection to the extent of a prohibition of this remedy; but to point out that it is one not so simple in its nature as might be imagined, and that it should never be inconsiderately employed.

CASE VII.

A gentleman, who had been several times attacked by gout, not in the severest degree, visited Buxton with much advantage; and, anxious to adopt all the means of prevention of his disorder, resolved on returning every year to the springs, so long as he should find success in bathing. Accordingly he presented himself to St. Anne and the baths every season for seventeen years. He omitted the eighteenth year; the charm was broken, and he had again a fit of gout; since which he has renewed his homage at the shrine of health, as regularly as before, and with the same success.

Observations.—I consider this to be an extreme case of continued exemption from gout, and should be still more disposed to extol the powers of the baths in preventing the return of rheumatism than of gout; because the latter is so much more distinctly a constitutional disease than the former: and the attempt of permanent cure must depend, therefore, essentially on the exact habits of living. Yet still, due importance should be assigned to those means which tend to improve the strength of the frame, and communicate tone to the system; and this benefit is eminently conferred by the Buxton bath. Those invalids who resort to the baths only for a season, and remain perhaps for a short space of time, render very slight justice to Buxton, and ought not to expect those lasting advantages which are with certainty bestowed on the more zealous and constant visitor.

CASE VIII.

A lady, aged forty, finding herself in a state of general debility, brought on by anxiety and fatigue, removed from Dublin to the vicinity of the sea-coast, where she had not the advantage of a machine, and she bathed with all the risk of exposure to the air. In this way she contracted an attack of rheumatism, which was most severe, affecting the upper

and lower limbs, attended with much fever, great irritation of the nervous system, and, finally, with the total loss of the power of walking; the attempt even of standing was so painful as scarcely to be endured. She had visited Bath, and used the baths there with great perseverance, but without any sensible improvement. On examination of the limbs, I found considerable bursal swelling around the knees and ankles; there was great stiffness, with tendinous rigidity; but it was evident that any inflammation which might exist was of the most passive kind; and therefore it did not appear objectionable that recourse should be had to the natural bath. It fortunately agreed perfectly, and was used in conjunction with the douche pump, and shampooing and friction. After some weeks, such an improvement was effected, as to allow of walking with some assistance. She was more sensible of the benefit she had derived from Buxton after her return home than at the time; and particularly as regarded the strength of the limbs, and the general tone of the constitution. This lady returned to Buxton the next season, and finally recovered the use of her limbs.

Observations.—The success derived in this case from the Buxton bath, after the failure of the waters of Bath, is a satisfactory tribute to the superior merits of the former as a remedy for chronic rheumatism.

CASE IX.

A gentleman, between 50 and 60 years of age, who had long been a martyr to gout, in his last protracted fit incurred a complete disability of the lower extremities, and had no other mode of taking exercise than being drawn in a chair, or using a carriage, into which he was lifted. He used a course of warm bathing in the Buxton water, beginning at 96°, and gradually decreasing it with a progressive diminution of stay in the bath to 92°, for three weeks; after which period he commenced with an immersion in the natural bath. This agreed perfectly, and he persisted in the use of the natural bath for six weeks, with such perfect success that he regained the comfortable power of walking. The plan of friction and shampooing was also employed. This patient was of so ple-

thoric a habit, and so prone to congestion in the vessels of the head, that he found immediate and very sensible disagreement from drinking the water, on every occasion that he made trial of it.

Observations.—The preliminary use of the warm bath, in this case, was very important. In the commencement, when the temperature was 96°, the patient remained in the bath nearly half an hour; but when it was reduced to 92°, not more than eight minutes: and it was always a point of treatment which I much insisted upon, that he should diligently use the hair flesh brush to all the affected parts while in the bath. This is not only useful in its immediate influence on the rheumatic parts, but the muscular action induced tends to maintain the equalization of the general circulation, which might otherwise fail if the patient should be perfectly quiescent in the water when at rather a low temperature.

On the Continent, the practice still prevails of a very protracted stay in baths of high temperature. Carried to the excess to which it is often done, it appears to me very contrary to right reason, and so wholly opposed to the methods we most approve from experience in this country, that any explanation of its advantages is difficult. To the force of habit which gives to the human body such power of endurance, we must look in part; and, in part also, to the great difference of climate, which creates beings of somewhat opposite nerves and temperament to ourselves.

Dr. James Johnson, in his very interesting account of the "Waters of Pfeffers," gives the following description. "The baths are arched with stone; the window to each is small, admitting little light, and less air; and, as the doors are kept shut, except when the bathers are entering or retiring, the whole space not occupied by water is full of a dense vapor, as hot as the Thermæ themselves. The very walls of the baths are warm and always dripping with moisture. Such are the *Sudatoria*, in which the German, Swiss, and Italian invalids indulge more luxuriously than ever did the Romans in the baths of Caracalla. In these they lie daily, from two to six, eight, ten, and sometimes sixteen hours." In a note he adds, "a German writer informs us that the

country people stay in these baths from Saturday night till Monday morning." If this be not an exaggerated statement, it is a very curious example of human fondness for pursuing a remedy in the extreme!

CASE X.

A lady, of middle age, of the nervous temperament, but usually enjoying good health, dislocated her knee by a fall: it was quickly reduced; but she suffered excessive pain, with total disability of the limb, for a fortnight. She experienced startings of the limb in a severe degree. Deep-seated inflammation ensued, and it was believed by the surgeon that the synovial membrane was much affected. The general condition of the joint was so sensitive, that all the ordinary means of treatment appeared to aggravate rather than relieve the irritation.

Having at length so far recovered that she could make use of crutches, she visited Buxton; and, after the use of a few tepid baths, entered on a course of the natural bath. The steady persevering use of it produced the happiest effects, and very gradually she obtained a sensible improvement. She returned to Buxton the following season, and finally recovered the use of the limb. The application of the pump was never admissible; and friction also, unless used in the most gentle manner, excited irritation and pain.

Observations.—I do not believe that, in this case, any description of bath could have afforded such remarkable benefit as was derived from the natural water at Buxton.

CASE XI.

