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OBSERVATIONS

ON

BUXTON WATER.

BY

JOS. DENMAN, M. D.

SECOND EDITION, CORRECTED AND ENLARGED.

"MULTA ITERATA VIDEO, ADDITA PAUCA."

LONDON:

PRINTED FOR J. JOHNSON, NO. 72, ST. PAUL'S CHURCHYARD,

By H. Bryer, Bridewell Hospital, Bridge Street.

1801.

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TO HIS GRACE

THE DUKE OF DEVONSHIRE.

MY LORD,

I HAVE long been of opinion with those, who do not approve of the usual method of dedicating books as to patrons; judging, that they ought to have no other patronage but truth and reason. The ancient custom was, I believe, to dedicate them to private and equal friends; or, if to great persons, to such as had an immediate relation to the subject. This consideration removes every difficulty on the present occasion. For when I observe the numerous and very magnificent buildings, which have been erected by your Grace for the accommodation and convenience of the public, I am induced to suppose, that the omission of your name, even from a stranger, would be impossible on a subject wherein you are so much

interested: but from a person, who has had the honour of being concerned, as a professional man, in your Grace's family for fifty years, such an omission would be deemed highly improper. Be pleased, my Lord, therefore, to accept this sincere, though probably the last token of affection and respect in the power of

Your Grace's very faithful,

and most obedient servant,

JOS. DENMAN.

Stoney Middleton,

June 4th, 1801.

OBSERVATIONS

ON

BUXTON WATER.

CHAPTER I.

OF THE SITUATION, ETYMOLOGY, AND ANTIQUITY OF BUXTON.

Buxton, so famed for its medicinal springs, is a considerable village in the north-west part of the county of Derby, but bordering upon Cheshire, from which it is separated by a chain of high mountains, intersected by very deep ravines or gullies.

It is situate in a very elevated part of the High Peak; the whole country surrounding it exhibiting the strongest proofs of some convulsion, or tremendous effort, in the bowels of the earth, but at a period so distant, that no record of it is remaining; tradition even has failed to convey to posterity any the least circumstance concerning it.

So many learned and ingenious men have given themselves the trouble of endeavouring to explain the etymology of Buxton, that some opinion may possibly be expected on a sub-

ject, which by no means appears to be exhausted.

Buxton is supposed by Dr. Jones, one of the earliest writers concerning it, to have derived its name from the stags or bucks taking soyle there when wounded; whence it was called by the foresters Buckstand. And as the place formed a part of the King's great forest of the Peak (Picus), which was certainly well stocked with deer of various kinds, the conjecture is fair and probable. There is great reason also to suppose, that the wild and extensive parish of Hartington, immediately adjoining, might receive its name from some species of deer.

Yet Jones is rather disposed to think, that the name was taken originally from an owner of the place. This, however, is not so likely; for where the names correspond, it will generally be found, that the surname of the person has been borrowed from the place of his abode: and at this day the vulgar pronunciation retains the translation of the Latin word "de", in this part of the country. Thus we hear of John o' Padley, and many other surnames expressed in a similar manner.

The truly venerable Dr. Pegge derives the word from boc, fagus, or bocca, caper, and hean, a stone; but apprehends the Saxon name to be modern, when compared with the high antiquity of the place.

Mr. Gough traces the name from boc, and coxit; that is, the warm springs among rocks; or from boc, fagus, if it be admitted that the beech ever grew in this place.

Dr. Pearson thinks the name may have originated from the German bock-stein, or the English stein-bock, or wild goat; but apprehends, from the many beech trees now in this neighbourhood, that the name may have a reference to them, from the Saxon word before mentioned.

Notwithstanding these very respectable opinions, and although the beech is now common here, yet there is the highest authority against this derivation. Cæsar, in his Commentaries, expressly says, that every kind of wood was to be met with in Britain, as in Gaul, except the beech and the fir. Let us take his own most elegant language: "*Materia cujusve generis, ut in Gallia, est in Britannia, præter fagum ac abietem.*" He might not indeed be acquainted with the different kinds of wood in the internal parts of the island, but it seems in some measure a confirmation of his assertion, that in a very fine part of the county of Derby, sixty years ago, there was not a single beech tree.

But it is time to leave the reader to his own opinion as to the etymology of Buxton: a point attended with uncertainty; and in this in-

stance interesting only from the increasing consequence of the place, and the names which have given sanction to the inquiry. Before, however the subject, be dismissed, it may be remarked, that the name is by no means peculiar to this county; and that the two words, beck, a brook or rivulet, and stone, appear to comprise every just allusion to the name.

The great antiquity of Buxton is a notion so universally adopted, and supported by so many persons of eminence and learning, that we are scarcely permitted to have a doubt concerning it. No pretensions of this kind can, however, extend to the ages immediately preceding the conquest of this island by the Romans: these are involved in the deepest darkness and obscurity. A wild, bleak, barren region, subject to depredations of every kind, if peopled at all, cannot be supposed to have been peopled in any considerable degree.

It is, however, generally admitted, indeed the opinion does not appear hitherto to have been controverted, that Buxton was well known to the Romans, and, among other reasons, the following circumstances have been particularly adduced to prove the fact.

1st. The remains of an ancient solid brick-wall round the well, afterward called Saint Ann's. This well, together with its basin,

was not entirely demolished till the year 1709; when sir Thomas Delves, in memory of a cure received by himself, erected the late handsome arch over the fountain.

2dly. In conducting a sough from the river to the bath in 1698, the labourers discovered at the distance of about fifty yards from St. Ann's well, and eastward of it, several sheets of lead spread upon large beams of timber, with other supposed remains of a Roman, or ancient bath of some kind.

3dly. The Roman way, called Batham-gate, leading from Brough to Buxton, part of which on Tideswell moor may be traced at this day.

The two first particulars have been transmitted down to the present time, but from what original authority does not appear: neither does it appear that much investigation has been employed on the subject. The name of the antiquarian who discovered this brick-wall of Roman construction is not mentioned; of his skill and judgment, therefore, no opinion can be formed: nor has a single specimen of so curious a piece of antiquity been preserved. Perhaps there is as little reason for concluding, that the leaden baths, or cisterns as they

are sometimes called, were of Roman workmanship. After the long residence of that people in Britain, some artist might remain in the island, capable of executing such works, which, however, are not described as approaching to any degree of magnificence.

The third particular, as having received the sanction of many learned men, has undoubtedly a claim to a more minute examination.

Batham-gate, or Baden-gate, lies on the most elevated part of Tideswell moor, between a village called Brough and Buxton, from which latter place it is distant about five miles. But the extent of it either towards Brough on the north-east, or south-west towards Buxton, can only be traced for a few hundred yards.

Brough is so contiguous to Castleton as to afford a strong presumption, if not a certainty, that they were connected parts of one and the same fortification. The name generally signifies a walled town, endowed with particular privileges; but in its more simple meaning implies merely a place of security. And certainly from the unfortunate circumstances of those times, which immediately succeeded the retreat of the Romans from Britain, such fortified places must have been often necessary, as indeed appears from the frequency of the name, and never more requisite than in such a country. The remains of an intrenchment

on the great hill or mountain west of Castleton are by some supposed to have been a place of worship; and this opinion is strengthened by the name of the mountain, which is called Mam-tor. A lead-mine at the bottom of the hill, and the most ancient work of the kind, in this part of the country, is also denominated Woden. But an attention to the line of this intrenchment, which on the north-side is carried to a great extent, far beyond the limits of Mam-tor, entirely does away this conjecture. The names of the deities, however, sufficiently prove the very intimate connection of these parts with every thing which is Saxon.

It is admitted that no road can be traced eastward from Brough to any part of the island: it is admitted also that Castleton is far posterior to the time of the Romans. If, then, the road called Batham-gate led only from Brough and Castleton to Buxton, no doubt can remain, that it was made by the Saxons. But I am inclined to believe, that this was only a small part of its utility, and that it formed a communication between various parts of the island. There is in the Saxon Chronicle an anecdote not foreign to this point.

In the year 924, king Edward marched with an army to Nottingham, where he built a bridge over the Trent, in order to join the two parts of that town then separated by the river. From

Nottingham he proceeded into Peak-land, to a place called Badecanwylla, in the neighbourhood of which he ordered a town to be built, and established a garrison. As the name is applicable to any bathing place, it may lead to a belief that it was intended for Buxton, which was but little out of a direct line into Scotland, the object of his expedition. But then it certainly would have retained so descriptive an appellation. Now as Bakewell is almost a literal transcript of the Saxon word, as it was formerly famed for its bath and sacred springs, and particularly as it lay in the precise line of the king's rout, there can scarcely be a doubt of its being the place mentioned in the Chronicle.

On a beautiful elevation, which in one part appears the effect of art, and to this day called Castle-hill, adjoining to the town of Bakewell, probably stood the fort erected by king Edward. The town is exactly nine miles from the road named Batham-gate; and this road may be supposed with much reason to have had a reference to it; as at the time it was a place of consequence, both from its contiguity to many great mineral works, and from its situation, lying in the great Saxon road pursued by king Edward, as before mentioned.

By what means the communications were maintained between the Roman stations on the

north-east part of the kingdom, and Congleton, Chester, and Bangor in the west, we are ignorant, but the name of Buxton does not occur in their itineraries: indeed there is scarcely a Latin name for it. Bucostenum, given in Ainsworth without quotation or authority, if it be not a vile word borrowed from the English language, seems rather to relate to herds of cattle, than to a medicinal water. The Aqua Solis so happily applied to Bath, may lead to a fair conclusion, that a place so remarkable for its warm springs as Buxton, had it been known at all to the Romans, would not have been left by them without some appropriate name, some term in their language, expressive of peculiarities and advantages so uncommon, and so rare in the island.

Major Rooke, whose reputation as an antiquarian is so well established, in the ninth volume of the Archæologia has given a description of what he supposes to have been a Roman edifice and camp at Buxton. The building, he imagines, was a temple dedicated to Apollo; and the camp, he concludes, was intended as a protection for the baths, while they were frequented by the Romans. The dedication to Apollo, as presiding over a water eminent for its medicinal qualities, is certainly a classical and ingenious conjecture. But when once it had been taken for granted, with or without

authority, that Buxton and its waters had been known to the Romans, the rest followed of course, and every circumstance was then to be adapted, and rendered applicable to their customs; though it could not have escaped the notice of the worthy antiquarian, that no Roman coins, vessels used in sacrifice, military weapons, or any thing of the kind, had ever been discovered in the neighbourhood. The Saxons had their deities, their bathers would at least require as much protection as the Roman; and on the first establishment of Christianity, which probably was also the first date of the reputation of this water, their chapel with its religious attendants would demand much more.

In Pilkington's history of Derbyshire is the following account, given to the author by the late doctor Bullock:

"Notice is taken in Camden's Britannia of a Roman brick-wall, cemented with red Roman plaster, close by Saint Ann's well, near which were the ruins of an ancient bath. And in the year 1781, when the foundations of the Crescent were laid, the shape and dimensions of this bath might be clearly discerned. Its form was an oblong square, or parallelogram, measuring from east to west thirty feet, and fifteen in the contrary direction. The spring lay at the west end, and at the other end might be clearly perceived a

flood-gate, by which the water was let out. The wall was of lime-stone, and of rude workmanship. On the outside, the bath was covered with a strong cement, probably designed to prevent the cold water from mixing with the hot. The floor was covered with plaster, and did not appear to have suffered any material injury. On the top of the wall were laid strong oak-beams, firmly connected together at the four corners. The bath, it was thought, had been open to the air."

Notwithstanding the exactness of this description, I am warranted, I believe, in asserting, that much of it is the work of imagination; and in this question feel no difficulty in committing myself to the evidence of many intelligent workmen now living. Undoubtedly great liberty has been taken on the occasion. All that the masons were able to distinguish were some stone steps, leading to a room of rude and coarse workmanship, together with some small pieces of white and red plaster, and rough beams of timber, laid in no precise direction.

If the bath was open to the air, where was the use of large beams of timber said to be tied together at the top of the building? The wall wanted no support, nor could it receive any from the weight it was destined to sustain. But probably the building was roofed; and

the timber seems a convincing proof that it was so.

It is worthy of notice, that in driving up a level to the bath, in the year 1698, by Mr. White, the foundation of an old chapel dedicated to saint Ann was discovered, and a large piece of the old wall was dug up and removed.

Upon the whole there is reason to regret, that the place mentioned by Mr. Pilkington was not more precisely examined. It might have been a bath, it might have been a chapel, or it might have been merely a cellar belonging to some house. But whatever it really was, as a piece of art, it by no means accords with our ideas of the architecture of the Romans, even in the declining state of the empire; and is very unworthy of their public buildings, which were invariably executed in a style the most correct, and with the greatest magnificence.

Enough, perhaps, has been said to render the acquaintance of the Romans with Buxton problematical at least, if the contrary has not been decisively proved. And whatever may be the different opinions of mankind on a subject relating rather to history than to medicine, the great obscurity, in which all inquiries concerning the times now under consideration are involved, renders it difficult, if not quite impossible, to trace them with precision. The clearest ideas possible

to be formed on such subjects seldom afford conviction to the reasoning mind. In the present instance, the real value and increasing reputation of Buxton water depend upon experience, and far superior considerations to the preceding.

Before this part of the subject is dismissed, it is but candid to observe, that, at the distance of five miles south from Buxton, is a road called the Street. This seems to lead in a straight line to Derby, by the village of Brassington; through which formerly lay the road between Buxton and Derby, but which is now diverted through Ashbourn. I do not recollect that this street has been taken notice of by any writer; and yet it appears to afford as strong a presumption as any argument hitherto advanced, that Buxton was known to the Romans.

In the discovery of these medicinal springs, and in distinguishing them from common water, very little sagacity indeed was required: for, as by their natural channel they soon fell into the open river, the eye could not avoid the obvious steam arising from the warmer current; nor the hands and feet the different sensations of warm and cold water.

The military, whether Roman or Saxon, oppressed by the fatigue of heavy marches in a climate naturally severe, and particularly exposed to violent and sudden storms, must soon observe

the use of this water in preventing the mischiefs arising from a combination of cold, moisture, and fatigue. Hence, a simple, easy, and rational foundation would be laid for extending the benefits, and consequently the credit of this water. Yet, notwithstanding these more obvious and accidental advantages, I am inclined to believe, that the solid and permanent reputation of this water was at last assisted by circumstances, which come now to be more particularly explained.

Christianity had made a considerable progress in Britain long before the establishment of parish, or mother-churches; and many chapels had been erected in various parts of the island. In Buxton was one situate near the warm springs, and dedicated to saint Ann. This chapel was afterward removed into the upper part of the village, became a chapel of ease to the parish church of Bakewell, as it still remains, and saint John Baptist became its patron. This change is a proof that the first chapel was founded before the division of parishes. The well remained under the protection of saint Ann, and its peculiar qualities would necessarily, either from real or imaginary advantages, become conspicuous, and extensively known.

