A treatise on the waters of Harrogate, and its vicinity / [Adam Hunter].

A TREATISE

ON THE

WATERS OF HARROGATE,

BY

ADAM HUNTER, Esq. M. D.

2s.

[c. 1845]

J. B. Fraser

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WATERS OF HARROGATE,

AND ITS VICINITY.

BY ADAM HUNTER, ESQ. M.D.

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HISTORY OF HARROGATE.

To those already familiar with the localities of Harrogate, the following account may appear superfluous; the medical reader in particular may consider it in some measure out of place. It has been customary however with most writers on mineral waters, to advert to the situation and natural history of the spot where they are found. The advantages are sufficiently obvious; there are many to whom, when visiting any watering place for the first time, such information cannot fail to be useful. In the ordinary affairs of life, trifles light as air frequently turn the scale; thus to those leaving their homes for the purpose of regaining health, or for the more mixed motives of health and pleasure; it is often a matter of anxious inquiry to ascertain some of the following particulars, in reference to the place to which they purpose to repair.

Harrogate is situated near the centre of the island, at the south-west extremity, and on the

upland of that fine plain which Dr. Drake, in his history of York, considers "the richest, pleasantest, and most extensive in Britain, if not in all Europe." It is divided into two villages, High and Low Harrogate, both of which have their respective mineral springs; they are distant only about half a mile from each other. The increase of buildings will, at no remote period, cause this distinction to be applied merely to situation. High Harrogate is in the parish of Knaresbrough, Low Harrogate in that of Pannal. A curious anomaly until very recently existed in their ecclesiastical superiority, Low Harrogate having been under the spiritual jurisdiction of the Archbishop of York, while High Harrogate was in the diocese of Chester. From the alteration of the Bishopricks they are now in the diocese of Ripon; but in different Archdeaconries; Bilton, which comprises High Harrogate being in the Archdeaconry of Richmond; while Pannal, which comprises Low Harrogate, is included in that of Craven. They are in the wapentake of Claro and forest of Knaresbrough, from which town they are distant about three miles; eleven from Ripon; eight from Otley; fifteen from Leeds; twenty from York; and at nearly an equal distance of about two hundred miles from the capitals, London and Edinburgh.

The name of Harrogate is derived from its being in the direct road from Knaresbrough to Heywra Park, and was anciently called Heywra-gate, as appears from a grant of land to St. Robert. This worthy was contemporary with King John, of Magna Charta notoriety; and in those olden times was highly venerated in the neighbourhood. As a village, Harrogate, at a much later period, could scarcely be said to exist. Long after the discovery of the mineral springs, they were always referred to by authors as being in the forest of Knaresbrough. This forest formerly a wild and barren waste, comprises a district twenty miles long by six or eight wide, which from some local judicatures still retains the appellation; though now almost all inclosed, and covered with fruitful fields and smiling villages.

The prospect from High Harrogate and the adjoining heights, is rich, beautiful, and extensive. York Minster, at the distance already mentioned may be distinctly seen. Still further to the east the view is terminated by the Yorkshire Wolds and Hambleton Hills; while the west is more directly though distantly bounded by the bleak rugged moors of Craven.

Being at nearly an equal distance from the German Ocean and the Irish Channel, it has been supposed, that from Harlow Hill, adjoining Low

Harrogate, an additional elevation of about one hundred feet would enable both coasts to be distinguished. An aspiring individual, by permission of the noble proprietor, the late Earl of Harewood, whose liberality to Harrogate has been evinced by a much more useful, though less conspicuous object, erected a tower, from the top of which visitors may enjoy the surrounding landscape. Though Blackstone-Edge and the Eastern Wolds frown darkly upon the attempted sea view, yet the spectator is gratified with a most ample and varied prospect. There are several excellent Telescopes placed on the platform of the tower, with which objects may be examined at great distances; the magnifying power of the largest is seventy-five, and from this spot on a fine clear day, the brick-work of a house near Richmond, a distance of forty miles, has been distinguished; the colour of a blue flag was noticed fifteen miles off; while the steeple of one of the churches at Hull, upwards of sixty miles from Harrogate, has been observed. Whether the gentleman peculiarly interested in turning his looks in that direction saw, or only fancied he saw, a point so distant, is not for me to determine. This is a most agreeable resort for the visitor, where hours may be pleasantly spent in the survey of the many interesting objects with