A gentleman, aged 50, slight in form, of the nervous temperament, inheriting gout from his mother, first affected with podagra at 35, consequent to a free course of living, often troubled with bilious disorder, visited Buxton when in a very hypochondriacal state, complaining of wandering gout and much indigestion; the symptoms were, a pale tongue, impaired appetite, sinking sensations at the stomach, and distressing flatulence, with irregularity of bowels, vitiated biliary secretion, and much urinary sediment, sometimes

lateritious, but usually whitish, consisting of the ammoniaco-magnesian phosphate. Four years previously, in a severe attack of gout, he had taken tincture of colchicum, which quickly relieved the symptoms, but, he says, much disordered the stomach, and he never since had been visited by "good gout," or been free from various nervous symptoms worse to be endured than the gout.

Without advice he went into the natural bath, and had full occasion to repent of his rashness. He was chilled as if in the coldest water; his head became affected with pain, weight, tightness, various noises, confusion so that he could not connect his thoughts; coldness of the extremities, and pains more resembling rheumatism than gout. He was apprehensive of an apoplectic fit.

Active treatment was immediately adopted, and with success. In a few days he used a warm bath at 98°, and taking at the same time cordial aperient medicine combined with carbonate of ammonia. Regular gout took place in the feet, and the pain attending it, he said, was "Elysium to his mind," compared to the nervous misery he had so long endured. He remained at Buxton six weeks, and was enabled to use the tepid bath regularly for a month, the temperature being gradually reduced to 94°, which was the lowest he could bear; and from this, and the use of the pump, which is conveniently used in the artificial bath, together with the process of frictions and champooing, aided also by the use of corrective and restorative medicines, his health became most satisfactorily improved, and he gradually acquired quite a new state of constitution.

Observations.—This case is full of instruction. It exemplifies the folly and danger of using the bath unadvisedly; and equally the error of taking the strongest preparations of colchicum with a view to dismiss the gouty paroxysm in the quickest manner, without any regard to the state of the system; without considering that the gouty inflammation in the limbs is an effort of nature to counteract some internal evil, and should only be removed rather gradually, and chiefly by those means which correct the disordered internal functions, thus directed to the true cause of the gout. The mild preparations of colchicum, and in my experience the acetum or

acetic extract for the most part, may be used with equal propriety and advantage for the relief of the painful and too irritative gouty action, but always in combination with other medicines, so that the colchicum only plays a subordinate instead of the first part in the treatment, and should be withdrawn as soon as the active external symptoms are overcome; it being then the care of the physician to place the constitution in the most healthy condition that is attainable. It is only in this way, I maintain, that we are at all entitled to speak of the *cure* of the gout, which is truly a symptomatic disease. It is, however, much to be feared, that the love of quackery will ever prevail with the majority of gouty persons; and that, at any sacrifice of future health, the most immediate means of *seeming* cure will be preferred to the slower and more rational modes of regular treatment.

CASE XII.

A gentleman, aged 64, robust, corpulent, of the nervous temperament, of bilious diathesis, and much subject to gout, visited Buxton when in his best state of health, desirous of preventing the return of gout by the use of the natural bath. This he tried, after due preparation; but it disagreed: he could not obtain the proper reaction; he felt chilly and nervous the whole day. He resumed the tepid bath at 94°, which he found sufficiently warm; and, using it every other day for twenty minutes, in conjunction with the pump, and friction with the hair flesh brush, he derived great benefit. Nor was he disappointed in the permanent good which he expected. He had no return of gout in the following year; but in the succeeding spring he was attacked with a severe fit. He revisited Buxton in the autumn, and made another trial of the natural bath, having previously used the tepid baths in gradation from 95° to 92°; but it failed exactly as before; and returning again to the tepid bath of 94°, he derived every improvement, and has been free from gout or other indisposition for eighteen months. His circulation was easily excited by stimulants, and he could not drink the water for more than a short continuance without the inconvenience of a sense of fulness in the head, with slight giddiness.

Observations.—This gentleman had often been seriously ill with disordered function of the liver, amounting to jaundice, and with which his most obstinate fits of gout had been connected. I have frequently seen that the natural bath does not act favorably with very bilious persons; but it is satisfactory to observe that the same water raised in temperature fulfilled every useful purpose. This case is only one of many others I have seen, serving to encourage the gouty invalid to visit Buxton every season, in order to confirm the benefits of the bath towards establishing the health and tone of the constitution; by which he must gain a great step in preventing the return of his painful disorder.

CASE XIII.

A medical gentleman, forty-four years of age, met with a dreadful accident in a carriage which fell over a precipice of twenty feet. In addition to the fracture of two ribs, he received much injury to the spine, which, after some interval, was followed by complete paralysis of the lower extremities. It is remarkable that, at the time of the injury, he so well preserved his consciousness, that he bled himself. His own statement of the case is as follows. "My mind was very considerably affected by this accident. My memory was perfectly correct as to all events anterior to its occurrence, and at all times, while a subject was immediately engaging my attention, my judgment was as acute as ever; but as to passing events, the memory had no hold. In two minutes after any subject was spoken of, or read of, or if an object seen, it was as entirely forgotten and lost sight of as a passing shadow."

In the beginning of August, three months after the accident, he arrived at Buxton. At that time he was so helpless as to require two persons to assist him in alighting from the carriage. In walking, he used the aid of his servant's arm, and a stick in the other hand. Even thus supported, he could only make progress for a very short distance without resting. He stooped much, and dragged both feet, particularly the right. The muscles of the extremities, though amended, were still much shrivelled, and the hands very feeble.

Till the 15th of August he used the warm bath, first at a high temperature, gradually reducing it to 92°. Subsequently he used the natural bath very regularly. The douche pump was also used, together with friction and shampooing.

At the end of six weeks he could stand quite erect, walk without assistance, scarcely at all dragging the feet, and could proceed a mile without fatigue. The general health became equally improved.

I have given only a slight sketch of this important case; but the result exemplifies, in a striking manner, the tonic and restorative qualities of the Buxton bath.

CASE XIV.

A gentleman, aged 35, slight in form, of spare habit, and of the nervous temperament, having led a life of too much indulgence, was attacked with hemiplegia. A year after, with a view to recover the use of his left arm and leg, he visited Buxton. He had been so judiciously treated, that the circulation was quiet, and the functions of the brain were not apparently disordered. It appeared prudent, however, to commence with the use of the artificial tepid bath, and the tepid shower bath on alternate days; the pump being applied in the former. After three weeks he had recourse to the natural bath, and continued the douche pump, directed to the limbs and spine; and loins also, where he felt much weakness and occasional pain with greater force. Frictions, &c. were also employed. The treatment succeeded admirably, and he obtained the most satisfactory improvement.