The erection of this chapel, with its religious attendants, may then be esteemed the æra of the reputation of Buxton. It is easy to conceive, that

one or more men of sacred character might here place themselves for the noble purpose of instructing, humanizing, and converting to christianity, a few ignorant, ferocious, and almost savage human creatures: and the efficacy of the water could not long escape the penetration of these worthy men, by whom, of course, it would be placed under the direction of their favourite saint. Nor would the honour of the saint receive any diminution probably from the use of such an engine in such able hands.

As an instance of the happy application of natural causes to particular purposes, and as a proof, at the same time, of the learning and abilities of the clergy at a very early period of our history, the following fact may be adduced. It occurred about the middle of the seventh century; and may be found in the first volume of the Biographia Britannica under the article Aidan.

A priest, called Utta, was sent by king Oswi to Canterbury, to conduct into Northumberland his betrothed wife Ealfleda, the daughter of king Edwin. The priest, who was to go thither by land, but to return by sea, addressed himself to Aidan, bishop of Holy Island, desiring his prayers for the success of his voyage. The prelate, having commended him to God, told him he foresaw a violent storm, whereby his vessel would

be in great danger; and at the same time gave him a phial of holy oil, bidding him, when occasion should require, to pour it into the sea, which would thereby be rendered calm. Utta followed the good bishop's direction, and by that means saved himself, and all who were in the ship with him, from impending destruction.

This is one of the miracles ascribed by Bede to Aidan, the truth of which was confirmed to Bede by a priest called Cynimund, who had the story from Utta's own mouth.—*See the Naufrag. of Erasmus.*

If we except an obscure author mentioned by Jones, there is very little on the subject of Buxton water before the time of queen Elizabeth. This author, whose name was Cotterell, talks of it as receiving its virtue from saint Ann, or from the river Jordan. Such notions, joined to the conceptions we are able to form of a long and dark period of our history, justify in some measure the insinuations of another writer, Lambarde, that Buxton was frequented on account of the miraculous cures performed by saint Ann, through the medium of this water. It will not, however, escape the observation of the attentive reader, that, whether the place was visited from motives of superstition and ignorance by the multitude, or from the expectation of rational and natural advantage by the enlightened few,

here is an acknowledgment implied of benefits received. These benefits are in some instances so immediate and obvious, that the force of the insinuation is done away, and it becomes even a proof, that from a very early period this water had been much in use.

The following official letter confirms what had been said by Cotterell and Lambarde on the subject of miracles, and at the same time is an additional proof of the violence of Henry, and the spirit of the reformation.

" *Right Honourable my inespecial good Lord,*

" According to my bounden duty, and the tenor of your lordship's letters lately to me directed, I have sent your lordship by this bearer, my brother Francis Bassett, the images of saint Ann of Buxton, and saint Andrew of Burton upon Trent, which images I did take from the places where they did stand, and brought them to my own house, within forty-eight hours after the contemplation of your said lordship's letters, in as sober a manner as my little and rude wits would serve me. And for that, there should be no more idolatry and superstition there used, I did not only deface the tabernacles and places where they did stand, but also did take away crutches, shirts, and shifts, with wax offered, being things that allure and entice the ignorant to the said offering, also giving the keepers of

both places orders that no more offerings should be made in those places till the king's pleasures and your lordship's be further known in that behalf.

"My Lord, I have locked up and sealed the baths and wells at Buxton, that none shall enter to wash there till your lordship's pleasure be further known. Whereof I beseech your good lordship that I may be ascertained again at your pleasures, and I shall not fail to execute your lordship's commandments to the utmost of my little wit and power. And, my lord, as touching the opinion of the people, and the fond trust they did put in those images, and the vanity of the things; this bearer can tell your lordship better at large than I can write; for he was with me at the doing of all this, and in all places, as knoweth good Jesus, whom ever have your good lordship in his blessed keeping.

"Written at Langley, with the rude and simple hand of your assured and faithful orator, and as one ever at your commandment, next unto the king's, to the uttermost of his little power,

"WILLIAM BASSETT, Knight."

"*To Lord Cromwell.*"

This letter, in which so little is yielded to the prejudices of the day, confirms the remark of Floyer, that Buxton was not much frequented about the time of the reformation. Floyer says,

that the heathen priests, having attributed the benefits received from the use of waters to their deities, and having been imitated herein by the Romish priests, who had dedicated Buxton water to saint Ann, the reformers, from an abhorrence of all such ideas, avoided every thing, which, in the most distant manner, might be supposed to give a sanction to such superstitious notions.

Yet, under these disadvantages, as well as the want of proper accommodations, this water recovered its former reputation in less time than might have been imagined: for Jones, who wrote in 1572, which was the 14th of queen Elizabeth, informs us, that since the earl of Shrewsbury had erected new and goodly buildings, and beautified the place, the water began again to be resorted to for its extraordinary effects.

Jones was a physician at King's Mede near Derby, and the title of his book is "The benefit of the ancient bath of Buckstones, which cureth most grievous sickness."

At this day much will not be expected from the chymistry or theory of doctor Jones, but his work is curious and entertaining. It contains also many useful and judicious observations. He tells us, that a register of the cases had been hitherto kept by the attending physician, or by the bath-man. And it is much to be regretted, that this measure was not pursued down to the present

time; as, by this means, a number of facts, leading to practical information, might have been laid before the public. The want of some plan of this kind is a principal reason, why the knowledge of Buxton water is so very confined.

That Buxton was a place well known at somewhat a later period will appear from one of lord Verulam's apophthegms; the value of which consists only in the greatness of the writer. "A plain old man at this place sold besoms, and a proud, lazy young fellow came to buy upon trust. Borrow of thy back, and borrow of thy belly, replied the old man, they will never ask thee again; I shall be dunning thee every day."

Twenty-five years only after the publication of Jones's book, in the year 1597, and the thirty-ninth of queen Elizabeth, Buxton was so much frequented, that it was thought necessary to add a clause to an Act of Parliament, whereby persons resorting to Bath and Buxton are prohibited from begging in those places, and directing that such persons should receive relief from their respective parishes. They are also required to have a pass signed by two magistrates, in which pass shall be fixed the time of their return. Nor are they permitted to beg, as before observed, under the penalty of being taken up, and treated as vagrants.

It is impossible to pass over this mark of attention and vigilance in the legislature, without being

affected by such a proof of the distinguished abilities of the original framers of the laws respecting the poor in this kingdom. That genius, which, without the shadow of a precedent, could plan and institute laws of the greatest importance, demands our highest admiration. Their acquaintance with the morals and manners of that class of people, for whom this branch of our police was formed, must excite the surprise and veneration of all, who consider them with the liberality and attention which they deserve and require.

That they are not without defects, must be ascribed in some measure to the ever varying state of society; and that the expenses attending them are become enormous, must be admitted; particularly if we take into the estimate the great number of public and private charities, which do honour to the present age. Yet these expenses appear to be heightened beyond their due proportion by the great decrease in the value of money, by the immense extent of our manufactures, by the unhealthiness of some of them, and often, too often, by the want of management in the execution of these laws. It is also to be feared, that they are much increased by the lamentable change so apparent in the manners and habits of our common people; who in losing sight of the frugality and providence of their fore-fathers, have lost also that honest, worthy,

independent spirit, which made them disdain to ask relief, except under the most pressing circumstances arising from age, infirmities, or accidental misfortunes.

CHAP. II.

OF THE CLIMATE AND AIR OF BUXTON.

THE air of Buxton, and the structure of the earth in its neighbourhood, are of so particular a nature, and appear to have such a strong relation to the advantages or disadvantages of the place, that some account of each of them will undoubtedly be expected. But as the principal object of the author is rather to offer the result of his own experience, as to the medicinal effects of this water, the reader is referred to more copious and elaborate histories relating to these curious and truly interesting particulars.

The tepid springs at Buxton lie in a narrow valley, surrounded by lofty hills, forming part of a chain of mountains, which are said to extend to the northern extremity of the island. These, in allusion to some in Italy, have been long denominated the British Appenine. The great elevation of this ridge of mountains may be deduced from a variety of circumstances; but nothing explains it more clearly than it's being the source of many rivers, which fall either eastward into the German ocean, or into the Irish sea westward. The two rivers of the Peak, the Darwent, and

the Wye, after pursuing a long winding course to the south, are received into the Trent, and with it are carried into the German ocean.

The winters in this part are far more severe, the snow falls more abundantly, and the frost continues much longer, than in the adjacent countries. The spring season is late, it's progress much interrupted by storms, and cold north-easterly winds; vegetation is checked, and proceeds slowly; a great quantity of rain pours down at all times of the year, particularly in summer; and much moisture descends in the forms of mist and foggy weather.

Many circumstances do, and must combine, to form such a state and temperature of the atmosphere in this region of the Peak; which, however, it has in common with other mountainous countries. There is less heat in them, because the air is less dense, the rays of the sun are less refracted, but little warmth is communicated to them from the sea, and the earth is cooled to a greater degree in winter.

Air, though called an element, is combined with other substances, and universally with water. The quantity of water which may be combined with air, depends on the density and heat of that air.

But air is not only combined with water; it is capable also of containing water in a state of

solution; and in this state is perfectly dry and transparent. Air likewise, though lighter than any other fluid, from it's viscidity is able to sustain other substances, provided they be minutely divided. And, besides this combination or solution, water may be diffused through, or suspended in, the compound of air and water.

Clouds are portions of air with water suspended in them. Now, as the atmosphere can only support them to a certain height above the level of the sea, in this elevated country they hang near the surface of the earth, where they are either intercepted or attracted by the tops and sides of the mountains, and where the air, in a state of complete saturation, is already prepared for decomposition, and the consequent precipitation of it's water. Even dry air, loaded as it may be with water, when blown from a warmer atmosphere into this high country, is rendered cooler; of course, it's solvent powers are diminished, and it's water necessarily precipitated.

When the solvent powers of air are diminished in a less degree, the moisture remains for a time suspended or diffused; and in this case, a thick, foggy atmosphere is produced. Hence the sudden changes of weather, which occur here in the course of a single day, may be accounted for; a circumstance which often happens, even in summer; for, the warmer air ascending from the

valley becomes almost immediately changed, and falls upon the higher lands, in some of the ways just mentioned. Yet, though it is admitted, that a large quantity of rain falls in the neighbourhood of Buxton, it by no means follows, that the atmosphere is more loaded with moisture in this place than in other countries apparently more favoured: probably the reverse is true, that it's atmosphere is less impregnated with moisture.

The mean temperature of the cold springs around Buxton is not quite 48; and as this is esteemed a pretty exact estimate of the temperature of a country, it may properly enough be concluded, that this is the state of the air in the mountainous part of the Peak.

Rain, in this country, is usually preceded by, or accompanied with wind. Whether this arises from general, or local causes, it is perhaps not easy to determine. By these winds possibly the atmosphere may be rendered more free from extraneous matter than in lower situations: the rains also, by washing off, or decomposing noxious particles, may eventually contribute to the purposes of health.

Opinions, however, formed on reasons like the preceding, cannot be admitted without some restrictions: for, if less elevated situations are exposed to mischief of various kinds from various

exhalations, inflammable air, which is lighter than common air, and abounds in very high regions, may, in it's turn, be productive of consequences equally unfavourable to health. A certain medium, then, is necessary in this respect; and from accurate observations it appears, that the state of air most friendly to *animal* life is from 1500 to 2000 feet above the level of the sea. The Peak, therefore, as it is reckoned to be in such a situation, may be supposed to lie under a favourable impression of the atmosphere.

It is also, for the most part, free from stagnated waters, and many other causes of putrid or bilious disorders. And these considerations are further confirmed by experience. From an almost uninterrupted residence, and the practice of fifty years in this country, I feel myself justified in the assertion, that the Peak is a climate favorable to health, and which has produced very many instances of longevity. Through the whole extent of it, intermitting complaints seldom appear: but by what authority we are informed, that fevers of any kind are here uncommon, I am yet to learn; and am concerned to be under the necessity of acknowledging, that fevers of a very putrid kind sometimes occur in this region. Doubtless fevers of an inflammatory tendency are more particularly prevalent; yet, even in these, a great alteration has hap-

pened within my own memory. Complaints heretofore truly and simply inflammatory, and which yielded entirely to what is called the antiphlogistic treatment, do not at this day bear those large evacuations formerly used with success; nor are they now removed by such conduct. So far as my observation extends, there is not a single instance of their disappearing without showing, in their decline, strong symptoms of putrid or bilious mischief. Whether this disagreeable and important change has arisen from some unobserved or unaccountable variation in the atmosphere, or by some great alteration in our mode of living; or whether from the introduction and great extension of many manufactories, which often preclude the benefit of open air, with the aggravation of an air confined in space, and contaminated by noxious particles, particularly by animal effluvia; it may be extremely difficult to determine. The fact is certain, and much to be lamented.

However foreign to the present subject, it cannot be disagreeable to the lovers of humanity to be informed, that the *bellond*, a disorder to which the miners and smelters of lead-ore (a large body of men in this county) have been particularly subject, the *mill-reek* of the Scotch, and the *colica pictonum* of physicians, is at this time so much declined, and so well understood, that it very

seldom occurs, and is in no instance fatal. It is not easy to assign any particular reason for a circumstance so interesting as far as concerns the miner; the much-improved methods of conducting the process for making lead from the ore seem to account satisfactorily for the advantages received by the smelter. But it is time to return to the subject of this essay.

It has been observed by Dr. Pearson, that the ridge of mountains, which has been so often mentioned, being very elevated, the column of the atmosphere incumbent upon it is consequently short; and, therefore, that the animal system sustains here a less weight than in many other situations.

From this circumstance the doctor thinks no practical inference can be drawn in a state of health; but apprehends that in a state of disease, a considerable change may be induced by a sudden transition into these regions. I am, however, inclined to believe, that even in a state of health, and where there is no affection whatever of the chest, a moderate degree of attention will convince any man, that a considerable effect on the animal frame is produced by this diminished pressure of the atmosphere.

Yet, however comfortable the reflection, that from the elevation of the country, the pressure on the human body is lighter and less oppressive,

and the air more pure, more washed and ventilated, the prospect to the invalide remains uncomfortable. Gloomy reflections will suggest themselves to the sick, while they are obliged to wait for effects, distant at least, if not uncertain; and where they are to be received under some certain disadvantages. In a country where there is said to be no spring; in which vegetation is slow, the harvests late, the rains incessant and immoderate, and the cold unusually severe, nay so intense as sometimes not to permit the snow to fall; it cannot be readily supposed, that any thing can be found to counterbalance such marked and real causes of apprehension. Let the infirm, however, be assured, that these expressions will admit of considerable qualification.