which the surrounding country abounds. On a fine summer evening, the setting sun frequently casts an inexpressible gorgeous splendour over this magnificent landscape, well might a Prince when witnessing a similar scene, exclaim "this is truly England." Nor can those various, noble, and imposing masses which the clouds often assume after rain, or the thunder storm, be almost anywhere seen to greater advantage. The air, sweeping over an immense tract of finely cultivated country on the one hand, and equally extensive heaths on the other, is at Harrogate, remarkably pure, bracing, and salubrious. It is considered apparently with good reason, that the absence of the Asiatic or pestilental cholera is principally to be attributed to this circumstance, and to there being no large body of water in the immediate vicinity. No case of that malignant disease has hitherto occurred at Harrogate; neither have infectious diseases of any kind ever been prevalent.

The geological features of the neighbourhood are in several respects interesting. There is no very remarkable variety of minerals, nor of organic remains to be enumerated, though some of each are curious. Dr. Dean however was of a very different opinion two hundred years ago, when he observes, "No place in this nation can boast of such

diversity of earths, quarries of stone, minerals, and mines of metals, and all this at a very small distance; for here we have white and yellow marble, plaister, oker or rubric free-stone, hard grit-stone, a soft reddish stone, iron stone, brimstone, vitriol, nitre, alum, lead, copper, and many other minerals might be found out by the diligent and ingenious. All which demonstrate that nature has stored this little territory with a greater diversity of hidden benefits than great and spacious countries; and that the fountains hereabouts must partake of their nature and properties."

Succeeding writers have by no means been contented with this ample list; almost every one entitling himself to the terms "diligent and ingenious," by adding a favourite substance or two. Dr. French gives "alabaster, and a glittering sand which yields some gold;" the late Dr. Walker furnishes his quota in "selenitical crystals and coal." After this glowing picture of mineral wealth, the following slight sketch, for which I am chiefly indebted to that eminent geologist, Professor Phillips, will appear extremely meagre, having nothing but facts and the recent improvements in the science to recommend it.

The lowest rock in the country, within twenty miles of Harrogate to the west, is the carboniferous

or mountain limestone, which ranges in noble scars down the borders of Wharfdale, and is thrown up in a dislocated condition at Greenhow Hill. The route from this place to Harrogate, and thence to Knaresbrough and York, or from Harrogate to Plumpton and Wetherby, reveals the whole stratification between the carboniferous lime stone and new red sandstone. The first stratum over the carboniferous limestone is a mass of shale, in some places several hundred feet in thickness, inclosing several thin layers of sandstone, and a few inferior seams of coal. This shale receives in Derbyshire the name of limestone shale, from containing some thin beds of limestone; but these do not exist in the vicinity of Harrogate. There is, however, in their place, a cherty bed of stone filled with crinoidal remains, found in several places in the neighbourhood, which is much employed on the roads.

This shale underlays the whole country between Pateley-Bridge and Harrogate, and supports the picturesque millstone grit rocks of Brimham, Almias Cliff, and Plumpton. These rocks, in geological phrase, are termed "outliers," from the main body of millstone grit, which ranges down the south side of the river Wharfe.

At Knaresbrough, under the Castle, a very interesting section is disclosed by the river Nidd, where the magnesian limestone is seen resting upon a succession of coarse sandstones, very much resembling millstone grit. Professor Sedgwick, however, considers this sandstone to be analagous to the rock known in Germany by the name of Rohtodteliegende.