Observations.—Here was an example of the good effects of the natural bath in a genuine case of paralysis, arising from apoplexy. In my cautionary remarks, therefore, at p. 42, I would not be understood to prohibit the use of the natural bath in paralysis; but rather to point out the necessity of great consideration being given to the state of the circulation, and of the internal functions. When we have reason to be satisfied on these points, we need not fear the recommendation of the Buxton bath, gradually introduced by other preparatory bathing. It is due to this patient to mention that he well deserved his amendment, from his exact conformity to rules of diet and regimen.

CASE XV.

A gentleman, aged 40, of delicate constitution and bilious diathesis, got wet to the skin in shooting, and imprudently sat by a fire at a farm to dry his clothes. In two days after, he was seized with acute rheumatism. At the expiration of six weeks of exceeding suffering, and when still affected with universal pains, but without fever, he was sent to Buxton, with directions to use the natural bath. After two immersions, acute rheumatism returned, with considerable violence, in the upper and lower limbs, and also in the neck and loins. He was slightly jaundiced, and the intestinal mucous membrane was in a state of great irritation. He declared himself in a worse condition of suffering than he had ever been ; and his mind fell into great alarm.

I will not detail the means of treatment; because my immediate subject is what relates to the Buxton bath. Suffice it then to say, that, after three weeks' course of medicine, he was sufficiently recovered to make use of the artificial tepid baths, and which were essentially serviceable, agreeing most perfectly. The weather becoming unfavorable, and the constitution of the patient being very delicate, he quitted Buxton without attempting again the natural bath. Under all the circumstances of the case, he might be considered as favorably convalescent.

Observations.—In this instance, the immediate use of the natural bath was exceedingly imprudent, not only as regarded the remaining susceptibility of the system to take on fresh inflammatory action, but on account of the highly disordered state of the liver, and of the mucous membrane of the bowels. It is a most unhappy fallacy of patients, and one from which medical advisers are not quite free, to believe that the Buxton bath must of necessity be curative and proper, so that rheumatism is the disorder, and that actual fever is not present.

CASE XVI.

A gentleman, aged 38, of rather delicate constitution, but for the most part enjoying good health, contracted rheumatism in both arms from exposure to wet in shooting, which had continued for several months, notwithstanding that he had

made use of leeches, liniments, warm sea baths, and colchicum. At this period, when I first saw him at Buxton, the complaint assumed a new character, affecting one arm much more than the other, and coming on with the greatest regularity of interval every evening, and lasting about four hours. There was no external appearance of complaint. The chief suffering was in the left fore arm, and the nature of the pain as if hot needles were inserted, and sometimes as if amputation of the limb were being performed. His fingers were so affected with tremor, that he could scarcely use the hand. Such was the constitutional irritation, that he was deprived of sleep, and fell into profuse perspirations; and, in the day time, felt weak, nervous, and shattered, as if by a long illness. It was evidently a case of intermittent neuralgia. He took quinine in free doses at short intervals, and at night acetate of morphia with black drop. Anxious also for the Buxton remedy, he made trial of the natural bath; but it disagreed. The system was in a state of too much irritation; and no comfortable reaction followed the immersion. Some advantage had been gained by the medical treatment, but insufficient; and I next prescribed liquor arsenicalis three times a day, and a strong veratria liniment to the parts most affected, continuing the anodyne at night. The best effects resulted. After five days, there was not any return of pain. He then used the natural bath, and very moderate pumping, with perfect agreement; and at the end of a month left Buxton quite recovered.

Observations.—This is one of numerous examples shewing the necessity, in some cases, of conjoining medical treatment with the Buxton bath, as indispensable even to its employment, and without which no success could be obtained. The opinion is too commonly entertained that no interference should be exercised with the bath; that it is in itself an all-efficient remedy in every case; and that it is almost a species of sacrilege to blend with it any other treatment.

CASE XVII.

A gentleman, aged 52, stout, and apparently of strong constitution, got wet in spring, and suffered in consequence

from an attack of bronchitis. This was subsiding, when, from fresh exposure, he was attacked with general pains of a rheumatic nature and lumbago. This latter affection took place suddenly in the night; and immediately the bronchial symptoms subsided. The complaint soon established itself as completely rheumatic; and, together with many of the usual remedies, he used a hot bath, frequently at 100°, with relief; but he did not gain permanent benefit from any treatment that was adopted. To the most affected parts, the shoulder joint and upper arm, he had applied veratria, by friction, without relief. In a state, therefore, of continued suffering, he visited Buxton in the autumn. He immediately used the natural bath and the pump; but, instead of advantage, he found a great aggravation of his symptoms; and, from the douche, the shoulder was rendered so much more tender, that he could scarcely bear the surface to be touched. The colour of the skin was natural, and it was cool to the touch. The character of the complaint had lately changed. There was still some lumbago, and there were general rheumatic pains; but the shoulder and adjoining parts were the focus of suffering. The pain was of the most excruciating description, and did not seem to be more than skin-deep. It had remissions, and some times almost regular intermissions. At this period he consulted me.

I advised the free application of leeches, which gave considerable relief; but still the pain was most severe. Pills composed of the acetic extract of colchicum, extract of conium, and Dover's powder, were very useful. He used the warm bath with advantage. From a sudden change of atmosphere, however, he had a relapse, and his worst suffering was renewed. All local applications having failed to give relief, I directed a small blister to the shoulder; and the cuticle being removed after vesication, two grains of acetate of morphia were sprinkled on the cutis. For forty-eight hours there was an absence of pain; but he was rendered as sick and disordered as if he taken opium internally, which always disagreed. I afterwards applied one grain, from which he received benefit and no inconvenience. I prescribed small doses of liquor arsenicalis joined with quinine

every eight hours. These measures were very successful. All the acute neuralgia having subsided, the use of the natural bath was resumed, and with perfect agreement. The patient quite recovered.