The spring is certainly late; but, even at Buxton, many pleasant days are experienced in this agreeable season, which, it is presumed, is never understood to produce steady and unchangeable weather in the most favoured parts of the island. Vegetation is undoubtedly slow, and checked by frequent storms, and cold north-easterly winds; but the appearance of the earth is rendered infinitely worse from the necessity of feeding sheep and cattle on the rising herbage.—This necessity is much increased by the small quantity of hay produced in the neighbourhood; small, both in proportion to their stock, and to the consumption

arising in a much-frequented place, and a considerable thoroughfare. This accounts, in some measure, for the uncommon lateness of their hay-harvest; their corn also is sown late, and reaped accordingly. But it is not here intended to commend the agriculture of this country, which will certainly admit of much improvement. It would, however, be unjust not to acknowledge, that there are some praise-worthy exceptions to the general practice, and that the number of these exceptions is continually increasing.

The invalide may also be informed, with much truth, that the roads in these parts are in general good; and that few days occur, in which a prudent man may not manage so as to take the benefit of a ride in some part of the day. Nay, many days of clear and steady sunshine are experienced on these hills, while the valleys are obscured by fog and vapour. Much has already been done by the very noble proprietor of these springs for the use and accommodation of the public; much yet remains to be done for the improvement of the country. When the hills shall be planted according to the beautiful specimen already given, where the very form and variety of them is preserved; when the *morasses* shall be drained; when a part of their tremendous rocks shall have been applied to raise adequate fences for their fields

and gardens, and a yet larger part to the melioration of lands happily situate for lime and coal, then a change in the very climate may reasonably be expected.

The effects of human ingenuity and labour, says Dr. Robertson, are more considerable than even our own vanity is apt at first to imagine. And from the same eminent writer we learn, that no small part of the fertility and beauty of this habitable globe, which we ascribe to nature, is the work of man; whose efforts, continued through a succession of ages, change the appearance, and improve the qualities of the earth.

CHAP. III.

OF THE STRUCTURE OF THE EARTH.

THE mountains around Buxton abound with chasms, and large cavities, which frequently have not a communication with the surface, but have been discovered by persons working in the bowels of the earth. Yet neither from these openings, nor from the steepest precipices, has there ever been found an opportunity of examining the contents to a greater depth than three hundred yards below the surface of the ground. So far the earth is said to be disposed in somewhat regular strata; and probably, in some measure it is so disposed. It is, however, admitted, that there are exceptions to this general observation: a circumstance which may readily be conceived, when it is considered that, in consequence of some violent and irregular impulse, many fractures and obliquities have been discovered. The working miner is not often a man of attention; and the conductor of these works is seldom the scientific person, that might be expected at the present day; so that the subject is by no means incapable of further investigation; and therefore allows of some difference in opinion. Indeed, in many

systems, there is often to be discovered something bordering on fancy or composition; something doubtful or suspicious; something, in short, which demands further examination.

The very learned and excellent prelate, to whom the world is so much indebted, as well for the general diffusion of science, as for his happy application of it to the most useful purposes of life, has compared the search of man into the bowels of the earth, to the endeavours of a gnat to distinguish the internal formation of an elephant. He, nevertheless, recommends every inquiry in the pursuit of effects arising from a great First Cause, which is itself always above our comprehension. Many obvious advantages arise from these attempts: but, if no direct benefits were derived from them, the gratification of innocent curiosity ought not to be despised; as they form an accession to the very few harmless pleasures bestowed by Providence on mankind.

In order to form some distinct ideas of the different parts which compose this mountainous country, and by that means perhaps to account, in some degree, for the warmth of those springs which are found in it, it will be necessary to state such facts, or seeming facts, as have been delivered by former writers, particularly by the late ingenious Mr. Whitehurst, whose opinions on

this subject appear to have been generally adopted.

The internal strata, then, which compose this part of the country, are the four following:

1. Grit stone.
2. Shale.
3. Lime-stone.
4. Toad-stone.

These strata are said to lie on each other in regular order: grit-stone, when present, being always incumbent on lime-stone, and so with the rest. Sometimes the two former are wanting, and sometimes the first bed of lime-stone.

The first stratum of toad-stone is over the second bed of lime-stone; and so in succession to the fourth bed of lime-stone; of which very little is known.

Between the lime-stone and toad-stone are small beds of clay, of a light blue colour tinged with green, containing pyrites and spar. The springs issuing from this clay are said to be warm; and all warm springs are supposed to arise from this blue clay, between the second bed of lime-stone and the second toad-stone; but this, perhaps, is a point as yet not sufficiently ascertained.

Besides the original strata, are some which are called accidental. These consist of clay in various states of induration, with beds of in

flammable matter disposed alternately on each other, and both incumbent on the original strata. Of this kind are beds of argillaceous earth and coal.

Grit-stone, shale, and lime-stone, are by no means uniform in their appearance, being often mixed with other substances. Toad-stone is in a more regular form; and, except some small cavities filled with calcareous earth, seldom contains any heterogeneous matter. This stratum is of a dark colour, hard, breaks alike in all directions, and has no marks of either animal or vegetable impression. There are seldom found in it any fissures corresponding with those of the adjoining strata; but fissures in them are often filled with toad-stone, which is from 100 to 600 feet thick. This stratum is sometimes wanting.

Toad-stone is composed of siliceous earth, clay, and calx of iron, with a small proportion of calcareous earth.

Sand-stone beds are pretty uniform, having only a few quartz pebbles in their fissures.

Shale is an argillaceous earth, containing iron-stone; and many springs issuing from this stratum are impregnated with iron. Here the miners often meet with the fire-damp, and with a bitumen highly inflammable; and, supposing shale sufficiently heated by other substances, it may possibly contain inflammable matter enough to be itself capable of burning.

The strata of lime-stone are laminated with interstices of shale containing much inflammable matter. In this shale are often found the impressions of various sea-animals: and these interstices are denominated veins, pipes, or rakes, according to their different direction. Some of these cavities contain lead-ore, or the ore of other metals; some are filled with inflammable substances, and some with various kinds of earth.

Nature furnishes materials, which, under certain circumstances, may become the occasion of subterraneous fire. To the formation of this fire some communication with the air may perhaps be necessary: and air may be conceived either to attend on the drippings of water, or to descend through the fissures on the surface of the earth, and once kindled it may subsist for ages by means of shale, coal, bitumen, &c.

From these, and other similar circumstances, many conjectures have been formed concerning the heat of mineral waters. These, from a very early period, have exercised and amused the minds of speculative and ingenious men. At this time, they seem to have settled into two different opinions; though, to an ordinary observer, the shades of difference appear to be of no essential consequence, or to afford any useful conclusions. It is not a debate whether the heat of mineral waters be owing to a subterraneous fire;

for in this all seem to be agreed; but whether that fire be originally caused by the decomposition of pyrites, or other metallic substances; or by a central fire within the bowels of the earth. It is, indeed, difficult to conceive how a decomposition of any matter can be so equal, and so constant, as to produce that continual, steady and unvarying heat to be observed in many springs. Yet, if these decompositions usually happen in countries abounding with pyrites (and there can scarcely be a doubt of the fact), the consequences ought necessarily to follow. And whatever difficulties occur as to this mode of producing heat, they do not at all appear diminished by the idea of a central fire. It has been very pertinently asked by what means, and at what time, was the central fire first kindled? by what fuel is it supported? in what manner does it communicate with this fuel? what space does it occupy? and for what length of time may it be expected to burn?

In both ways, the production of vapour creates no sort of difficulty or contradiction; and the diffusion of great heat, whether from a decomposition of mineral substances, or from a central fire, must have an effect on the calcareous earth equal to the separation of it's gas; and at the same time, to the formation of a sufficient quantity of inflammable air.

In corporibus solidis et tangilibus non invenitur aliquid quod in natura sua calidum sit originaliter. Aquæ autem calidæ in balneis videntur calefieri per accidens, sive per flammam aut ignem subterraneum, sive ex conflictu corporum.—BACON.

The theory of Dr. French, as it is one of the earliest, and by no means void of ingenuity, may not be unacceptable to the reader, who is left to draw his own conclusions on this philosophical subject.

In a work entitled THE YORKSHIRE SPA, published in 1654, by John French, M. D. he makes an inquiry into the origin of springs in general: wherein, rejecting the notions of those who supposed them to proceed from rain or dew, or snow, he maintains the opinion, that they are derived from the sea by subterranean channels. And as heat is absolutely necessary for rarefying water into vapour, he thus endeavours to account for the production of it.

"It does not," says he, "proceed from the sun, nor from the struggling of winds in the bowels of the earth, nor from sulphur, nor from quick-lime. It ariseth not from any fermentation in the generation of metals or minerals; for it does not appear how any crude metalline matter can be sublimed from the central parts of the earth towards the surface, but by means of subterranean heat.

"Hot springs are from a fire in the very

caverns of the earth; these being full of a bituminous matter kindled in water, and feeding the flame: as in distillation, the water rising in vapours is condensed into liquor. There is, indeed, this difference, that in distillation, the fire is under, or on the outside of the vessel; whereas here the fire is in the cavity itself through which the water passes. The fire forcing the water into vapours, these ascend through the crannies of the earth, and therefore the most part are turned into water. If the fountains be near the fire they are hot, and full of spirit; if pretty remote, they are then only tepid. And, that the fire may be fixed, this bitumen is perpetually generating. The bitumen and sulphur, being melted by the fire, follow the flamen, so as to keep it permanent in one place. Yet the waters have not the smell, or taste, or colour of bitumen, because they are heated by the rocky earth, which is itself heated by the subterranean fire. Nor is there any want of air, of which there is such plenty under ground, that Aristotle says, all springs are generated from it. Neither is air the proper aliment of fire, but unctuous vapours arising from the burning matter. The fire is in proportion to the vent and exhalation. The bitumen is first kindled by hot and dry exhalations; which, wanting vent, are attenuated, rarefied, take fire, and then set fire to the bitumen."

CHAP. IV.

OF THE SPRINGS AND BATHS.

NOTWITHSTANDING the general account of the strata in the vicinity of Buxton, which is the subject of the foregoing chapter, it may be proper to give, in a cursory manner, a description of the particular earths lying contiguous to the springs, as they appear to have an undoubted connexion with the qualities of this medicinal water.

To the south of the river Wye, where in a narrow valley lie the tepid springs, the upper part of the earth is a black lime-stone; which, in some places, is covered with broken shale, to the depth of several feet.

On the north side of the same river, shale, for a short space, forms the uppermost stratum: somewhat higher on the side of the hill, grit-stone appears at the surface.

The loose stones in the river, are, for the most part, iron-stone. Under the river, and for a little way on each bank, the earth consists of loose masses of different kinds of stone, called rubble, which fills up the separation between the strata on each side of the river.

The absence of two strata, grit-stone and shale, on the south of the river, and their ap-

pearance on the north side, should seem to denote a fracture in the earth in this place, which fracture has, in one part, displaced the two uppermost strata.

From whatever cause Buxton water receives it's warmth, or from what stratum soever it originally proceeds, it issues to the day through the fissures of a rock of blackish marble. Some of these openings are large, and some apparent only from the circumstance of the water running through them, attended with large air-bubbles. The springs are many, and the water pouring from them so great, that they have enabled the proprietor to make a number of useful and substantial improvements. The attention of former times has been almost altogether applied to the baths; so much as in some measure to justify the notion that the water had been used only for the purpose of bathing. Even in our own time, that particular spring called Bingham's well, which seemed to invite an appropriation for internal use, either on account of its interference with the magnificent buildings lately erected, or from some other cause unknown, has been entirely neglected.

The place where the water is usually taken, and which is yet called St. Ann's well, is a very elegant building in the Grecian style, and is certainly a great improvement, both with respect to it's conveyance from the original spring, and

from the mode of delivering it to the company. Before the late alterations, the water rose into a stone basin, which, as has been before observed, was enclosed in a wall of brick. This wall remained to the time of sir Thomas Delves, who built the late handsome arch over the well, which was about twelve feet square, and set round with stone benches. The basin was about twenty-five yards north of the outermost bath. This was supposed always to have been the original spring; but there is not a shadow of doubt that the water was conducted into the basin in a rude and slovenly manner, and from a very considerable distance. It must, indeed, be allowed, that the water is now conveyed from a somewhat greater distance into the present basin, which is of white marble. But as it runs through a narrow, neat channel of grit-stone, by which it is covered to the very edge of the basin, it is equally beneficial, and at the same time free from many impurities arising from soughs and drains, to which the other was frequently and unavoidably exposed. The temperature of this water, which does not in any degree depend on rain, or other accidental circumstance, is always eighty-one by Fahrenheit's thermometer.

There is another fountain, called from it's situation the Hall-well. This is enclosed in a

neat room opening into the corridore, which leads from the hall to the crescent; and is particularly convenient in bad weather. But, as it lies at a still greater distance from the spring, it's temperature is one degree below the former. In other respects it's qualities are the same.

An exhalation, or steam, often hovers over St. Ann's well early in the morning, and late at night; and sometimes, when the atmosphere is very moist and cold, it continues for the whole day. This last appearance is esteemed almost a certain sign of rain.

There is no sediment, of any kind whatsoever, in the well.

Besides the tepid springs which are peculiar to Buxton, there is also a chalybeate, which rises from a bank of shale on the north side of the river, and immediately below the George inn. This spring, before the building of the crescent, was a clear water, and much in use. Doubtless, at the time of covering the river for the purpose of erecting the crescent with it's offices, the intention was to preserve and improve this spring; as is evident from the neat little dome placed over it. By some means, however, either from the enlargement of the surface, by which it is become more exposed to the common air; or, from some other cause, the water is now always in a state of decomposition, muddy, and unfit

for use. It would certainly afford much satisfaction to the public; and possibly, in some complaints, it might be attended with really good effects, if this spring could be restored to it's former state of purity.

The temperature of this spring is by Fahrenheit's thermometer 54.

Whoever considers with attention the gentleman's bath, will have abundant reason to be satisfied, both with it's natural advantages, and those arising from it's structure and other adventitious circumstances. It can scarcely be doubted, that it was the first and original bath in the place; and the buildings over and around it seem to have been happily situate for the comfort and safety of those, who had occasion to use it. Within these few years, it was the only bath in Buxton, if we except that set apart and appropriated by the kindness and charity of the proprietors for the benefit of the poor; but which, till lately, has been shamefully and unwarrantably neglected, and in great disorder.

The gentleman's bath is enclosed in a very handsome, arched room, 30 feet long, and 17 wide. The dimensions of the bath itself were 27 feet by 12 feet 8 inches; but it has been diminished by a reservoir taken out of it for the supply of several other baths, now become necessary from the increased number of bathers.

The reservoir is 7 feet 6 inches in length, and 4 feet 6 inches wide.

This bath is lined with polished grit-stone, and paved with the same, except on the east side, where there is a rock of blackish lime-stone, from which arise two very powerful springs; while many smaller come up from the joints of the pavement, and through the crannies of the rocks. All these produce an immense quantity of water, together with which they throw up large air-bubbles, which dilate gradually as they rise towards the surface, and as the pressure of the water is diminished. At the south-east corner is a pump; at each end are good stone stairs; and over the bath, at proper distances, are chains of iron, for the convenience and safety of the bathers, together with an iron-rod passing the whole length of the bath. And, though here, as at the well, a considerable steam often hangs over the whole room, it is remarkable, that the iron is in no degree affected by it.—This steam is most observable in cold weather, and when the doors have been shut for some time.