These brief but leading features of the stratification of the district, offer some useful subjects for reflection. It is evident that no experiments for coals, in the vicinity of Harrogate, are likely to meet with any success; nor can it be doubted that the sulphuretted springs arise from the thick bed of shale above mentioned. It also appears that a geologist, who has leisure to explore the country will find Harrogate a good central position, from which he may examine the magnesian limestone on the east, and the millstone grit and limestone shale to the west and south. The Mineralogist may search for all, and he will find, at least, some of the metals and minerals enumerated, particularly limestone in different forms; but he will be chiefly interested by the barystrontianite, or double carbonate of barytes and strontian, found near Pateley-bridge.

The botanical characters of the district are numerous, varied, and interesting; and afford a fine field for the pursuit of this pleasing study. Within a circle of a few miles there is soil, temperature, and situation, for almost every species of indigenous plant found to flourish in the same parallel of latitude. To attempt to enumerate these, would far exceed my limits, and might even deprive the botanist of the great pleasure which every one takes in hunting for and discovering his own game. The grounds of Studley, Mackershaw, Hackfall, Copgrove, Grantley-Lake, Brimham-rocks, Swinton, and Sawley-moor, with the lofty and percipitous banks of the Nidd, are peculiarly rich in rare and beautiful specimens; while the elegant taste of the proprietors of several of the neighbouring mansions, and their indulgence to strangers who visit them, allow many of the most delicate and highly prized exotics to be added to the list.

The population has increased rapidly within the last fifty years, and has fully kept pace with the growing importance of the place. It is now upwards of four thousand. The various hotels for the accommodation of visitors, are now conducted upon a scale in no way inferior, and in some respects perhaps superior, to that of most watering places in

the kingdom. Elegant lodging-houses are likewise increasing annually, and provisions of all kinds are to be procured of the best quality.

There are two chapels belonging to the established church, one of which was erected at Low Harrogate in 1824, principally for the benefit of the visitors. It was built by subscription, assisted by the commissioners of the million act; and was endowed with fifty pounds per annum by the King as Duke of Lancaster. The other at High Harrogate is a new and handsome structure, built upon the site of the old chapel, which had become inadequate for the wants of the place, and was otherwise falling into decay. It too was erected by subscription, with a liberal donation from the church building society, and was opened in October, 1831. It contains twelve hundred and fifty sittings, of which eight hundred are free. A District Parish has been assigned to this church under the provisions of the 58 George III. cap. 45: this part of the extensive parish of Knaresbrough will consequently cease to pay church rates to the mother church which it has hitherto done. Besides the two church chapels there is a neat Wesleyan Methodist chapel, erected some years ago, in a good situation, Beulah Place, between High and Low Harrogate. There is also a small chapel for the

Independents. There has been some intention of building a meeting house for the society of Friends; this however, is yet in abeyance, and a school-room is taken for the meetings of this body during the season. The Roman Catholics have recently erected a goodly structure at Knaresbrough, whither the visitors belonging to that ancient persuasion generally repair for religious worship. Harrogate and the vicinity is also well supplied with schools; for in addition to several private seminaries, which the peculiar advantages of the situation, as well as the merits of the preceptors, have raised into considerable repute, there is a national and sunday school in which upwards of three hundred children are instructed. Most of the places of worship referred to have likewise a school attached. An elegant and commodious infant school has been recently erected and is supported by William Sheepshanks, Esq., at North Parade, near the church, for the poor children of the district without any distinction. It is conducted by a master and matron of character and experience; about one hundred children attend. The benefits thus accruing to the rising generations at Harrogate, must constitute a pleasing reward to the true liberality and benevolence of the founder.