Observations.—In this case, the remedy of the natural bath and pumping was quite misapplied in the first instance. The nerves at the seat of disease were in too high a state of painful irritation to allow of such stimulating excitement; but it was satisfactory, that, after the removal of such irritation, it proved very useful in helping to restore the tone of the body. The *endermic* method of applying the morphia was remarkably successful. The liquor arsenicalis and quinine rendered great benefit, and without offending the stomach—with such propriety do we use the most active means of treatment when they are truly remedial and appropriate to the disease.

CASE XVIII.

A farmer, aged 40, of full habit and the sanguineous temperament, from remaining long in wet clothes, and then imprudently drying himself by the fire, experienced a most severe attack of acute rheumatism, which lasted seven weeks. When he had been convalescent about a week, he visited Buxton, and on the day of his arrival, after a journey of fifty miles, without advice went into the natural bath, and remained three or four minutes. He thought it was comfortable and useful—so much is it the happy fate of all new remedies to be approved. In the evening, he felt rather chilly, and slight general pains. He had been told that it was rather a sign of agreement than the contrary to have such pains produced by the bath; he therefore used it again the next day, and remained in six minutes. In the evening, he had strong rigors, followed by high fever; and, on the following day, I found him in bed, suffering from acute rheumatism in the upper and lower limbs. It was a severe relapse; but all the urgent symptoms were removed in a fortnight; and, in a short period after, he was in a fit state for the natural bath, its use being introduced by that of tepid baths, graduated in a series from 96° to 90°. He perfectly recovered without any fresh adverse circumstances.

Observations.—This is only one of many examples I have seen of the error of employing the natural bath before the removal of the inflammatory diathesis, and while the tendency to rheumatic disease is yet strongly existing. It is obvious, on the least reflection, that as on the one hand the Buxton bath is to be justly regarded as a powerful remedy, a most valuable means of doing good; so, on the other hand, it may be an instrument of much evil from its misapplication.

It too frequently happens, that, amongst the Charity-bath patients, cases are presented wholly unfit for the natural bath; and every year's observation has convinced me, that, in order to prescribe it with a reasonable expectation of success, careful consideration should be given to the case itself; the constitution of the patient; the exact state of the system; and the nature and amount of any symptoms of disorder in the constitution which may be existing.

CASE XIX.

A gentleman, aged fifty-two, always healthy till a year ago, when, having walked hard on a cold wet day, he experienced at night a sudden pain in the sole of the foot, as if he had trodden on a sharp flint. For some days he felt shooting pains in different parts of the right foot. By care and treatment, this attack passed away. In a month after, he went in a boat upon a lake, and a storm arose from which he got wetted to the skin, and remained in wet clothes. In a few days succeeding to this exposure, he was seized with acute sciatica on the right side. He was confined to bed for six weeks, enduring great suffering. Veratria was used with no permanent relief, although it was prepared of a strength to produce the required specific sensations. Mercury was rubbed in to the extent of causing ptyalism He went to the sea, and used hot baths from 93° to 100° for three weeks, almost daily. He recovered, and passed the winter favourably, but relapsed in the spring, and once more had recourse to mercury and hot baths. Again he improved, and thought himself well for six weeks, when, from an accidental exposure to cold and damp, sciatica returned in all its former severity. In this state, scarcely able to walk with assistance,

he visited Buxton. He used warm baths with comfort and good effect; but he was anxious for the natural bath, which he tried, together with the douche. Immediately pain in the sciatic nerve was brought on by the slightest movement of the limb, attended with spasms; and it was evident that the nervous system was too sensitive to allow of such means of excitement. On the following day, he was in great agony for several hours. He received relief from pills composed of crude opium the acetate of morphia and the acetic extract of colchicum. Due attention was paid to the state of the digestive organs. Some mercurial aperients were administered. Afterwards, paroxysms of pain occurred with remissions. Small doses of liquor arsenicalis, with fuller ones of the disulphate of quinine, were given with the best effects; and great advantage also was derived from the endermic application of acetate of morphia on an occasion when he described his suffering "as if the joint had been wrenched round and drawn out of its socket."

At the conclusion of three weeks of medical treatment, in conjunction with warm baths, he was in so improved a state, that I ventured to prescribe the natural bath. Now it agreed perfectly; and, in another week, the douche was also used with success. This treatment, together with the internal use of carbonate of iron, was continued for one month; and so successfully, that he quitted Buxton with the power of walking without pain or inconvenience.

Observations.—This case is very instructive, shewing the unfitness of the natural bath, and of the douche especially, when the nervous system is under high irritation, and the particular nerve affected in a state of acute neuralgic suffering. These conditions being altered, we see, on the contrary, how completely the bath succeeded. When he resumed it under proper circumstances, if in some pain on entering, he found ease soon after the immersion, and continued comfortable the rest of the day.

CASE XX.

A gentleman, aged 50, stout in person and of full habit, but of the nervous temperament, subject to dyspepsia attended

with heart-burn, a sense of tightness and pain along the sternum, and a frequent palpitation of the heart, in the month of February first perceived a pain in the right hip, on the day following his having stood for several hours on wet ground, inspecting some works on his premises, having also been previously imprudent in the way of exposure. He recollected, too, having received a strain in riding from the starting of his horse. The pain was at first deep seated, as if in the socket of the thigh bone. Afterwards it was well marked in the sciatic nerve and its branches, still continuing in the hip. He was cupped and blistered, and remained in bed a fortnight, and he was relieved ; but, on resuming exercise, he soon found the complaint in full force, and it had continued without intermission when I first saw him at Buxton in September. One eminent surgeon considered the hip-joint to be seriously affected. After walking a few minutes, severe pain came on, beginning at the hip and extending down the whole limb in the course of the sciatic nerve, and compelling him to take rest, the difficulty of the sitting position being at the same time great. He seldom experienced any pain in bed, but had extreme difficulty in rising. The sensation of pins and needles at the knee and down the leg was distressing. There was lumbago in half of the loins on the right side, and a tenderness to pressure at the first and second lumbar vertebræ. This symptom led one surgeon of experience to pronounce his conviction that there was disease in the ligaments of the spine, and that the case was essentially spinal. He advised issues, and the constant recumbent position.