The quantity of water flowing from these different springs has been calculated to be after the rate of sixty gallons in a minute; and some have made the calculation still higher. Whatever be the exact quantity, it is sufficient to fill the bath to it's usual height in the space of two

hours and twenty minutes. It's ordinary depth is about 4 feet 10 inches. In the north and lower end is a sough, carried through the wall from the river; by means of which, the bath may be emptied, washed, and cleansed daily.

The temperature of this bath is precisely and invariably 82 by Fahrenh. thermometer.

In the south-east direction, and very near to the former, is the gentleman's private bath; into which the water is conveyed by pipes from the reservoir just mentioned. It is in a neat room, with a dressing-room adjoining, through which is the passage to this bath. It is of an oval form, and lined with gray marble; the dimensions 10 feet 6 inches by 6 feet. Yet, though the water is conveyed for so short a space, and immediately from the reservoir, either from the coldness of the leaden pipes, or of the marble basin into which the water is received, it loses one degree of heat. By means, however, of flues placed round it's bottom, this water may be rendered many degrees warmer; and it may be filled in twenty minutes.

North of, and immediately adjoining to the first, or gentleman's public bath, is that for the ladies. The water of this bath arises principally from a number of small springs, in various parts of the pavement; but part of it is supplied by means of pipes from the reservoir. It is of

grit-stone, and it's dimensions 22 feet by 12; and may be filled in nearly the same time as the gentleman's public bath; with the temperature of which it pretty exactly corresponds.

Next to their public, is the private bath for the ladies, which is supplied from the reservoir so often mentioned. It is of gray marble, oval, and nearly of the same temperature as the former, and may be filled in twenty minutes; it's dimensions being only 11 feet by 4.

Besides these four, are two other baths; one called the Matlock, supplied by two leaden pipes, one from the reservoir, and the other from a cold spring. This bath is so constructed, that it's heat may be in some degree regulated at pleasure. It's dimensions are 11 feet and a half by 10 feet wide.

The next is the poor's bath. This is also of grit-stone, and about 8 feet square; and is served entirely from the first, or gentleman's bath; it's temperature being the same. All these baths have each a convenient pump, and are from 4 feet to 4 feet 10 inches in depth.

The seventh, and last of the baths, is situate near the river Wye, which is now arched over, for the convenience of the new buildings. It receives it's water from this river, though it's temperature somewhat exceeds that of the latter, being 54 by Fahrenh. thermometer. This also is

built of grit-stone, and it's dimensions 15 feet by 10.

Independent of, and unconnected with the foregoing, is that called the new bath, lately erected by Dr. Norton.

This lies in the same valley with the others, but at a considerable distance toward the south; and at no great distance from the famous cavity called Pool's Hole. It issues, in part, from the same kind of strata; but it's temperature does not exceed 64 by Farenh. thermometer: a circumstance owing, perhaps, to the difficulty or impossibility of separating the cold springs, which are here intimately mixed with the tepid. It is, however, a neat building; and before it's division was 30 feet by 12, is 4 feet 8 inches in depth, and provided with a pump.

Since this bath was divided, one part by means of flues has been rendered capable of being heated to any degree almost of temperature. But, in describing a bath which promised many advantages, and which would certainly otherwise have been a great acquisition to the place, truth compels me to mention a palpable mistake in the conduct of it. From the omission or neglect of carrying off the cold water from the heated part of the bath, it happens, that during the time of the patient's immersion in a bath of the temperature of perhaps the waters of Bath, the feet

are standing in water of 64, fresh issuing from the springs in the floor, continuing therefore impossible to be warmed, and applied to a part particularly susceptible of the impression.

It is so much the custom in public places, to make unkind observations, and unnecessary complaints, that the force of such as are of real consequence is generally lost and ineffectual. Yet it is impossible to omit one instance, which the most candid must allow to be of very essential importance. This is the want of a warmer bath in the vicinity of the others. Persons frequenting Buxton on account of health are often subject to nephritic or calculous complaints, as well as to inflammations in the bowels, and to disorders and obstructions in some of the viscera.

All these frequently require the use of a warm bath, from which they sometimes receive great and instantaneous relief. The difficulty, however, of procuring a bath of the temperature precisely indicated, is great indeed; and at a time when the place is much crowded with company, and every servant engaged, this difficulty can only be conceived by persons conversant in public places; and the distress is according.

CHAP. V.

ON THE ANALYSIS OF MINERAL WATERS IN GENERAL, AND OF BUXTON WATER IN PARTICULAR.

THE investigation of the medicinal properties of water by resolving them into their first principles seems at first view extremely simple, and naturally to lead to a fair and just deduction as to their effects. The present highly-improved state of chymistry may induce us readily to believe, that nothing at this time will be able to resist the exertions of able men engaged in this useful and entertaining branch of experimental philosophy. A little reflection, however, soon compels us to hesitate as to these extensive powers: and judging from analogy on the effects of many medicines, even of some with the natural and chymical qualities of which mankind are most intimately acquainted, our ignorance will be sufficiently apparent. For instance, we know not by what means, or by what law of nature, the powers of mercury are directed to the salivary glands; why cantharides are disposed to have such a particular effect; or why intermittents so frequently yield to the bark. These, with many other similar matters, have

hitherto resisted, and possibly ever will resist all explanation.

The consequences, however, resulting from pursuing this mode of reasoning too far, are as obvious as they are mischievous. They tend to fetter the mind, to cramp the genius, and to lead to all the obscurity of the darkest times. On the other hand, our faculties are so limited, and the imagination so forward, as well as our ignorance of a first cause so astonishing, that our ideas are fanciful often, and require continual restraint; so that the mind is called upon to leave room for judgment, and to carry on it's researches with sobriety and diffidence. And this will appear more requisite, as it is impossible not to observe a great difference of opinion, on a variety of occasions, in men of the most distinguished abilities.

Water, says an eminent chymist of the present day, cannot, in a philosophical light, differ in it's effects from artificial preparations. Yet, from the very same authority we learn, that, though waters may be considered in some measure *a priori*, this ought always to be done with caution, as being ever imperfect; and that the investigation of their properties and powers is, and possibly ever will be, unknown.

Mr. Boyle, in his essay towards a natural history of mineral waters, is of opinion, that there

are, beneath the surface of the earth, divers mineral substances, some fixed, some volatile; some in the form of hard, some of soft bodies, and some of fumes; to many of which learned men are strangers: besides such, which, though they may have been accidentally seen, have their nature so little known, that names even have not been given them.

Considering, then, the many ingredients, with which we are unacquainted; that the proportions in which they are mixed may be numberless; and that the qualities resulting from these commixtures may be different from those of the ingredients in a separate state; the difficulty of determining, *a priori*, the effects of mineral waters, appears to be almost insuperable.

The late able anatomist, Dr. Hunter, in his Lectures, observes that no conclusions can be drawn from the analysis of the blood; as the substances produced by such analysis may be very different from any thing really existing in the blood.

"Many books," says a popular writer, "have been published on the mineral waters; some of them with much ingenuity: but they are chiefly employed in ascertaining the contents of them by chymical analysis. This, no doubt, has it's use; but is by no means of such importance as is generally imagined. It is possible for a man to

know the analysis of the whole *materia medica*, without being able to apply a single article of it in the cure of diseases. One page of practical observation is worth a volume of chymical analysis."

Dr. Pearson, to whose industry and perseverance the world is obliged for many particulars concerning Buxton water; and who has advanced proofs decisive, in my opinion, of the mistakes of former writers, as to the peculiar kind of air contained in it, concludes his experiments in the following words: "The instructions here given must only be employed to direct us in the application of this substance, so long as experience of it's effects in diseases is wanting for our guide, and for the interpretation of natural phenomena. Nor are we to reject the use of it in any case, although the facts alleged of it's salutary influence do not correspond with principles founded on it's chymical history; or are not to be explained by any hypothesis herein adopted."

Analyzation, however, must be allowed to have many, and considerable advantages. It certainly tends on rational grounds to explain the use of waters, as medicine; and may lead to the practical knowledge of them, in cases where experience is defective. Under due restraints and qualifications, therefore, it can never with propriety be omitted; and has a just claim to be

esteemed a necessary part in every medical work of this kind.

A great variety of substances have been discovered in mineral waters; but the following are all that have hitherto been observed in the analysis of Buxton water:

1st.

FIXED, FIXABLE, OR MEPHITIC AIR, OR GAS; the presence of which is easily ascertained from the effects. This is very different from common air, both in quality and weight; being unfit for respiration, and heavier than common air: the latter being necessary for the support of fire and flame, which are both extinguished by mephitic air. Now, as the lime-stone contains a great proportion of this air; and as the Peak abounds with this particular stone, Buxton water has been supposed to be strongly impregnated with this gas. And this opinion, for a long time, appears to have been universally admitted. Dr. Pearson has, however, corrected this mistake, and has satisfactorily proved, that, so far from owing it's effects to this air, Buxton water contains less of it than many springs which are in domestic use.

2dly.

INFLAMMABLE AIR; the presence of which is too often perceived from its violent and fatal effects. This species of air is totally different from the former; for that extinguishes fire and flame; whereas this air, on the application of flame, takes fire immediately. It is found in shale, and other bituminous substances: and as the vicinity of Buxton abounds with these in large quantities, it renders it probable, that inflammable air, in a considerable proportion, enters into the composition of this medicinal water.

3dly.

SALTS; of which class are the acids found in mineral waters. The most prevalent acid, if it could be discovered in a distinct and separate state, would always be the vitriolic. But this is scarcely possible; for in it's course it is certain to meet with something, either earth, or salts, or metals, with which it must of necessity combine.

There can be no wonder if the muriatic acid is frequently found in water, when the quantity of rock-salt in the bowels of the earth is considered. This, however, is always combined with a fixed alkali, forming with it muriatic salt.

4thly.

EARTHS; which, in some proportion or other, are universally to be found in all spring waters; as evidently appears from evaporation. Calcareous earth, in particular, is to be observed in great abundance; being suspended in, or dissolved by the water continually flowing over it. The incrustations so generally noticed in the culinary vessels used in this country afford a certain proof of this impregnation.

Calcareous earth combined with the vitriolic acid in water, forms gypsum, or selenites.

Clay combined with the vitriolic acid, forms alum.

THE following experiments, though trite and of small value to the practical chymist, may be useful to those persons, who have not been in the habit of making trials of this kind; and may be sufficiently satisfactory, without more laboured and complex processes, which are capable of being multiplied almost *ad infinitum*.

To each experiment is annexed such observations and deductions as naturally arise on the subject, and may serve to explain the principle on which they are grounded.

EXPERIMENT I.

Lime-water added in different proportions to Buxton water, the mixture always became more or less turbid; and, in a short time, a woolly sediment was deposited, the liquor recovering it's transparency.

OBSERVATION.

The muddiness and sediment are a proof of the existence of gas, or mephitic air. The air quits the water to join itself to the quick-

lime, and by this means this change is effected. But if that vapour was contained in it, in any large quantity, the decomposition must be attended with that sparkling briskness observed in many other waters.

EXPERIMENT II.

Paper dyed with archill did not appear to receive any change of colour when dipped in this water.

OBSERVATION.

This is a certain proof that no acid, in a separate state, is contained in this water; as also that the acidulous gas in it is small in quantity: for a tincture of archill with the least possible proportion of an acid becomes red; and if the quantity of gas was considerable, with it as well as any other acid.

EXPERIMENT III.

For a time, no change appeared from the addition of syrup of violets to Buxton water;

but in a few hours the mixture became greenish, and so continued.

OBSERVATION.

This should seem to intimate the presence of some alkaline salt in this water in a separate state. But as the same effect is produced by any of the absorbent earths, this change of colour is rather to be attributed to an earth than to any other cause.

EXPERIMENT IV.

One dram of solution of lead in the nitrous acid added to eight ounces of Buxton water, the mixture became immediately turbid, and soon deposited a sediment of a dark colour.

OBSERVATION.

This decisively proves that the water contains some portion of an earth, which, being attracted by the nitrous acid, is of course precipitated.

EXPERIMENT V.

Half an ounce of fixed alkali, or the kali præpar., added to eight ounces of Buxton water, the mixture continued a long time clear; but at the end of twelve hours, it let fall a large quantity of flaky, whitish sediment.

OBSERVATION.

This denotes calcareous earth suspended by gas, or combined with some other acid: when this acid is saturated with the salt, it throws down the earth with which it is suspended or combined.

EXPERIMENT VI.

Thirty drops of a solution of silver in the nitrous acid added to four ounces of Buxton water, the liquor became immediately turbid, and soon deposited a large white sediment, which gradually changed to a gray colour.

OBSERVATION.

This demonstrates the presence of the muriatic acid in the water. The acid, in which the silver is dissolved, quits the silver, and combines with the alkali which is the basis of sea-salt; whilst the silver unites with the muriatic acid, and is precipitated.

EXPERIMENT VII.

With two drams of Prussian lixivium to four ounces of Buxton water, it soon became milky, and deposited a white sediment.

OBSERVATION.

Hence it is clear, that no metallic substance is contained in this water. Had there been any portion of iron, the deposit must have been of a blue colour.

EXPERIMENT VIII.

No change whatever is produced by green tea or by an infusion of galls.

EXPERIMENT IX.

One Winchester gallon of Buxton water evaporated in the gentlest manner, and, as it was at first presumed, with the most exact attention, left a deposit weighing twenty-one grains.

The quantity of sediment in this instance was so much more considerable than what has been procured by many persons of greater skill, that some doubts on the subject were immediately suggested. On several repetitions, therefore, I

am ready to acknowledge, that the same quantity has never been obtained. Perhaps something may depend on the immediate degree of dryness in the residuum; perhaps on the equal siccity of the whole mass; or upon the circumstance of the salts acquiring moisture from the situation in which they are placed. But neither by myself, or others who have at my request examined this point with the utmost caution, has the mass of residuum ever amounted to more than 16 grains, since the first essay.

The contents of the residuum, repeatedly made and carefully examined, appear to be

	Gr.
Calcareous earth	12
Vitriolic selenite	2½
Sea-salt	1½
	16 grains.

Buxton water, in it's diffused state, leaves no permanent marks on writing paper with sugar of lead; neither does it tarnish silver: both which might be expected from any volatile inflammable principle. Yet it is remarkable, that, towards the conclusion of the evaporation, the silver vessels in use were somewhat tinged; at the same time, notes on writing paper made with sugar of lead, cerussa acetata, became discernible. Again, Buxton water, in it's diffused

state, is free from taste or smell. But, towards the end of the process, the flavour became stronger; and the taste, as indeed might be expected from the salts and selenite, was nauseous and disgusting.