The Charity Baths and Hospital Wards, or as it is now styled the Harrogate Bath Hospital, built

1823-4, and opened for the reception of patients in the spring of 1825, ought not to be omitted in this sketch. They were established by the liberality and exertions of several humane individuals, chiefly visitors at Harrogate, or residing in the neighbourhood. Where many lent their aid, it might be invidious to particularize a few; yet the name of the Honourable Montagu Burgoyne must always be associated with this undertaking, as one of its earliest and most ardent supporters. George Lane Fox, Esq. M. P. of Bramham, took also a lively interest in their success, which he still continues. The late Earl of Harewood likewise not only contributed a liberal sum in money, but presented the land for the buildings. R. Richardson, Esq. held the office of Treasurer for many years from the commencement, to whom much credit is due for his uniform attention to the Institution. The charity is chiefly supported by the donations of the visitors, at the different hotels and lodging-houses; there are also annual subscribers; its sphere of action is therefore only limited by the extent of the means. It is satisfactory to know and reflect, that the utility of this establishment has more than equalled the most sanguine expectation of its founders. Some thousands of the worst description of cases, for which these waters are found beneficial,

have either been completely restored to health, or very much relieved; any visitor may soon be satisfied by a personal inspection of the excellent and orderly manner in which it is conducted. There were at first twenty beds for Patients, which have lately been increased to eighty. Few Medical Charities have effected greater good with the same relative means, and no charity can be more deserving of steady and liberal support. Since the commencement 5,202 Patients have been admitted. The report for 1845 states, "During this "season 428 Patients have been admitted, forty of "whom were *cured*, and the rest, with the exception "of about thirty greatly benefitted." The subscriptions amounted to £260. 1s. 0d., and the collections at the different Hotels to £291. 13s. 6d., the remainder consisting of Legacies,* Donations, Church collections, &c. to £145. 9s. 0d. The expenditure for the year 1845 was £995. 17s. 5d. To many indigent and suffering individuals, from the manufacturing districts it has been of inestimable benefit.

The principal places of amusement and public resort, are the Races, Balls, Billiards, Reading-Rooms, and Circulating Libraries; of these the

* The late Mrs. Lawrence, of Studley Park, left by her will, (free of Legacy Duty) £1000, Three per cent, reduced consols, which in due time, will be transferred into the names of the Trustees, for the benefit of the Charity.

Library and Reading-Rooms of Mr. Langdale, the Bookseller and Publisher, at High Harrogate, are from their extensive and well-arranged supply particularly worthy of notice. The Promenade Room, at Low Harrogate, opened in 1805, is well frequented, and found extremely useful in cold, wet, unseasonable weather. This capacious Room, seventy five feet long by thirty broad, is open for public meetings of all descriptions, which during the season succeed each other with great rapidity.

The late Mr. Williams, the spirited proprietor of the Cheltenham, or Saline Chalybeate Spring, having tastefully laid out the grounds adjoining, which are well adapted for the purpose, with walks, seats, and shade, and erected a splendid building, termed the Royal Promenade and Cheltenham Pump Room, into which the water of the spring is conveyed. This room is one hundred feet long by thirty broad; and is decorated internally with great magnificence; the pier glasses and Chandeliers being of the largest size and best construction. A circulating library is attached, and during the season the room is well supplied with the daily and weekly effusions of London and provincial press. It was opened with much pomp and festivity in August, 1835; and

from the various advantages connected with it, continues well and deservedly frequented.

Public Baths, the want of which had been so long and justly complained of by the faculty, and felt by the public, have also being recently erected. As if to make amends for the previous delay, two complete suites of these important auxiliaries to health have been built and fitted up in the most approved, convenient, and elegant style. Here Mr. Williams again took the lead; his Baths are situated immediately adjoining the Old Promenade Room; they are central and easy of access, particularly for the visitors at Low Harrogate. It is perhaps to be regretted, that from the nature of the situation, and other circumstances connected with their elevation arising from their proximity to the Promenade Room, the building on which so much money has been expended, could not have been rendered more ornamental. The Baths are supplied from a spring rising within the building, which has not hitherto been particularly analyzed, but which is understood to be one of the oldest Sulphur Wells, from which water for Bathing had been obtained for many years. Upwards of forty baths either hot or cold can be supplied here daily at the shortest notice.