I could not bring myself to believe that the case was of this serious nature ; and, upon a close investigation, I came to the conclusion that it was a case of sciatica connected with partial lumbago, and a chronic inflammation of some of the ligaments of the vertebræ, a state of painful disorder kept up by very great derangement of the functions of the liver. He had used warm baths at Leamington, and drank the saline waters for a month, also taking the iodide of potassium in full doses, without having acquired any apparent benefit. On first arriving at Buxton, he made trial of a few natural baths ;

but on each occasion the immersion was followed by an increase of the pains, by coldness of the extremities, an exceeding sense of general discomfort, with nervousness, palpitation of the heart, oppression of the chest, and embarrassment of the breathing. I found in the urinary and alvine excretions the strongest evidence of hepatic error; and, accordingly, I prescribed alteratives and aperients as the most essential parts of the treatment*, conjoined with warm baths, and occasionally the vapour bath†; for there had been frequently a dry and heated state of the skin. It much relieved his general muscular stiffness. The acetate of morphia was applied frequently to the parts in pain by the endermic method, preceded by small blisters, with much advantage. Subsequently, liniments were used; one of which was composed of the solution of veratria in alcohol, with soap liniment. After an assiduous treatment of this description for one month, the amendment obtained was most satisfactory. He could walk a considerable distance without pain or inconvenience. He quitted Buxton with instructions to continue the alterative aperient medicines at more distant intervals, with the use of sarsaparilla, Brandish's alkali, and iodide of potassium; occasionally exchanging this mixture for one

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* I here wish to observe that in all cases of confirmed wrong functions of the liver, and the evidence of which is always made clear by the appearance of the urinary and alvine excretions, great perseverance is required in the use of aperient and alterative medicines; for, otherwise, only half a cure will be accomplished.

† At page 29 I have alluded to the difference of agency on the surface of the body which may belong to the various kinds of water baths which are used; and I may here observe that a similar distinction is to be held in view with regard to the varieties of vapour baths, as the simply aqueous, and the sulphurous acid gas; and to which may be added the hot air bath. The most powerful is the sulphurous acid gas bath. It is admirably administered at Green's establishment in Great Marlborough Street. I have no doubt that it excites the capillary vessels of the skin more than any other, and induces the fullest and most effective perspiration. I can scarcely advert now to the different medicated baths, as the alkaline, strongly carbonated (fully charged with carbonic acid), iodine, mercurial, and nitro-muriatic. This last, which a few years ago was so popular, is now seldom thought of. Although I cannot assign to it the great merits claimed for it by its zealous proposer, the late Dr. Scott, yet I am well persuaded that it has the power of influencing the internal functions occasionally, though perhaps not often; as well as acting differently on the skin from any other kind of bath.

with the disulphate of quinine. This gentleman finally obtained a perfect recovery.

Observations.—The urgency of this case was well manifested by the surgical opinions pronounced upon it. It may appear surprising that the Leamington waters had not been more useful. This case of confirmed visceral error required the decided and continued action of mercury, and it would not yield to slighter means. The happy results obtained were the best proof of the propriety of the treatment, and of the correct view which I had taken of the disease. The patient was not in a fit state for the use of the natural bath, nor could it be compatible with the mercurial influence on the system which it was necessary to establish. I imagine that, in this case, the heart did not contract more strongly, as I have supposed may usually happen, according to my statement at p. 32; but that, on the contrary, from the shock to the nervous system not being well sustained, the left ventricle might act too feebly, and consequently the heart would not get duly rid of its blood, and the circulation through the lungs would also be necessarily interrupted. In regard to the general treatment of the patient, I need scarcely add, that a very strictly regulated diet and a careful regimen were particularly enjoined.

CASE XXI.

A gentleman, aged 45, of robust frame, and generally enjoying good health, had contracted sciatica from exposure to damp, and not found relief from various means which he had used for six weeks. His digestion had become disturbed by the pain and irritation of his complaint. He visited Buxton, and, after one preparatory warm bath, used the natural baths and the pump. He received immediate relief, and, in rather less than a month, a cure. He said, expressively, "that the first six baths seemed to wash away the pains." He was convinced that the drinking of the water was beneficial to his stomach; for, on intermitting its use, the dyspeptic symptoms returned, and were again removed by his regular beverage at the well.

CASE XXII.

A young lady, aged 20, had been the subject of two rheumatic fevers within four years. On each occasion she was bled considerably, and particularly on the last. She visited Buxton within three months after the beginning of her convalescence from her second illness, suffering in a most distressing degree from violent beating of the heart. Under any mental or physical excitement, she felt, according to her own description, "as if the heart would jump out of her breast." She had often severe shooting pains in the region of the heart. The nervous system was morbidly sensitive in a high degree. She was thin, weak, and very pale. Her nights were restless and often sleepless. She was still affected with occasional rheumatic pains in several of the joints. The appetite and the digestion were considerably impaired. She had been put on a course of digitalis, kept on low diet, and not allowed any stimulant, on the idea of restraining the circulation.

A different plan of treatment was evidently required. I prescribed carbonate of iron in a saline draught twice a-day; at night, a combination of black drop, acetate of morphia, and hydrocyanic acid, each in small doses; and over the heart a larger plaster on thin leather was applied, consisting of empl. opii, belladonna, and soap cerate. The diet was gradually improved to one that was generous, and wine a little diluted was added to it. At first a cautious trial was made of the tepid shower bath, beginning with one gallon of water, and this was gradually increased to five gallons. Such was the remarkable improvement effected in three weeks, that I thought it expedient to direct the natural bath. As, at first, this delicate patient entered it with apprehension, and very slowly, the head was affused as she was stepping in; and she made her immersion as quickly as she could, then instantly leaving the bath. The heart, as if taken by surprise, palpitated much more than from the shower bath, but no permanent inconvenience followed. It soon became regular. Suffice it to say, that the natural bath was continued for five weeks, with occasional intervals, and at the end of the second week the douche pump was used very gently, the water being

directed over the left side of the chest, and to the rheumatic limbs. A complete recovery was obtained; and this young lady quitted Buxton in good spirits, and was daily acquiring the bloom of health.