There is undoubtedly, in Buxton water, that principle which must be denominated inflammable or phlogistic; though perhaps it's combination with the water may be so intimate, as to resist a separation even in a boiling heat. It should seem that this principle is so very closely connected with the water, that, till some of the other constituent parts are set at liberty, this vapour cannot be discovered. That it does exist originally in the water appears from its effects in most febrile cases; which certainly cannot be accounted for, from any other primordial cause.

For the satisfaction of professional men, the different analyzations hitherto made of this water are here subjoined.

Dr. SHORT.

A gallon of Buxton water, in winter, produces 23 grains of sediment; but in summer, about half a grain more, viz.

	Gr.
Salts	12 and nearly ½
Earth	12

Dr. HUNTER.

A gallon of Buxton water, evaporated, produced 25 grains of sediment, viz.

	Gr.
Earth	15
Native alkali Sea-salt, each	5

Dr. PERCIVAL.

A gallon of Buxton water, evaporated, produces 23 or 24 grains of sediment, viz.

Calcareous earth,
Fossil alkali, and
Sea-salt; but all in small proportions.

Dr. HIGGINS.

A Winchester gallon of Buxton water contains of

	Gr.
Calcareous earth combined with acidulous gas	11 ½
Selenite	1 ½
Sea-salt	3 ½
Marine salt of magnesia	1 ¼
Iron combined with acidulous gas	$\frac{1}{16}$
Grains	17 $\frac{16}{16}$

It contains likewise four ounce measures of phlogisticated air, and two ounce measures of acidulous gas; exclusive of the gas retained by its calcareous earth in the heat of boiling water.

DR. PEARSON.

A gallon of Buxton water contains 15¾ grains of sediment, viz.

	Gr.
Calcareous earth	11½
Vitriolic selenite	2½
Sea-salt	1¾
Grains	15¾

As Dr. Pearson was the first chymist who expressed his doubts as to the quality of gas contained in this particular water, and consequently the cause of it's salutary effects, which, till his time, had been, in a great measure, attributed to it's mephitic air, it may be proper here to recapitulate some of his arguments on this subject.

He says, that neither the taste of Buxton water, nor the appearance of it's bubbles, indicates the presence of this spirit in any considerable proportion. He admits, indeed, that it does contain a certain portion of gas; as is clear from his experiment with lime-water, by the mixture of which with Buxton water a white precipitate is formed; but, judging from the saturation, he apprehends it cannot exceed the half of what is found in many common springs.

He is of opinion that hepatic vapour, or phlogiston, does not enter into the composition of this water; because it is without smell or flavour of any kind.

He says, that the water does not contain any of the mineral acids in a separate state, but both the vitriolic and the marine, combined with alkali or quick-lime: that there is in it no magnesia, or metallic salt; nor any phlogistic substance separable by heat and evaporation.

He supposes it's spirit to be a permanent vapour, composed of air and phlogiston, and perhaps of the same nature with the fire-damp; that it is unfit for respiration, and that light and flame are extinguished by it; but that, notwithstanding, it may be taken without injury.

The quantity of this permanent vapour he estimates at about $\frac{1}{6\frac{1}{2}}$ of it's bulk, or in the proportion of something more than four ounce measures of vapour to sixteen pints of Buxton water. Yet, though part of this vapour is air, he presumes the particular kind of air to be unknown, only that it is not gas, or phlogistic vapour.

Enough has possibly now been said on the analysis of Buxton water: perhaps, in the estimation of many, more than sufficient.—Yet it

cannot have escaped the observation of the intelligent reader, that there is a difference of opinion still existing, as to the constituent parts of this water; so that the future examination of it's contents is by no means precluded. Except as to the iron, I am disposed to give entire credit to the analysis of Dr. Higgins, though he has not thought it expedient to give the public the particulars of his process. For myself, I can truly aver, that nothing of the kind has ever occurred in my attempts to investigate the contents of Buxton water: it does not appear, that they have occurred in the multitude of experiments to any other person. The presumption is, therefore, that it was a circumstance owing to some accidental cause; and though that particular cause does not appear, yet many things suggest themselves as equal to the occasion.

From those, and such like experiments as the preceding, medical persons at a distance, and in some degree at a loss hitherto for information, will be enabled to form due notions of the constituent parts of Buxton water, and thereby to judge of the propriety of recommending a medicine, of which, possibly, they may not have had the opportunity of judging from experience.

Many persons resorting to this place, though not professional men, will have the manner of repeating these and similar experiments. They

will then be able to judge of the precision of such as have been offered; and, what is of no small consequence in such a place, they will have in their hands a fund of rational entertainment. And though it be admitted, that the analysis of a medicinal water is inadequate to the explanation of it's effects; yet, if the use of such a medicine alone, or jointly with other circumstances, produce substantial benefits, nothing further can be required to justify the recommendation of it in all similar cases.

CHAP. VI.

OF THE USE OF MINERAL WATERS.

WHATEVER difficulties occur, or how nice soever the distinctions required in the analyzation of waters; beyond all doubt, the greatest caution is necessary, when practical inferences are attempted to be drawn from any theoretical principles concerning them. Something on this head has been slightly noticed in a former part of this essay; but as the consideration is by no means confined to the present subject, offering to the mind some very important views, regard for a most useful profession, and duty to the public, forbid me to be silent on the occasion. At the same time, to borrow an expression from one whom I shall often mention, I am not so weak and senseless, as to seek for reputation by exploding the opinions of those, whom I ought to flatter, if I consulted my own interest, or courted applause.

Without further preface, it cannot escape observation, and is a fact which must be greatly lamented, that the science of medicine is not in that state of progression, in which it ought to be, to keep pace with other sciences: nay

should seem as if the very ingenuity of many of it's professors is one great cause of this misfortune. This will not appear paradoxical, when it is considered, that physicians, instead of diligently adverting to those symptoms, which might possibly distinguish the complaint, too often attend upon a sick-bed, determined to make every symptom correspond with their own preconceived notions. But when we find system after system exploded, and observe the mischiefs arising from an abandonment of our own common faculties, it becomes every man to speak his sentiments freely, however contradictory to the high popular opinion of any individual, admitted either by incompetent judges, or demanded by his own bold, dogmatical assertions.

Among many passages to show the impropriety of the means used for the improvement of medicine, and how little they have been conducive to that end, lord Bacon observes, that medicine is a science more professed than laboured, yet more laboured than advanced; the labour having been rather in a circle than in progression.

In another part he says, that the subject of man's body is of all other things in nature most susceptible of remedy; but then that remedy is the most susceptible of error; for the subtility of the subject causeth large possibility, and easy

failing; therefore the inquiry ought to be more exact: besides, the subject being so variable, hath made the art more conjectural, and art being conjectural hath made so much more room for imposture.

Again. The over-much credit given to authors, by making them dictators, and not advisers, has done infinite damage to the sciences. Impatience of doubt, and haste in assertion have also been very prejudicial: whereas, in contemplation, if a man begins with certainties, he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties.

Again. It is not the insufficiency or incapacity of the mind, but it is the remote placing thereof, that breedeth mazes and incomprehensions; for as the case at a distance is full of mistakings, but is exact at hand, so it is of the understanding; the remedy whereof is not to quicken or strengthen the organ, but to go nearer to the object.

At present there is a kind of contract of error between the deliverer and the receiver; for he who delivereth knowledge desires to deliver it in such form as may be best believed, and not as may be best examined; and he who receives knowledge desires rather present satisfaction than expectant inquiry: glory prevents the author from disclosing his weakness, and sloth

prevents the disciple from knowing his own strength.

Sydenham, whose descriptions of diseases do him immortal honour, is so diffuse upon this subject, as to render it difficult to confine ourselves to a moderate number of quotations.

Hypotheses, says this worthy man, owe their origin to ostentatious vanity, and idle curiosity; whence it is easy to conceive how much they obstruct the improvement of physick, which is a science depending chiefly on well-conducted experiments, and close and faithful observation.

The humour of overlooking familiar and obvious effects, to search after their secret causes, is an error of very ancient date, which, by quitting the descriptions of nature for the trifling sallies of a wanton imagination, has served to render the art uncertain, fallacious, and often unintelligible. The most curious disquisitions concerning the cause of diseases are often only superficial reasonings, artfully deduced, and clothed in a beautiful dress, which like all other things that have their foundation in the fancy only, will be forgot, whereas axioms drawn from real facts will last as long as nature itself.

No judicious person, acquainted with the nature of man and things, will hastily embrace the sentiments of another person, though of the greatest authority, in matters of mere speculation;

for there is so much subtility in argument, that though a proposed theory may seem at first to command the assent of those who hear it, yet, soon after, another man of greater abilities shows it's fallacies and inconsistencies, substituting in it's place a new hypothesis, which in it's turn meets from some third person the fate of the two former; and there can be no end of the dispute, till we come at length to him, who is arrived at the height of human knowledge: but the great difficulty of finding this person, and distinguishing him from the rest of mankind, will soon appear to any one, who is not so extravagantly vain as to lay claim himself to the character.

The speculative part of science, says Dr. Gregory, seems generally to have engrossed the attention of men of genius. Persons of a philosophical turn have an aversion to all application, where the active powers of their own minds are not immediately employed. But in acquiring any practical art, a philosopher is obliged to spend most of his time in employments, where his genius and understanding have no exercise: and in the practical part of medicine, nothing is required but assiduous and accurate observation, and good sense to direct the proper application of such observation.

In medicine, proceeds the doctor, the facts, on which the art depends, are so numerous, and complicated, so misrepresented by fraud, credulity, or a heated imagination, that there has hardly been ever found a truly philosophical genius, who has attempted the practical part of it. There are, indeed, many obstacles of different kinds, which occur to render any improvement in the practice of physick a matter of the utmost difficulty, at least whilst the profession rests on it's present narrow foundation. Almost all physicians, who have been men of ingenuity, have amused themselves in forming theories, which gave exercise to their invention, and at the same time contributed to their reputation. Instead of being at the trouble of making observations themselves, they culled, out of the promiscuous multitude already made, such as best suited their purpose, and dressed them up in the way their system required. In consequence of this, the history of medicine does not so much exhibit the history of a progressive art, as a history of opinions, which prevailed perhaps for twenty or thirty years, and then sunk into contempt and oblivion.

The late Mr. Grey, in a letter to Dr. Wharton, has expressed himself very strongly on this subject. He says, that the love of system is the most contrary thing in the world to a science

entirely grounded upon experiments, and which has nothing to do with vivacity of imagination.

Enough has now, I trust, been deduced from the best authorities, to justify this digression, and to prove the necessity of using other means for the improvement of a profession of such immense consequence to mankind.

But there is an example so much in point, so very applicable, that, though it may have the appearance of illiberality, the writer is not afraid to produce it from a neighbouring nation, whose researches in science, whose deep speculations on every subject, whose superiority in chymistry particularly, must be confessed and admired, whose reputation even in surgery is universally acknowledged; while at the same time they exhibit few instances of esteem in the higher department of the profession.

To return to our subject.

From the analyzation of Buxton water, the solid contents of which are calcareous earth, vitriolic selenite, and marine salt, all in very small proportions, it appears that no inference can be drawn, as to it's effects: on the contrary, here is a decisive proof, that it's active qualities proceed from some other cause. It has been repeatedly observed, that the quantity of what has been called fixed air in it, is smaller than what is contained in common water in general; it's effects

therefore cannot possibly be ascribed to this cause: and, unless they do depend on the elastic vapour of Brownrigg and Pearson, it does not appear by what means they are produced. It cannot, however, be denied, that, though the particles which enter into the combination of a medicine may not seem powerful either in their own nature, or in quantity, it's component parts may operate very differently in a separate state, and in a state of union. It may be further considered, that this elastic vapour is assisted by a degree of temperature far exceeding the heat of springs in general: and that the solid contents, however trifling in appearance, added to this vapour in this particular degree of heat, may produce consequences of which we are not aware, and of which we are not warranted *a priori* to judge. An objection has I know been started by some ingenious men on this subject, as if the benefits arising from medicinal waters were owing to their temperature only. But let us reverse this proposition, and ask in return whether common water of equal temperature exhibited in febrile complaints is equally mischievous with mineral waters? Will any advocate for this doctrine maintain this to be a fact?

Many methods of preparing this water have been devised by learned and ingenious men; and at such a distance of time as to give man-

kind a right to inquire after the benefits, which have resulted from such artificial preparations. Many baths have been erected at a large expense, in imitation of these at Buxton: most of which seem to have dwindled, or sunk into oblivion, almost as soon as finished. And, to speak the truth with all sincerity and candour, so many, and such various and collateral considerations are included in the advantages arising from naturally medicated waters, that the recommendation of a substitute, which must necessarily be deficient in many particulars, is scarcely justifiable, where the original medicine can be used without much inconvenience: and many such defects will readily suggest themselves to every considerate mind. The following observations respecting the present state of society, as being not foreign to the occasion, and as tending to illustrate the manner in which benefits are often received, will, I trust, not be unacceptable to many readers.

The custom of attending on watering places, as they are called, is often attributed to fashion, and has been exposed in severe terms, as an improper desertion of business and family affairs. In some instances, this may be the case; and

in such it deserves to be reprobated in the strongest language. In general, however, many and great allowances are to be made for these excursions.

From the late discoveries and improvements in various branches of science, a much greater number than usual of persons are engaged in the pursuit of professional or ornamental knowledge. By the wonderful extension of the commerce and manufactures of this kingdom, the minds of multitudes are employed in concerns the most serious and important. Emulation in science, and competition in business, call for the most vigorous and most unremitting attention of the mind. The excessive solicitude, too generally the consequence of such pursuits, precludes the use of bodily exercise, succeeded by want of rest, and many other disagreeable circumstances. For, in this situation, the mind is so intensely employed, that the instruments of action are deprived of their proper energy and power. Hence, by degrees, the digestion of the food is imperfectly performed, the secretions become vitiated or diminished, and the muscles lose their wonted activity and strength. To these preludes of declining health is frequently added an irregular and debilitating stimulus; which, operating on a system already weakened, produces an unequal and incompetent circula-

tion, tending yet farther to increase the relaxation, and interrupt the due secretions.

Here it cannot derogate from the reputation of Buxton, or any other medicinal water, to assert, that the use of it is greatly assisted by change of air, temperance and regularity in diet, avocation from business or study, moderate exercise, early hours, and cheerful company. Neither is the vehicle itself to be slightly passed over, as a thing of no importance.

For this element of water, which affords the means whereby the contents of all mineral waters must be conveyed into the body, is itself happily adapted to many beneficial purposes. By the subtilty of it's parts, it is capable of introducing itself into the minutest vessels; abating the constriction of their fibres, opening their canals, rendering them more patent and flexible, and at the same time increasing their contractile powers.—Hereby, the morbid susceptibility of impression, to which many constitutions are liable, is diminished; while many of the causes of such impressions are removed from the habit.

Water should seem to be also of essential consequence to the fluids, in mixing or dividing their particles, and breaking down their cohesions. It may sheath, lubricate, and soften

the juices: such as are obstructed, it may either dispose to an immediate discharge, or may conduct them into more open channels, by which they are prepared for discharge at a proper, though more distant time. And though water is generally esteemed the vehicle for more powerful and more active bodies, it cannot be called simply such, but in many respects may be considered as a medicine of great importance.