The late Mr. Thackwray, of the Crown Hotel, soon afterwards commenced, and lived to finish an

elegant suite of public baths. These are situated in the pleasure grounds at the north end of the hotel, immediately adjoining the sulphur spring No. 2 of the analysis. This situation is admirably adapted for the purpose, the grounds as laid out being well sheltered and tastefully ornamented with walks and shrubberies, and now form one of the most delightful home promenades for invalids in Harrogate. The supply of water for these baths as connected with the spring No. 2, and other sources is abundant, and of the best quality. In addition to the usual hot and cold baths, vapour, hot air, and fumigating baths, with the general or local application of each, are constructed upon the present most approved principles. Two large rooms extending the whole front of the building, are handsomely fitted up, and used at present as waiting-rooms.

The erection, then, of these two splendid suites of baths, will for the future effectually remove the reproach to which Harrogate was so long subjected, in comparison with other watering places of much inferior pretentions, in reference to this useful branch of medical hygiene.

The season, so called, commences early in the spring, and continues to the latter end of autumn, but the greatest influx of company is during the months of July, August, and September. It is

calculated that of late years there have been upwards of thirty thousand visitors annually. From the advantages of field sports and other causes, some even prolong their stay over the winter. No stronger proof can be afforded of the efficacy of the waters, than the continued and increasing resort of such a number of visitors.

The roads about Harrogate have of late years been greatly improved, though there is still room left for additional amendment; nor is this to be wondered at, seeing that a blind man* was in the first instance employed to lay out the principal lines of road in the neighbourhood, upon the ingenious principle doubtless, that where such an individual could travel, any one with two eyes might surely follow.

If irregularity is the basis of the picturesque, Harrrogate yields to no place in England. The buildings which separately are in many instances elegant, are some of them, and those too of the latest erection, so placed as if intended for a nuisance to the next neighbour or his lodgers.

Leaving Harrogate,† therefore, where a bountiful

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* John Metcalfe, better known by the appellation of Blind Jack of Knaresbrough, of whom many singular anecdotes are told. He served as a guide over the forest, and contracted for making roads, building bridges, &c.

† Langdale's Harrogate Visitors' Guide, affords a fund of useful and amusing information on every subject connected with this district. A new and much improved edition has lately been published.

providence has bestowed more than man hitherto has developed, the pedestrian may soon gain the banks of the river Nidd, and woo health, solitude, the muses, or whatever is dearest to his wishes, by its shaded and romantic stream ; or turn his steps towards the sequestered village of Pannal, anciently Rosehurst, a name still sufficiently applicable. The Church is a Vicarage, dedicated to St. Robert ; the first incumbent recorded is John Brown, 1348 ; the Rev. Thomas Simpson at present holds the living. There is an excellent modern school where one hundred and fifty children are instructed according to the system of Dr. Bell. It is a matter of tradition that Charles the first passed through this village in the spring of 1647, surrounded by those men or their agents, who soon afterwards brought the unfortunate monarch to the block. The well-mounted equestrian or experienced whip, can shortly among other less distinguished places, visit the ancient and interesting town of Knaresborough, Plumpton, Boroughbridge, Aldborough, Harewood-House, Hackfall, Swinton, Ripley Castle, Ripon, Fountains Abbey, Studley, and Newby. A wider range will lead him to Bolton Priory in the beautiful valley of the Wharfe, inferior to none in England ; to York the ancient capital of the kingdom, or to the commercial and enterprising town of Leeds.

MEDICAL HISTORY.

The discovery and early history of these springs, with the authors who have written upon their qualities, are equally indispensible in a treatise of this kind, and become the next subjects of inquiry. Water is so directly necessary to human life, that its use must have been coeval with human existence. As one of the four long considered elementary principles, air, earth, fire, and water, it is, from its peculiar qualities and variations the most susceptible to the senses, of any of these elements, and could not fail to attract the earliest attention which man bestowed upon surrounding objects. "There are few things," observes a recent writer, "endowed with more marvellous properties, or which are less studied and understood. The lover of rural nature is sensible of its charms, whether it murmurs in a brook, rolls in a foaming cataract, or expands into the silvery mirror of a lake. Hence the poet and the