Observations.—Although it is always incumbent upon us, on the principles of justice, to criticise the past treatment of a case by others with great delicacy and caution—since we must be ignorant of the exact circumstances which might exist, and the consequent motives of the practitioner,—yet it does seem probable that, in this instance, the patient being always delicate, too much depletion had been used. In the chronic state of suffering, hypertrophy of the heart was apprehended as being likely to take place; but the case was evidently an example of morbid irritability in its action. Happily the dangerous disease of hypertrophy is not of frequent occurrence, as compared with the common occurrence of acute rheumatism. I believe that, when it does happen, there must be an especial predisposition to it, which is actively promoted by the rheumatic diathesis. Unquestionably the heart itself is also the occasional seat of the rheumatic action and irritation; and the long continuance of consequent excessive action, in concurrence with morbid predisposition, appears to lead to hypertrophy.

CASE XXIII.

A lady, aged 40, rather robust, but of the nervous temperament, much affected with general rheumatism, unattended with fever, had suffered for many weeks from neuralgia in the face and teeth, and severe pains of the head, which were evidently rheumatic. After suitable preparation, she had recourse to the natural bath, and also received gentle strokes of the pump over the head and face. The effects were most satisfactory, but particularly when the atmosphere was favorable; for on damp days she experienced so much aggravation of her pains, that the benefit of the bath was much counteracted.

She took carbonate of iron, and used occasionally an embrocation of veratria dissolved in alcohol and compound soap liniment, in conjunction with the other treatment,

with much advantage; and, although she did not lose the symptoms, she derived very great and satisfactory amendment.

Observations.—This was one of the numerous instances which I have seen illustrating the superior effects of the bath when used in favorable weather: and here, to speak in figurative language, it may be expressed as matter of regret that Nature has been rather at variance with herself, in joining these most salutary baths for rheumatism and kindred diseases with a too variable sky. The relief to this disadvantage is certainly a great one, the quickly drying soil.

CASE XXIV.

A gentleman, of the middle age, of delicate constitution, and of the nervous temperament, had undergone extreme fatigue at an election, and after great perspiration carelessly exposed himself to midnight air. He was shortly after seized with sciatica in one limb, and this was followed by pains in the femoral nerves of both thighs, and in the nervous branches supplying the muscles of the upper arms. He was so much deprived of sleep by intense pain, that he soon became reduced in strength and flesh.

In these circumstances, having taken various medicines without relief, he visited Buxton. He first used tepid baths without benefit, and, on the contrary, with a relaxing and injurious effect. He then had recourse to the natural bath, with the best result, as it acted most favorably as a tonic. But it was necessary to join medical treatment with the bathing. Belladonna liniment, well rubbed into the skin over the situation of the painful nerves, afforded much relief. He also took, with great benefit, first a bark saline draught in effervescence with free doses of the black drop; and afterwards medium doses of Fowler's solution with the black drop. He finally quite recovered.

Observations.—In this case the carbonate of iron had been tried without success, and it proved oppressive to the stomach. The arsenical solution agreed perfectly; and it is fortunate that, in particular forms of disease, we can avail ourselves of this powerful mineral tonic without fear of injury.

Yet, I must observe, it is not a medicine to be given on common occasions; nor ever without a careful watching of its effects.

CASE XXV.

A gentleman, of rheumatic constitution, and altogether delicate in health, became at length troubled with occasional severe pains in the muscles contiguous to the spine. The complaint increased, and after some time assumed the form of neuralgia; and pains of a peculiar shooting nature were extended both to the upper and lower extremities; but the greatest severity of suffering was experienced in the upper portion of the spine, on pressure of which, the patient shrunk violently with the sense of pain; and sometimes this pressure produced immediate spasms of the muscles, chiefly of those of the arms. The darting excruciating pains of the spine frequently occurred with such suddenness and force, as to resemble tic douloureux; and they were attended with a peculiar sense of coldness, so that he could fancy "that ice had been introduced into the spinal marrow."

Acupuncturation at the spine, in conjunction with the heat of burning moxa projected from a syringe, proved very useful. He took full doses of carbonate of iron in the day, and, at night, as much of black drop with acetate of morphia and camphor as was necessary to procure sleep and tranquillity.

I feared whether the natural bath would be suitable in this case; but fortunately it agreed perfectly, and acted very beneficially as a tonic. This gentleman was quite relieved from the violence of the symptoms; and, although he remained an invalid, he derived from the treatment at Buxton such permanent benefit as gave him much satisfaction.

Observations.—So many local applications had been used in this case, particularly leeches and blisters, that it was necessary to make trial of new means*. With respect to acupuncturation in neuralgia rheumatica, I must confess that I never saw it decidedly useful, except in one case of sciatica; but in that, the benefit was immediate and well marked; and it was one of difficult treatment, for other means had greatly

* Had I then been in possession of Dr. Granville's ammoniated lotion, I should have used it in this case. I find it an excellent counter-irritant application.

failed. The moxa heat was useful to the present patient, in relieving the sense of coldness at the spine, which was so peculiar and deep seated.

CASE XXVI.

A gentleman received a severe strain of the ankle joint, which left the ligaments weakened and liable to rheumatism in wet weather for a whole year. He had obtained only slight benefit from liniments. From three weeks' use of the natural bath, and the pump, together with hand-rubbing, he derived such remarkable benefit, that he felt his cure to be complete.

Observations.—This is one of the numerous cases in which I have witnessed the superiority of the Buxton treatment over all other for the consequences of strains of muscles and ligaments. For those especially who are prone to rheumatism, the common practice of using the coldest water under a pump is hazardous, in the probability of producing rheumatism in the joint. The medium temperature of 82° is more suitable than that of 50°, the usual temperature of water from a common pump; which produces too much of the sedative effects of cold, thereby tending to increase the debility of the affected parts, instead of acting, according to the expectations of the patient, as a tonic.

CASE XXVII.

A gentleman, aged 55, robust and of the mixed temperament, rheumatic in constitution, was, without any assignable cause, suddenly affected with enlargement of the bursæ surrounding the shoulder joint of the right arm in a considerable degree, and in the same manner in the left, slightly. Notwithstanding the treatment used, the complaint increased; and when he first consulted me, I was struck with the extraordinary enlargement, which produced great deformity, and much impaired the use of the arm. In the commencement of the attack, the swelling was painful; but, at the period of my attendance, it would allow of being freely handled.