For it may readily be conceived, that, in some instances, the solid, or the yet more active parts of which water is composed, may serve merely as a medium for the use of the element. To explain this idea, let us suppose such indications to take place as require the introduction of a quantity of pure water into the system, for some of the purposes already mentioned, of opening very minute vessels, of diluting the fluids, or cleansing the secretory glands. But in most, certainly in many stomachs, the very volume of water here required would oppress the powers of that organ; or a water of such a temperature might create mawkishness or sickness, so as to defeat our endeavours. At this moment, the spirit or vapour, and sometimes even the more solid particles, prevent this debilitating effect; and, by their mild and

friendly stimulus, enable the stomach not only to retain, but also to convey into the habit, such a proportion of element, as may be agreeable to the rational and well-intended ideas of the prescriber.

CHAP. VII.

ON DRINKING BUXTON WATER.

THERE is much reason to believe, that this water was in use as a bath, long before it was taken as a medicine. Even at so late a period as the time of Dr. Jones, it does not appear to have been taken internally: for in his work published in the year 1572, he makes no mention of it in this respect; nor does he give the slightest direction concerning it. By the writers who succeeded Dr. Jones, it is indeed mentioned as an internal medicine. Yet it is to be supposed, that the brick-wall, which is said to have been remaining in the year 1709, did enclose the well called St. Ann's; which place, it has been observed, was improved by sir Thomas Delves, and put into a neater and more convenient form for the purpose of drinking the water.

Perhaps the fact may, without much violence to truth, be thus stated.—Whenever the internal use of the water was prescribed, such a quantity was to be swallowed, as to render any particular direction concerning it frivolous or absurd. And it will hereafter be observed,

that in advice comparatively modern, the mode of taking this water is such as cannot be justifiably advised at the present day. Occasionally much mischief, and in general little benefit, would arise from such a practice; so that it may fairly be concluded, that Buxton water, as a medicine, must frequently lose reputation; and even, in some instances, prove positively mischievous.

But how soon, or how late soever this water was enclosed for medicinal purposes, it was, from the earliest time, of most essential importance to the inhabitants of the village, as it still continues to be at this day; being almost the only water now in use for culinary, and indeed for every domestic use. No wonder, then, if attention was paid to it at a very early period of it's history; and that the utmost care was taken to guard it, as much as possible, from all impurities.

In the prosecution of a work professing to speak particularly on the use of Buxton water, it is no easy task to methodize and arrange those disorders, which may indicate such a medicine. If some of them be specified, we may be enabled to judge of the propriety of it's use, and of it's probable effects in many other disorders.

In the first place, then, Buxton water must be esteemed a very valuable medicine in certain affections of the stomach and bowels; particularly in such as arise from intemperance or debility. These, with their concomitant symptoms, as want of appetite, indigestion, acidity, and flatulency, seldom fail to receive a speedy and permanent relief. The first digestions improved, the chylopoietic organs recover their functions, and the constitution is often recruited beyond expectation, and sometimes almost beyond belief. In all cases, however, of this kind, it is prudent to begin with the smallest quantity of the water, to advert carefully to it's effects, and to regulate our conduct accordingly. To some patients, the addition of a spicy substance will be requisite, in order to assist the natural stimulus of the water: but it is seldom that any thing more than a few drops of the

tincture of cardamoms is necessary for this purpose.

If the first attempts do not succeed, but the water should appear to disagree, the point ought by no means to be given up hastily. In this situation a gentle emetic may probably be administered with advantage; at any rate, some warm aperient will generally be required. It is not intended, however, to recommend emetics, or purgatives indiscriminately, and in general terms, by way of preparation for drinking this water. Preparation of any kind is seldom requisite; and in many irritable cases, such as frequently occur in this place, strong and stimulating purgatives are religiously to be avoided. What is meant, is, that in such complaints as are now under consideration, it is almost always proper to attend to the first passages; from which every thing, that can act as a fomes, ought to be removed: particularly, as the bowels, during the use of the water, are apt to be more indolent, and more unequal to their office, than in other situations. Here, unless some aperient is given, every endeavour to correct morbid secretions, or to recover general strength, will be vain, and futile at least, if not directly prejudicial.

In some instances, the water itself has a tendency to produce a discharge from the intestines.

Whether this effect arises from a restoration of tone, by opening a free passage to the visceral secretions; or by rendering the secretions themselves more stimulant, is not very clear; but such is the fact. This flux, if so it may be called, is almost without a single exception attended with beneficial effects; provided it be not checked or improperly treated. And as it is accompanied by no unpleasant symptoms, no pain, no sense of debility, or faintness; but, on the contrary, by an increase of strength and spirits; there is nothing to call for anxiety or impatience, either in the physician or the patient.

In habitual diarrhœas, and in all such disorders as denote a want of tone in the intestines, this water will be found eminently useful. So also in many complaints arising from obstructions in the viscera, if not attended with obstinate costiveness; and it may not be unnecessary to repeat the direction, that in such, a very small quantity is to be taken at a time; and even this quantity is to be carefully observed as to it's effects; otherwise, troublesome, if not dangerous symptoms, will inevitably be the consequence.

In such disorders of the stomach and bowels as evidently arise from spasm, the business of di charge is best conducted by injections; which,

at the same time, have also the effect of fomentations. Such clysters as are of the emollient kind, may be advantageously employed once or twice a day. If the effect be not sufficient, a little castor oil should be taken occasionally. And here it may be observed, that, although the number and variety of opening medicines is very great, the choice of them is sometimes difficult, and requires a greater degree of caution, than is generally imagined. The inefficacy of some, the stimulant quality of others, and the debilitating effects of almost every medicine of this class, will be universally acknowledged.

Having had frequent occasion to mention aperients, and particularly such as are of the mildest nature, it may be proper, in this place, to give a caution concerning lenitive electuary, in cases where the use of Buxton water is indicated. For much experience has convinced me, that it is disposed to create very troublesome symptoms, as acidity, flatulency, and sometimes a considerable degree of pain in the stomach. Whether these complaints arise from the preparation itself, or from some adventitious cause, as it's being in a state of fermentation, it may be difficult, perhaps, to determine. But as the composition has a strong tendency to fermentation, and especially at that season of the year

when this place is most frequented, it is probable that this may be generally the reason. It is sufficient to have observed the circumstance, in order to guard against the consequences.

SYSTEMATIC writers have assigned two causes as the original foundation of the gout: a certain morbific matter at all times present in the body; or a disease of the whole constitution, particularly of the nerves, in which the first powers of the constitution are lodged. Which of these causes is the true and real foundation of this disorder must be referred to the further investigation of the learned: fortunately for mankind, the practice of medicine in gouty cases seldom depends on any theoretical reasoning.

By some of it's warmest admirers, Buxton water has been esteemed almost a specific in the gout; many have supposed it capable of doing great service in all such cases indiscriminately. Truth and justice, however, demand a contradiction to such unwarrantable notions: but they demand much more. In no complaints whatsoever, which have fallen under my observation and experience, is greater caution required in the use of this water, than in the gout. The internal use of it in this disease, when evident

marks of debility in the constitution do not appear, is usually attended by many unpleasant symptoms; such as wandering pains flying from limb to limb, with more or less redness in the part so MOMENTARILY affected, and some degree of fever. Yet in these very cases, it frequently happens that the bath may be used, not only with safety, but with considerable advantage. In all such situations, therefore, and they very often occur in this place, a nice and careful distinction of circumstances is absolutely required; and this caution is likewise necessary for the satisfaction of the patient; whose mind is apt to be disturbed by his present sensations; and who is anxious to quit a place, where a medicine from which he had much expectation has disagreed, and where, of course, he apprehends that he shall meet with further disappointment.

In the gout, many disorders of the stomach and bowels may be observed very similar to those complaints which have been already mentioned. They are sometimes the consequence of a misplaced or repelled gout; and in such, Buxton water is often as beneficial as in the other cases.

Patients of this description always require the addition of some aromatic to the water; and the warmer aperients are here extremely useful;

indeed, without them, the relief is seldom correspondent to our wishes. Emetics in these cases, if at all justifiable, are to be exhibited with extreme caution, and a regard to the particular situation immediately before us.

The gout has been termed, but in my opinion unjustly, the opprobrium of physic. Of no disorder to which the human frame is liable have we a more exact, or a more masterly description; in none is the treatment better adjusted to the symptoms; nor can any thing be more judiciously characterized than the distinction between the regular and the anomalous species of that complaint. It must, however, be admitted, that a cure is not to be expected from any medicine in present use. And though, in some young and robust constitutions, much of the fomes may be cut off by regimen and temperance, it is to be lamented, that, in many persons, this method is inadmissible. Too often, it is to be feared, a certain degree of stimulus in diet is requisite for the prevention of internal attacks, and to give due energy to the sluggish springs of life and action. The appeal might be made with much confidence to the experience of every professional man, or even to the observation of any intelligent patient, provided his sufferings would permit him, without prejudice, to attend to his own sensations. It

is, then, no defect in the art, if it be found unequal to the restraint of the strongest passions and propensities to which human nature is exposed. If, at an early period of life, these passions have been indulged so far as to admit of no control, no blame can fall upon a liberal and useful profession, because it finds itself under the necessity of yielding to long habits of luxury or intemperance. Too generally it is obliged to accommodate all it's powers, and adapt it's mode of relief to present circumstances, and present sufferings.

To return to my subject. It has been already observed, that, in many gouty cases attended with debility, Buxton water may be taken with much propriety, and frequently with good effect. This idea will be found particularly applicable to such cases of atonic gout, as chiefly affect the stomach and bowels; and resemble the disorders of those parts in the manner heretofore described.

The afflicted of this class, then, ought not to flatter himself with the vain hope of totally eradicating his complaint by the use of this water, or of any other medicine. Such vain expectations can be productive of nothing but

mortification and disappointment. But, if he will rest contented with the moderate prospect of acquiring a more free use of his limbs, with the consequent advantage of greater ability for exercise, together with that of rendering the gout more regular and mild in it's attacks, with longer and more perfect intermissions, such reasonable satisfaction will seldom be denied him from a proper and cautious use of Buxton water.

However disagreeable to my own wishes, as well as to long-received opinions, truth and much experience forbid me to speak highly in praise of Buxton water in paralytic disorders; the frequency and increase of which are universally acknowledged and lamented. In the management of these patients, it must be allowed, that a careful attention, and precise discrimination of the original, as well as secondary causes, so far as they can be obtained, are indispensably necessary. In many, either from the actual plenitude of the vessels, or from the rarefaction of the blood, much increased by drinking this water, the disposition to stupor and heaviness, those common symptoms in palsies, is greatly aggravated. These are often the prognostics of an impending apoplexy; which, in some instances at least, might have been prevented. And, besides the direct mischief arising from the

use of this water, it has also a tendency to stimulate the appetite ; a sensation too apt to be indulged by persons of this description ; and when indulged, productive of consequences obvious to the plainest understanding. When the stomach is in an over-loaded and distended state, it's muscular powers, already weakened, become still more unequal to the digestion of the aliment, whereby the disposition to danger is yet more increased. The afflicted of this class ought, therefore, to be extremely cautious in this respect ; any considerable quantity of food ought never to be taken at a single meal, particularly in the evening, for reasons which scarcely require an explanation.

But if some paralytic disorders arise from plenitude or rarefaction, there are also some which proceed from a diminished or defective energy in the habit ; and indeed are attended with evident marks of debility. In these, no danger can accrue from a prudent use of this water : on the contrary, it's gentle stimulus may contribute to warm and invigorate the stomach, with which all the muscles of the body so wonderfully sympathize. Here the addition of some aromatic to the water is almost always required ; and perhaps æther may, in such cases, be somewhat of an appropriate medicine, while it answers at the same time every purpose of the

spicy tincture. The bowels must on no account be neglected; as they usually experience the same want of tone with the rest of the body: for which reason, the use of some warm aperient can seldom with propriety be omitted. And the former cautions respecting food are even in these cases of debility to be carefully observed.

Having had occasion to mention the sympathy of the stomach with the muscles of every part, I may be permitted to give a familiar instance of it. When a person has undergone the extreme of labour, or fatigue, if a cordial of any kind be exhibited, long before it is possible for that cordial to take effect on the general circulation, the muscular powers of the body in general are wonderfully recovered, and action, and even vigour, renewed through the whole frame.

Beside these two species of palsy, local complaints of this nature are frequently observed, arising from unnatural pressure, or accident of some kind. But as such have generally a relation to the bath, rather than to the internal use of this water, they will be more properly noticed in the succeeding chapter.

There is a complaint in the œsophagus, proceeding sometimes from a paralytic affection, and sometimes from local disease. This I have known more than once mistaken for a disorder of the stomach, for which the patient has been

directed to drink Buxton water. The least hint on this subject may perhaps lead to the prevention of a mistake so inconvenient often to the patient, and so unpleasant to the recollection of the prescriber. I am concerned to add, that, so far as my experience goes, this complaint has in every instance been peculiarly distressing and unfortunate.

Nervous complaints, as they are called, include such a variety of disorders, arise from such a number of causes, and lead to so very extensive a field for inquiry, that a detail of them cannot be expected in a work of this kind. The distinction between those attended with fever, and those which are free from it, ought ever to be kept in view. This, and this only, can afford plain and satisfactory directions for our conduct in the use of Buxton water. It is painful, however, to observe how seldom this distinction is made in any situation: and as, without it, all our endeavours are frustrated, no wonder if patients are induced, by negligence or want of judgment on our part, to fly for relief from one quack medicine to another.

Indolence, intemperance and vexation have been assigned as general causes of the gout; it is doubtful whether this will be altogether admitted; though, unquestionably, they add to the frequency and violence of it's attacks. But there

can be no difficulty in acknowledging, that they are the common sources of nervous disorders. For the two first, the remedy seems obvious, but is by no means so easy and practicable as may be imagined. Long habits of indolence and intemperance make such a rapid progress, and gain so powerful an ascendancy by gratification and indulgence, as too often to counteract the endeavours of the most sensible and most determined persons. Great care is required, therefore, in checking every disposition of this kind in the first instance, from what cause soever it may arise; and firmness and resolution in resisting the influence of habit, are always indispensable.

Far be it from me, or any man, to trifle with the real and weighty afflictions, which inevitably press on the checkered passage of our lives. Of these, every human being, at a certain period of life, may be supposed to have received his share: they must and will be heard; he who does not feel them is more or less than man. "The mind diseased, the rooted sorrow, the troubles of the brain;" in these the patient, it is true, must minister to himself. Alas! he will long minister in vain. The lenient hand of time, the avocations of business, the sympathy of friends, and the consolatory reflections arising from superior considerations, gradually afford that relief, of

which, at the present moment, unhappy man almost despairs.