He visited Buxton, and used the natural bath on alternate days, and the douche pump (for the most part) every day,

with the best result. The bursal enlargements almost entirely yielded at the end of a month.

Observations.—This treatment by the bath and the pump is always applicable to bursal enlargements, wherever situated, when not attended with inflammation. They are rarely painful in the chronic state; but impair the motion of the joints, and the action of muscles and tendons. The bursæ at the knee are the most frequently affected; but the hands, elbows, and feet, are also very liable to this troublesome complaint.

It is well known that the cause of these peculiar swellings is some morbid condition of the bursal sac, which is lined with a thin pellucid membrane that secretes the same kind of gelatinous mucus which is found in the cavities of the joints, and serving the same general purpose—to lessen friction, and prevent the consequences which would otherwise result from it. They occur chiefly to the gouty and rheumatic, but also to those not affected with either disease; and as the result of strains or over-action of parts. Enlargements arising from chalkstones, improperly so called, as the deposit is formed chiefly of the super-urate of soda, and not of carbonate of lime (chalk), are quite of a different nature; and, when indurated, are not at all influenced by the water, internally or externally used; nor are they, for the most part, readily controlled by this or other treatment, even when the secretion is recent.

When the lower extremities only are affected with the bursal swellings, the pump may be used without giving the patient the trouble of altogether undressing—such are the arrangements for this purpose. This method is called dry pumping.

CASE XXVIII.

A lady, aged 20, had gradually fallen into a state of great constitutional debility, the stomach having so completely lost its tone, that the smallest quantities of food would disagree, producing a sense of weight and soreness, with occasional nausea. The usual stomachic medicines had failed to give relief, and many that were tried appeared to be injurious. Leeches and a blister had been applied without apparent

benefit, and the complaint had otherwise been treated on the principles of opposing chronic inflammation.

The drinking of the water at St. Anne's well, the doses at first small, and gradually increased to the full quantity, succeeded to admiration, and the patient improved in health in the most satisfactory manner.

Observations.—Although some persons drink the water without any sensible effect, merely stating that it does not disagree, and others only experience its diuretic influence, yet there are individuals, suffering from great delicacy of stomach, who readily discover the useful qualities of the water as a mild tonic and an agreeable, effective diluent.

In affections of the mucous membrane of the bladder, and disordered condition of the kidneys and ureters, I have seen much benefit obtained from the water; and which I have prescribed to be drunk largely in such cases.

Were I to enumerate all the various forms of disease in which the Buxton bath has proved useful, in the narration of cases which I have had the opportunity of treating, a large volume would be required; but I hope that, in avoiding what has been often called a great evil—a great book,—I may have given a sufficient account of my subject for the purpose of general medical information. It is obvious that, if in the recital of my cases I had gone into a fuller detail of symptoms, I could not have confined myself within convenient limits.

OF THE BUXTON CHARITY BATH.

As on the former occasion, I shall conclude with speaking of the Charity Bath, to which I have for many years been senior physician. It is an institution most highly deserving the protection and assistance, not only of the affluent, but of all those who are raised above want, and can render even small contributions. What offices can render such heartfelt satisfaction as those of benevolence and humanity! What pleasure to the invalid visitors, when themselves daily receiving the benefits of the bath, to behold the improvement

effected amongst the afflicted poor by the same means; and to know that they are contributing, by no inconvenient sacrifice, to such blessed ends! I will not expatiate further on a theme which deserves a more able pen to do it justice; but annex the Report which was drawn up at a meeting held at the Great Hotel on the 18th of September 1830, Charles C. Western, Esq. M.P. (now Lord Western) in the chair.

It was resolved, "That the following appeal to the public should be addressed, through the medium of their chairman, to the principal nobility and gentry in Derbyshire and the adjoining counties; to gentlemen of the faculty; and other persons throughout the country at large, who were likely to take an interest in the success of the Institution.

"The extent of relief to the unhappy objects of this charity is, in the first place, necessary to be laid before you; and upon an examination, by the meeting, of the accounts of former years, I am enabled to state to you that, upon an average of the last four or five years, about *eight hundred persons* have annually had the benefit of the baths granted by the noble proprietor—medicine from the funds of the charity—and gratuitous advice from the medical trustees. Above *four hundred* of these persons have also received an allowance of five shillings per week for three successive weeks*, the time in general considered to be sufficient, though in many cases a longer period would be highly desirable, if the funds of the charity would allow it. The number of patients admitted this year has not been reduced; but the defalcation in the funds being to the extent shewn in the report of the annual meeting, it is evident that the further aid of the public is indispensably necessary to the continuance of that relief which the charity has been hitherto enabled to afford.

"The reputation of these Springs has been long known and generally acknowledged; but it is the strong opinion of this meeting that their remedial and restorative powers are

* At the September meeting, 1838, a resolution was passed, increasing the allowance to the invalids to six shillings per week (if standing in need of such pecuniary aid) for the space of four weeks.

by no means adequately appreciated by the principal inhabitants of the surrounding neighbourhood; nor does it appear that they are even sufficiently known to the faculty in general, or to the country at large. But it is impossible for persons who have been in the habit of visiting this place, and who have watched the rapid progress which the patients of this charity exhibit, from the lowest stage of disease to renewed energy and health, without being convinced that the most important sanative effects are produced by the proper use of these Springs, in a great variety of cases. The situation of this place is peculiarly calculated to furnish examples of extraordinary and varied cases of disease, being within a short distance of the great manufacturing towns of Leeds, Manchester, Sheffield, Birmingham, Macclesfield, and Stockport. Multitudes, broken down by the confinement and unhealthy nature of their employments, come here miserable spectacles of accumulated disease, the greater portion of whom recover, in an almost miraculous manner, their health and strength, and are restored to their families and friends.

" It is most material to observe, that the medicinal qualities of these waters are by no means confined to the cure of rheumatism and gout. In almost all cases of debilitated and broken-down constitutions, the effects of acute or chronic disease, climate or intemperance, as well as the unhealthy occupation of the workmen in manufacturing towns, the most beneficial results are experienced from the use of the baths, and the waters taken internally. The powers of the digestive organs are wonderfully restored: the skin being brought into a more healthy state by the bath, aids the relief given to the stomach by the water which is drunk, and thus a healthy action of the whole system is brought about, the patient is restored to his former vigour, and a condition of permanent health.