It is in the less evils of life that men ought resolutely to minister to themselves. The minute and sinister events which daily perplex and teaze us, are, upon examination, of so little moment, that they do not seem to call for that exertion, of which the human mind, under such circumstances, is capable. They do, however, require it: and, unless men guard with circumspection against their intrusion, and make a steady resistance to their continual and importunate demands, they are certainly laying the foundation in their own minds for an endless supply of misery and ill-health.

There are some nervous complaints, which appear to have had their origin, or at least to have been much increased by a too liberal use of mercurial medicines. One affection of this kind is particularly to be observed, as conveying an unpleasant, if not a tremendous appearance. A palpitation of the heart, if it proceeds from a distended, weak, or diseased vessel, does really present as intimidating and frightful an idea, as the imagination can well form. But as it is a symptom often arising from great irritability of constitution, or from some stimulus remaining in the system, much comfort accrues from the hope of it's originating from one or other of these consi-

derations. In this, and indeed in many disorders which have a relation to the nerves, either from the efficacy of the water, the peculiar air of the place, or some of the more indirect and collateral advantages attending it, few patients leave Buxton without being sensible of having received some considerable benefits.

Buxton water is frequently of use in scrofulous disorders, which are at this time esteemed, and probably on good grounds, affections of the lymphatic system principally. By the ready introduction of the water into the finest vessels; and by it's mild and friendly stimulus, it is certainly well adapted to these complaints. And as the cortex by no means interferes with it's use, but, on the contrary, contributes much to its efficacy, it will be very proper to give it in some shape with the water. Though the substance is more powerful, yet, as the tincture or extract is more convenient, one of them is preferable. In such cases, the bath is a very essential object, as will be observed in another place.

It may be necessary to add here, that, whatever has been suggested concerning scrofula, has no relation to such species of it as are attended with fever; particularly such as affect the chest, as is too frequently the case.

The quantity of Buxton water to be taken at one time, as prescribed by many writers, is too

large; by some it is immense. We are gravely advised to take three pints in the forenoon, and a tolerable portion in the evening. But experience does not justify the use of it in such quantities, so far as I know, in any case; and in some such bold advice seems to threaten the most mischievous consequences. The best thing which can happen from large draughts, is a tendency to pass off by the kidnies. But how seldom is such an effect required? And, if it does not pass off in some such manner, how many serious misfortunes is this water capable of producing?

In common, two glasses, each of the size of a third part of a pint, are as much as ought to be drunk before breakfast, at the distance of forty minutes between each: and one or two of the same glasses between breakfast and dinner will be quite sufficient. And indeed, whether it is meant to strengthen the stomach, to correct or restore the secretions, or to be introduced into the most minute parts of the habit, theory and practice will here perfectly coincide. The instances, therefore, in which a large quantity of the water can be advisable, are rare, and form very few exceptions to the general rule which has been laid down.

In nephritic and calculous patients, a deviation may sometimes be properly enough made from these directions; for in them, the very weight

and pressure of such a fluid, when applied to the urinary passages, may possibly be attended with advantage; and it is a fact, that many such patients do find great relief. Yet as the parts are very liable to spasmodic constrictions, a considerable degree of judgment is required, in order to distinguish, in some measure, the real cause of the complaint: otherwise, by enlarging the dose, an additional force will be given to a stimulus already too great; and an aggravation of the symptoms must inevitably follow. In many, and particularly in cases of this description, æther is very properly administered with the water.

On much reflection concerning the use of Buxton water in nephritic complaints, I have been often at a loss to account for the benefits which many patients have received from it. It cannot be ascribed to the fixed or mephitic air contained in it; for of this it contains less, as has been repeatedly observed, than many common springs. Can it be supposed to proceed from the disposition it has to correct acidity in the first passages? which, according to the opinion of an ingenious, though anonymous writer, is the means of preventing many causes of irritation from arriving at the kidnies. The relief is too sudden to be attributed to an alteration, which, in the nature of it, must be gradual and pro-

gressive. Possibly it may be owing simply to the effect of quantity in a fluid friendly to the constitution, and particularly disposed to wash away some particles of matter inimical especially to the urinary secretions.

Dr. Beddoes, in recommending the aqua mephitica alkalina, observes that several questions of great difficulty and subtlety may be proposed respecting the operation of alkaline substances in such cases.

1st. Do they merely produce the expulsion of concreted matter? or do they excite such an action of the uropoietic organs, as tends first to produce, and then to expel this matter? The former supposition is more probable, since concretions are often lodged in the passages, without exciting pain; and the discharge of small calculi about the probable period of the beginning operation of this medicine has been observed.

2nd. Do alkalis act as lithontriptics, or otherwise?

The effect is much too sudden; the speedy and considerable discharge of gravel makes it probable that they produce, in the pelvis of the kidney or ureters, some movements, which observation shows to be by no means necessarily connected with an increased secretion of urine.

Our secretions, proceeds the doctor, it should seem may be altered, either by altering the action of the secretory organ, or by presenting to it materials different from those upon which it has been accustomed to work. The urine, by whatever cause, is remarkably changed: and we are informed by Berthollet, that the urine first made after a dose of mephitic alkaline water will change turnsol paper to a blue colour, even if it be not taken above a quarter of an hour before the discharge. Of all the secretory organs, the kidneys and the mammæ are most certainly and quickly affected by the passions, and by food.

Beddoes on the Nature and Cure of Calculus.

Whatever may be the deductions of theory from the analysis of Buxton water; or whatsoever weak and idle notions may be entertained concerning it, which arise from it's want of taste or flavour; certain it is, from all manner of experience, that, in feverish and inflammatory complaints, it is found extremely prejudicial. Indeed, it's active properties are such, that young persons in the highest health seldom drink it with impunity; and as they are not apt to be cautious on such occasions, they ought always to be reminded by their friends, and put upon their guard as to the use of it.

In all approaches to hectic disorders, this water ought to be religiously avoided. Even in the apparent state of convalescence from the pulmonary abscess, either from it's own active qualities, or the unfriendly air of the country, the most careful trial of it can hardly be made without danger of aggravating the mischief. And in that frequent, treacherous, and cruel species of hectic arising from tubercles, it is scarcely possible to drink it with any kind of safety. For, exclusive of it's noxious effects in diseases of the chest, the state of the tubercles is so continually changing from indolence to inflammation, and thence to suppuration, that if the exhibition of the water might at one time be supposed innocent, or even proper; at another, and perhaps a very short period, it must prove irritating, and attended with palpably bad effects.

From every thing which has been said on this subject, it will easily be collected, and indeed cannot have escaped the notice of every reader, that chronic disorders are those for which Buxton water has any pretensions to be celebrated. These, in general, only admit of relief by the slow and gradual operation of such medicines as are called alterative; such as act by inducing an almost imperceptible change in the constitution; of course, therefore, requiring

time and perseverance. Of this kind is the water now under consideration.

From the observations which have been now made on Buxton water, joined to fair analogical reasoning, conclusions may be drawn as to the rational use of it in several disorders which have not been particularly enumerated.

The intention of this work is by no means to prevent or preclude the necessity of proper advice; but principally to afford some degree of satisfaction to professional persons at a distance, by which they may be enabled to form some judgment as to the propriety of a medicine they may be disposed to recommend.

If this has been done with good effect by the information herein contained, the domestic physician, as better acquainted with the particulars of his patient's case, will be rendered a more competent judge of the advantages to be expected from this water, than any stranger possibly can be. The afflicted also will have the unspeakable comfort of using a medicine by the advice of a friendly and well-informed neighbour.

Before this part of the subject is concluded, it is highly necessary to take notice of a circumstance of some consequence to persons resorting to Buxton, whether invalides, or otherwise.

St. Ann's well, with it's pump, is so contiguous to the crescent, as well as to the hall, and is, indeed, so very convenient to the whole village, that it is difficult to prevent the servants from bringing this medicinal water to the table, as well as from using it for every culinary purpose. Now it is admitted that no great change is produced by the loss of it's warmth; but, at all events, much of it's effect is still remaining. That spirit, or vapour, which is not dissipated in a boiling heat, is doubtless left only in a state of compression. It readily then becomes dilatable; and, when put into action by the warmth of the body, may be capable of producing great mischief. A water so impregnated, and the constituent parts of which are detached with so much difficulty, cannot with safety be employed for general purposes.—There is, besides, an absurdity in the practice, and something dissonant from every idea of propriety in the inhabitants of the place. For, if a medicinal water, as they suppose it to be, can be taken with impunity in the most unrestrained, and most unqualified manner, it is scarcely possible to conceive that the powers of such a water can be equal in any degree to those virtues, with an opinion of which it is so much their interest to impress all mankind.

To conclude this subject so far as concerns the internal use of Buxton water. Whenever

mineral waters are found to exhaust the strength, depress the spirits, take away the appetite, distend the bowels, excite fever, occasion or increase the action of coughing, they ought by all means to be discontinued.

For the chymistry of Dr. Short, it may be necessary to make, at this time, a considerable allowance: but his directions for the use of Buxton water are drawn from much experience; and they are delivered in so apposite and so expressive a form, that this part of the subject may be properly concluded in his own words:

"If, by drinking large quantities of this water, we load and pall the vessels, so that they are not able to throw it off by perspiration, or some of the emunctories, by such stupidity, and not by any fault in the water, we expose ourselves to many dangers.

"Since, even in a healthy state, exercise is necessary for the purposes of digestion, circulation, nutrition, secretion, and evacuation, it is particularly required, during the use of this water, that the additional quantity of fluid may not remain a sluggish and oppressive load in the body.

"As the weight and motion of the blood are increased, and the blood itself rarefied by drinking this water, our exercise should not be too violent. Neither should it be used but at

a time when the secreting vessels are emptiest and most passable. The proper time, therefore, is in the morning, when the vessels are expanded and relaxed by the night's rest, which has also thrown off many superfluities, and, in particular, has unloaded the vessels on the surface of the body.

" Since the secretions depend so much on a proportionate diminution of the superfluous juices, the appetite ought not to be indulged either with improper food, or too great a variety of it; especially at night, when the active voluntary faculties are, or ought to be, in a passive and relaxed state.

" If rest be necessary for the due mixture of the fluids, for the apposition of nutritious particles, and for the evacuation of superfluities, as well as for the invigoration of the whole system, then such as have occasion for, and expect relief from these waters, should not be tempted, on any account, to invert the order of nature, by turning night into day, and day into night."

CHAP. VIII.

ON BATHING.

BUXTON water is of so peculiar and happy a temperature, that it may be used either as a moderately warm, or as a gentle cold bath: for it has been repeatedly observed, that the heat of it is by Fahrenheit's thermometer 82 degrees, and the heat of the blood 98. Many and various benefits, therefore, may be derived from it in each of these respects; but the present object is to regard it principally as a tepid bath: and, from whatever cause arising, whether from temperature, it's constituent parts, or both, experience will justify a very pleasing account of it's effects; which being often immediate, obvious, and distinct, the inquiry will be attended with a considerable degree of satisfaction.

Though in an address to professional persons in general it may not be necessary, there can be no impropriety in attempting to explain to others the manner, in which great changes may be made in the system, and great benefits received from a bath of the temperature here described.

In the first place, on plunging into the water, a certain shock is received, the impression of

which is more or less powerful in proportion to the difference of temperature. By this force the blood is driven back from all the small vessels on the surface of the body, and impelled upon those which are deeper and more internally seated. The last, of course, become overloaded, and must continue so, as long as the contraction of the former shall remain. But, in a constitution of common strength, the shock is almost instantaneously overcome by the powerful exertions of the heart, and large internal vessels, which drive back the blood into the smaller canals. Now the skin becomes softer, the absorbents are called into action, and imbibe the water; while, at the same time, the exhalents perspire their contents. A most agreeable glow, and sensation of warmth is then perceived. The water absorbed by the lymphatics becomes mixed with the blood, and other juices of the body; and this with the advantage of requiring no labour from the digestive organs: a point of no small consequence in many constitutions.

By this relaxation of the skin and muscles externally seated, the pores are expanded, the fluids in the capillaries, or fine vessels on the surface, are rendered thinner, their motion becomes more free, and the perspiration, of course, is considerably promoted.

It has been doubted, by men of great eminence, whether any considerable quantity of water be imbibed during the operation, because little, if any addition of weight is perceived in the body after bathing. But perhaps this circumstance may be accounted for by the temporary increase of perspiration; which may reasonably enough be supposed to bear a certain proportion to the quantity of water absorbed.

By the use, then, of such a bath as this of Buxton, many advantages may be derived. The solids receive a moderate stimulus, which, for a short time, increases their action without diminishing their powers. They are softened, moistened, dilated, agitated and strengthened. The motion also of the fluids is accelerated; and by the diluting, as well as rarefying effects of this water, they are attenuated, and fitted either for circulation in their proper channels, or for evacuation; advantages which are greatly assisted by the enlargement of their canals. They become then better adapted to the necessary and due functions of the body; or are prepared for removal from the habit, either by insensible perspiration, or the other emunctories provided for their discharge.

"When the actions of the body," says Dr. Jones, "be depraved, diminished, or abolished by distemperatures not mortal, nothing more

safely, nothing more aptly, nothing more delicately reduceth them to their pristine activity, than the dulce or delectable baths or wells of Buckstones. Buckstone baths have not the fourth part of the heat of the bath of Bathes, being only as if a quart of boiling water were commixed with a gallon of cold water; but Bathe is, as if to a gallon of seething water were put a quart of cold water. For this reason, it attracteth and dissolveth more speedily, but Buckstones more sweetly, more delicately, more finely, more daintily, and more temperately, not bringing half so many accidents as Bathe; but in process of time, very effectually for many infirmities, most commodiously restraining unnatural discharges, and strengthening the feeble members, assisting the animal, natural, and vital faculties, dispersing opilacions, and qualifying griefs."

In many disorders of the stomach and bowels, whether proceeding from spasmodic affection, or obstruction, or both, Buxton water is often of great service; even in many which do not properly admit of its internal use. Complaints of this kind are usually attended with pain, fulness, hardness, tension, and constriction of the part; and often with some degree of fever.

Such symptoms necessarily forbid the drinking of the water; yet even here the bath may be used with confidence, unless some obvious and positively bad effects appear to arise from it.

The use of the bath will, however, in all such cases, be much assisted by some appropriate medicine. The neutral salts will often be found beneficial; and contribute much to the relief of patients in this situation. Should they disagree, or prove ineffectual, some mild purgative will be required. Soap and rhubarb, manna, senna, or castor oil, will be then indispensably necessary. Clysters also should not be neglected, as being of essential use in a variety of respects. And, during the time of bathing, friction of the abdomen with the hand will not be found trifling or useless: at other times, advantage may be received from employing a flannel, or brush, for the same purpose.

In such situations, the pump, so far from answering any beneficial purpose, never fails to stimulate and increase the symptoms: if it be at all admissible, it is at the conclusion or end of bathing, when the fever and obstructions have been removed. At this time, the cold bath is generally indicated. And it is one of the peculiar advantages of Buxton, that it is in our power to give that precise shock, which the particular circumstances seem to demand. If

that period of the complaint be demanded, which requires the use of tonics, it is when the stools, after being clay-coloured or white, have recovered their natural appearance; and when the urine, before clear and high-coloured, is found to deposit a reddish sediment. These changes, joined to the cessation of pain and fever, may be esteemed decisive of the advantages already obtained; and afford, at the same time, a direction as to the measures now to be pursued.

The morning has been generally, almost indeed universally and indiscriminately, recommended as the most favourable time for bathing; but, in my opinion, very injudiciously. In disorders of the stomach and bowels it is particularly improper. For, as in such it is often advisable to continue in the bath for a considerable time, the patient is hereby exposed to many inconveniences. The effects of a tepid bath on the skin have been already observed; and they are really such as, in this cold and inhospitable climate, to confine the patients within the house for the remainder of the day. Hence they are precluded from any benefits arising from the open air, and from that easy, gentle exercise, which, and which only they can well bear.

Breakfast is, or ought to be, a light meal, easily digested. And while, on the one hand, it gives no permanent fulness to the vessels, on the other hand, it contributes somewhat to fortify the system, and to render the patient more equal to an operation, which to some is terrifying, and to many fatiguing for the moment. There is nothing in it which can possibly contradict any other rational indication; while, at the same time, it admits of every advantage arising from air, exercise, or society.

As a general rule, therefore, for invalides, the time between breakfast and dinner seems the most proper for bathing; but this is to be understood as relating to the tepid bath. The prescribed or usual exercise is to be taken before the bath. Yet, though this is the usual time, if the earlier part of the morning will permit, it is always good husbandry, particularly in a country so liable to storms, to avail ourselves of the opportunity.

Breakfast, exercise, and the bath, will be sufficient employment till dinner; after which the bather is scarcely exposed to any degree of mischief; so that he gains every advantage from this time of going into the water, and avoids every thing which may be dangerous or disagreeable.

It will be proper, however, to observe, that, if it be necessary to drink the water during the use of the bath, the bath must be used rather sooner in the forenoon, that a glass may be taken an hour before dinner. For it may be laid down as a general rule, without exception, that in no case is the water to be taken immediately before bathing, which, however absurd, is notwithstanding a common practice. The least consideration on the consequences of filling the vessels at such a time, with the rarefaction arising from the particular composition of the water, must render every argument on this head superfluous and unnecessary.

In many complaints of the kidnies and urinary passages, where no calculus is actually formed, or any ulceration taken place, the frequent and long-continued use of the bath will generally be found pleasant, as well as beneficial. Many of these require the internal use of the water together with the bath. In spasmodic affections of these parts, bathing should seem a very rational medicine; but, for some cause not so obvious, it is not unusual to meet with disappointment in this flattering expectation. Perhaps the deep situation of the muscles affected, or perhaps the want of a sufficient degree of warmth in the water, may have been

the cause of this disappointment. In some instances, possibly, the spasm may have been increased by the additional pressure, and consequent irritation of the water. It seems proper to take notice of a circumstance, which has occurred in the case of several intelligent and attentive persons, in order to guard medical men against violent promises, and their patients against sanguine expectations, which not seldom end in dissatisfaction and disgust.

WHATEVER objections may be made from experience to the internal use of Buxton water in gouty cases, very few instances occur of any mischief arising from the bath, under any circumstances whatever of that disorder. This appears particularly fortunate, and almost astonishing, considering the great disparity between the temperature of this water and of the blood, and the extreme boldness with which it is sometimes prescribed; particularly when it is considered, that the heat of the blood must be unavoidably increased by pain, and by the symptomatic fever usually attending. But, though the practice has not been followed by any bad effects hitherto known, it is by no means justifi-

able, as it must be liable to mischievous consequences, however they may be concealed by caution and cunning, which, it is presumed, are never wanting in such places of resort. Neither can there be a necessity for running any kind of risk. For the pain and fever commonly abate in a short space of time, when bathing may be used with propriety; and surely with infinitely more satisfaction, both to the physician and the patient.

In most cases of the gout, where the bath is advisable, the use of it may be as frequent and as long continued as may be agreeable to the patients themselves; guarding them only against that sense of fatigue or faintness, which is the consequence of staying too long in the water. Few will bear to remain in the bath for more than forty minutes; and the most frequent means never more than daily bathing.

For the reasons before assigned, the hour of bathing, for gouty patients, should be between breakfast and dinner in general; but, in some cases, the evening will be preferable; taking afterward a light supper, with a little wine, if the constitution and former habits of living require it. The frictions heretofore recommended, both in and out of the bath, are in the gout extremely beneficial, both in resolving

impacted juices in the sheaths of the tendons, and the aponeuroses of the muscles, and also in restoring their tone and action. These exertions serve so powerfully to assist and second the advantages to be obtained from bathing, that they ought never to be omitted; not even when the infarctions are so inspissated as to appear almost ossified; for in such, the friction is not attended with any degree of pain; and the benefit is often more considerable than might have been expected.

The objections which have been made to the early and indiscriminate use of the pump, will apply yet more forcibly in gouty patients. When the vessels have been softened, moistened, and rendered more pervious by the liberal use of the bath, when the viscid fluids have been attenuated, resolved, and fitted for circulation, then, and not before, the parts may be urged to recover their former energy and powers. At such a time the pump comes very properly in aid of other rational endeavours. The cold bath also, or at least the more gentle shock of this water, will contribute much, in this convalescent state, to the recovery of general, as well as local strength.

Very nice distinctions between the gout and rheumatism will scarcely be expected in a work of this nature. Due attention to the con-

stitution of the patient, to antecedent and predisposing causes, to the returns of the complaint, and the seat of the pain, will enable us, with tolerable precision, to make just distinctions between them. In either case, during the state of inflammation, drinking the water is carefully to be avoided: and, when the different temperatures of the water and the blood are considered, it may be reasonably supposed, that there are seasons when the bath ought not to be used. In much pain, attended with inflammation and fever, great caution is required; and instances are not wanting, of very serious and palpably bad effects produced by the bath, under circumstances approaching to the state here described.

The acute rheumatism, for it is universally known there are two species of this disorder, requires, for the most part, general or topical bleedings, together with a cooling, diluting regimen; and medicines adapted to the same intentions. It is evident, therefore, that, in this case, medical assistance is indispensably necessary. It has, however, often occurred to my apprehension, that the abstinent method recommended by Sydenham is less liable to objec-

tion than any other; and, upon trial, will be attended with equally good effects.

The other kind of rheumatism is very properly termed the chronic, as harassing the patient often for a long time. This frequently succeeds to the acute, after the inflammatory symptoms have subsided; particularly where the evacuations, during that state, have been too large, or too long continued. It may affect any of the joints, but usually falls upon the vertebræ of the loins, or on the hip: in the former case it is called the lumbago; in the latter, the sciatica.

The chronic rheumatism is supposed to have it's origin from a weakness and want of tone in the blood vessels, and muscles of the part affected; consequently it requires a totally different mode of conduct from the inflammatory. And as it is always attended with more or less of rigidity and contraction, our attempts must be directed both to the restoration of the powers, and the activity of the parts concerned.

It is possible that there may be cases composed of both these species of rheumatism; such must of course demand a more varied method of relief, depending much on the present circumstances. In these, this bath should seem to promise some peculiar advantages.

But cases will occur in which this bath, joined to every other rational medicine, proves un-

successful. Pains in the hip may sometimes be observed which defeat all our endeavours, and in which every attempt to give relief is found totally ineffectual. Here a suspicion will naturally arise, that, from some accident, or unknown cause, matter has been formed in the neighbourhood of the joint. Under such circumstances, by obstinately persevering in the bath, we add to the distress of the patient, and at the same time bring discredit on a very valuable medicine.

Even in cases where no matter has been formed, but a large distension of the vessels has appeared, together with more or less of an extravasation of their ordinary contents, bathing, so far as my experience goes, has answered no other purpose than to fatigue the patient, and, by irritating the part, to prevent or weaken the powers of absorption. By such ill-judged attempts the complaint is rendered more obstinate; and that relief which might have been produced by happier and more gentle means, is frustrated by the very violence of our own intentions.

It is a common observation, that the chronic pains remaining after a fit of the gout or rheumatism are, for a few days, increased by the use of Buxton bath. Dr. Hunter endeavours to account for this, by supposing that the impacted fluids, which obstructed the small vessels in the muscular and tendinous parts of the body are attenuated, and absorbed into the habit. Perhaps in some instances, and to a certain degree, the reasoning may hold good; and the fact is sometimes undoubtedly as is here represented. But the inhabitants of the place, and it is presumed that in all such places they are not deficient in this kind of skill, are apt to avail themselves of this circumstance; and, by converting it into a general rule, to protract the expectation of the afflicted for so long a time as he may choose to stay. The trick is carried sometimes so far, as to assure the sick, with a tolerable degree of confidence, that the increase of pain is a good symptom; and that they are not to expect any essential benefit from the bath, till their return home.

With respect to paralytic disorders, unhappily at this time so prevalent, having been explicit in a former part of this work as to the internal use of Buxton water, little remains to be said on this head. But as palsies proceed from such a variety of causes, and affect parts so very distinct, any general direction must be absurd or impracticable.—Some attack particular muscles only, some the whole limb; others one side of the body, or the whole frame; some arise from violent, or accidental causes; some from partial debility, or from a stimulus or pressure on the brain. In cases where the affection is partial, and confined to the limbs, there is reason to suppose that Buxton water, as a bath, is capable of doing essential service. These require also, with the use of the bath, many collateral and corresponding aids, both external and internal. But surely nothing can be more improper than to give particular directions for the conduct of those, whose cases differ so materially; and whose situation, if not, as is too often the case, deplorable, is always such as to require the greatest precision and vigilance on the part of the physician.

In the course of many years attendance, I have had occasion to observe nice and able distinctions from some professional men in these

complaints. As might be expected, they have proceeded from men of great abilities, and deservedly high in the public estimation. But in general, and it is a point greatly to be lamented, patients of this description come to Buxton with very lax and vague advice, and unguarded in every sense of the word. Too often they come to the place without any advice at all. The majority seem entirely ignorant of their own perilous situation; some visiting the place under the notion of suffering from a rheumatic complaint, and many from that particular restlessness so observable in paralytic disorders.

Many diseases of the skin appear to receive considerable benefit from this bath. These, though on a superficial observation they seem trifling and of no great consequence, frequently elude the most skilful and most powerful endeavours.

Before I proceed further on this particular complaint, I may be permitted to take notice of an observation to be found in a treatise on the waters of Bareges. The body immersed in that water, says the writer, feels as if it were rubbed with pomatum or cream: and this circumstance, among others, is adduced to prove the presence of a balsam in the water. But, assuredly, this

is a sensation by no means peculiar to the waters of Bareges; for it is almost universally remarked by the bathers at Buxton. The effect has nothing to do with any balsam in this latter place; but proceeds simply from a large quantity of it's peculiar air or vapour attaching itself to the skin, before it has risen high enough to mix with the common air of the bathing-room.

It is admitted that no complaints of the system are less understood than those of the skin. Their appearances are so various, and the description of them in books so confused and indistinct, that scarcely any thing satisfactory can be collected concerning them. Many ingenious attempts have been made to investigate the nature of them; but at present there is no part of medical practice which is more defective.

It should seem as if two mistakes were committed in the theory respecting these diseases; and that these errors lead to disappointment in practice. The systematic writers on surgery are desirous of reducing them to a single cause, and to suppose them local only. The indications of physicians proceed upon the notion of some unknown indisposition of the fluids; or, from some general derangement of the solid parts of the body. But, though in many instances the cutis is the only part of the system affected; and those affections yield to well-di-

rected external applications; yet every candid practitioner must confess, that he has met with many cases, which have baffled all such endeavours. Many instances will occur to his recollection, where obvious advantages have been received by his own patients, from powerful medicines in the hands of selfish and cunning men. On the other hand, it must be acknowledged, that patients have been frequently harassed, and sometimes essentially injured by the long-continued exhibition of violent medicines; when such complaints have given way to mild external applications.

It cannot be supposed consistent with the intention of this essay, to enter into a minute detail of cutaneous disorders, with their various symptoms. It must of necessity be an inquiry attended with much difficulty, without affording any practical conclusions.—Omitting, therefore, no rational internal medicine (for in few of these cases is it proper to drink the water) the directions concerning the bath must depend on present circumstances: for the different aspect of the complaint at different times creates an absolute necessity for deviating from any general rule. Sometimes the eruptions are in a state of inflammation, when the bath certainly aggravates the mischief: sometimes, when the parts are in a more quiescent state, it contributes

greatly to the ease and comfort of the afflicted. At all times, when it can be used with propriety, by washing off impurities, and promoting the perspiration of the whole body, as well as of the particular part affected, it contributes considerably to the cure of almost all such disorders. And it is somewhat singular, that writers the most devoted to the doctrine of locality advise, in the strongest manner, every means to promote general as well as local perspiration: assigning substantial and well-founded reasons for an advice, which, the more it is examined, the more satisfactory it will appear to every candid and experienced mind.

HAVING attempted in some measure to explain the use of Buxton bath as a medicine, it is almost impossible to avoid some notice of it in a state of health.

Persons advanced in years, in whom the muscular fibres are gradually becoming too rigid, and not sufficiently yielding to the impulse of the fluids, may probably at all times receive considerable advantage from a bath of this temperature, exclusive of it's constituent parts. Neither can there be a necessity for confining this advice to persons in years; for, with cer-

tain restrictions and qualifications, it may be extended to any period of life.

From a cold bath of the temperature of that of Buxton, few persons can possibly receive any injury; on the contrary, if there be no defect in the large vessels, or any thing in the habit directly to contradict the intention, every man must feel an improvement in health and strength from the moderate use of it.

Those who are timid as to a cold bath, will here have the opportunity of trying one moderately cold, with the great advantage of receiving a gradual preparation for such as are more powerful.

Where a tepid bath is required, nothing of the kind can possibly be found more agreeable; and to persons in high health it may be esteemed a real luxury.

If, in the course of these observations, the writer has been able, with some degree of precision, to accommodate the general principles of bathing to the use of Buxton bath in particular cases and circumstances, he presumes it is all that can reasonably be expected. He has endeavoured, and he trusts with some kind of accuracy, faithfully at least, to prevent any considerable mistakes, which may arise in future, from the recommendation of the water: at the same time he hopes, that he has promoted and

extended the knowledge of a safe, a pleasant, and an effectual remedy on many occasions. Such were his real and chief objects; meaning, from a principle of duty, to give the result of his experience, without any expectation of future interest; and with the ambition only of retiring the "*miles emeritus*" of that public, from whom he has received innumerable obligations.

He takes the liberty of concluding with the lines ascribed to the beautiful but unfortunate queen of Scotland:

"Buxtone, quæ calidæ celebrabere nomine lymphæ:
"Forte mihi posthac non adeunda, vale."

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