" The peculiar air of this place should not, perhaps, be wholly overlooked. It is elastic and dry, owing to the elevation of the district in which it is situated, and its limestone soil. When rain falls, it is speedily absorbed; neither leaving dampness nor moisture to depress the patients, or counteract

that general bracing quality of the atmosphere so conducive to their recovery.

"It is submitted, that, upon these considerations, not only would it be a matter of serious regret that the funds of this Institution should fall off, but that it is most earnestly to be desired that we should be enabled materially to increase them; and I trust you will feel that, with the hope of accomplishing this object, the meeting, of which I have the honor to be the organ, is fully justified in making this special appeal.

"Were the salutary powers of these Springs more generally understood, thousands among the higher classes might be restored to health and happiness; and numbers of the afflicted poor returned to their families, again able and active members of the community."

The benevolent and distinguished individual who presided, signed this address after expressing himself in the following words. "In conclusion,—I venture to take the liberty of expressing my individual conviction of the correctness of the opinions herein given by the meeting. I have visited this place very often; I have had abundant means of observation; have watched the singularly beneficial influence of the waters in a great variety of cases; and have in my own person repeatedly experienced their efficacy in an eminent degree."

From the fact which I have stated of the increased allowance recently made to the necessitous patients, it may be inferred that this judicious address was followed by good results.

Two charity sermons are preached in the course of every season. Subscription and donation books are kept at the different hotels and lodging houses. Every small contributor has the privilege of sending a patient to the Charity; and a donation of £10 constitutes a subscriber for life, with power to recommend a patient annually.

OF THE BUXTON CHALYBEATE.

In addition to the tepid springs which are peculiar to Buxton, there is also a chalybeate, which rises from a bed of shale, on the north side of the river, behind the George Inn. It flows into an open basin from a conduit called the Lion's Mouth, and the copious deposit of reddish precipitate at once shews the character of the water.

It is a spring, not of strong impregnation, as the following statement will shew; but it is a very pure water, and instances may occur in which its use will deserve recommendation. I have in some instances found it desirable to prescribe this water instead of St. Anne's well, either by itself or as an adjunct to the bath; but I must add, that the cases which call for such a preference, are not those which may with propriety be called *Buxton cases*. In those circumstances of constitutional error and weakness, in which chalybeate remedies are proper, there will be every propriety in having recourse to this water, and in joining with its use some medicinal preparation of iron, if by itself it should, although agreeing well, fail to produce the desired benefit. It has long been a common practice to use this water on the spot, as a wash for weakness of the eyes; and it is found certainly useful, in its cooling and tonic qualities. The influence of a chalybeate water on the constitution is a subject by itself, and for my extended observations on this remedy which nature presents to us, I beg to refer the reader to my General Treatise on Mineral Waters,* in which I treat at length of the excellent chalybeate of Tunbridge Wells. I proceed now to state some general chemical particulars of this chalybeate.

The taste of the water is slightly and agreeably chalybeate.

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* A Treatise on the Composition and Medical Properties of the Mineral Waters of Buxton, Matlock, Tunbridge Wells, Harrogate, Bath, Bristol, Cheltenham, Leamington, Malvern, Isle of Wight, Brighton, and the Beulah Spa, Norwood.

The temperature 54°.

The specific gravity is 1·0003.

ACTION OF TESTS.

Tincture of galls in a few minutes produces a violet hue.

Prussiate of potash, a light greenish blue.

After boiling, or after simple exposure for a short time, no change of colour is occasioned by these re-agents.

Nitrate of silver scarcely produces a change.

Nitrate of lead no immediate change; but soon a slight cloud appears.

Solution of soap scarcely disturbs the transparency of the water.

Lime water, no obvious change.

Muriate of barytes, a slight cloud.

Muriate of lime, no sensible change.

Pure ammonia causes a very slight brownish precipitate, perceptible after standing.

Carbonate of ammonia, a similar effect.

Oxalate of ammonia, a slight cloud.

From the effects of these re-agents, we may infer that the iron in this water is held in solution by carbonic acid. From comparative experiments which I made on a former occasion with the different springs of Tunbridge Wells and Tunbridge, I conclude that the proportion of iron in this water does not much exceed half a grain in a gallon.

It has only a small proportion of carbonic acid.

It contains a small proportion of the muriatic and sulphuric acids in a combined state.

It is a remarkably soft water.

OF THE WATERS IN DOMESTIC USE.

I have, lastly, to subjoin my statement respecting two of the waters in domestic use, to which I have alluded at page 25; the one from the Manchester Road spring, and that from the pump behind the Angel. I examined them in conjunction with Mr. Garden. The first, from the Manchester road,

with which the houses in the Crescent and the Square are supplied, is in specific gravity 1000·3, and contains, in a wine pint, only seven-tenths of a grain of solid matter, which is chiefly of vegetable nature; and it is entirely free from all mineral impregnation. It is indeed a water of singular purity, and admirably fitted for the use of the table.

The Angel pump water is of specific gravity 1001·5, and yields of solid ingredients from the wine pint 4½ qrs., which consist of the carbonate and sulphate of lime, and the muriates of magnesia and lime, and also a very minute portion of the oxide of iron, as appeared from the following experiment:—

A pint of the water was evaporated to dryness, and the dry mass was redissolved in two drachms of distilled water, with the addition of half a drop of muriatic acid; and to respective portions of this solution, a drop of tincture of galls, and of solution of precipitate of potash, were added. No immediate change was produced; but at the end of twenty-four hours there appeared from the galls a slight precipitate, which was evidently owing to iron; and from the prussiate of potash, the color of the liquid was rendered bluish green.

The other water was tested by exactly the same process; and not the slightest indication of iron was afforded. Hence it appears, that although the quantity of iron in the water from the Angel pump is exceedingly minute, yet it must be considered sufficient to render the water unfit for constant drinking, and especially for all such persons as are very sensible to the influence of a chalybeate.

I now conclude my little work, and shall be happy if I have had some success in setting forth the merits of the tepid springs. Their good name, however, rests upon the experience of many ages. Their virtues are consecrated by time; and, for the benefit of suffering humanity, long may the springs be preserved in all their purity; and, from being still more known and understood, may their useful influence be extended to the widest bounds!

THE END.

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