painter have vied with each other, to celebrate these emanations of creative kindness. But higher and deeper thoughts, than any which external beauty can suggest, fill the mind that contemplates the internal constitution of this Protean liquid." No discredit, therefore, can attach to those who have considered that there was no species of remedy for the ills which humanity is heir to, so early brought into practice. It would be in vain, however, as some have attempted, to fix the period, as we have no records to shew, when mineral waters were first used medicinally. The sacred Scriptures are sufficiently explicit on this head. The waters of Marah* have occasioned some bitter disputes regarding the tree, or its effects, used to sweeten them, while the cure of the Assyrian ruler in the river Jordan, and the pool of Bethesda, lead us, in acknowledging the miracles, to consider likewise the natural means employed.

In the earliest medical records extant, Hippocrates has noticed the effect of water, and accurately defined its sensible properties, while the multitude, in all ages, and in all nations, have attributed peculiar healing powers to certain springs, and honoured them with the name, or placed them

* Exodus, xv. 23—26.

under the direct influence of some presiding deity or saint, long before that science arose, which enabled us to descriminate the justice, or dispute the title, of such lofty and occasionally unqualified pretensions.

The nature and principal variety of the Harrogate mineral waters hitherto discovered, have been long known to the profession, and their beneficial effects extensively experienced by the public. Nor have they attained their present celebrity by any of those adventitious circumstances, which, at one time caused similar springs to be generally resorted to, and in a few years leave them entirely deserted; for, with the exception of Bath, which has been celebrated as a watering place from the most remote period of our authentic history, and carries its origin far into the obscure regions of fable, no other mineral springs in England have obtained a longer, more extensive, and equally increasing reputation.

The Tewit Spa, so called from the lapwings which yet frequent the spot, appears to have been the first of the Harrogate springs which acquired notoriety for its medicinal properties. It was accidentally discovered in the year 1571, by William Slingsby, Esq. an ancestor of the present Sir Charles Slingsby, Bart. of Scriven Park. Having travelled

in Germany, and used the celebrated chalybeate waters at Spa, this gentleman was struck with its great resemblance to the Sauveniere Fountain, and, with a laudable patriotism not uncommon, had the circumstance been less warranted by facts, preferred it to the Spa Fountain, as being "more brisk and lively," and, in the language of the times, "fuller of mineral spirits, and of speedier operation." Living in the neighbourhood, he continued to use it with advantage for many years; and his example, together with the cures performed, some of which, as given by Dr. Stanhope, are stated by Dr. Short, "as perhaps the greatest and most remarkable filed up in the authentic records of physic, down from Hippocrates to this day," soon increased its celebrity, and led to the discovery and use of the other chalybeate and sulphurous springs. Although the Tewit Spring is the first of which we have any account as having been taken internally, it is evident, from the names of some other wells, such as St. Mungo's, St. Robert's, and St. Ann's, that they had been resorted to, at least for bathing, many centuries before.

The treatises which have been published expressly on the Harrogate Waters, constitute no inconsiderable number; and when taken in conjunction with what has been remarked by those

who have written more generally on this department of medical science, are amply sufficient to shew their importance.

Without entering into the particular history of, or instituting any minute comparison between these works and their respective authors, it may be observed, that Dr. Dean appears to have been the first who published an account of the Tewit Well, in 1626.* It had previously however found two firm advocates in a Dr. Timothy Bright, and Dr. Anthony Hunter, physician at Newark-upon-Trent, the latter of whom, says Dr. Dean "often chided us physicians at York for not writing upon it, and deservedly setting it upon the wings of fame."

Dr. Stanhope, in 1632, wrote a fanciful, but not incorrect, statement of the springs known in his time ;† and details a number of wonderful, cures, in the quaint, rounded, and verbose language of that stately age.

Dr. John French, in 1651, "being commanded by his occasions down to the Spaw in Yorkshire,

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* Vide Spandarine Anglica, or the English Spaw Fountain, in the Forest of Knaresburg ; as also a relation of other Medicinal waters, in the said Forest, 4to., London, 1626.

† Entitled, Cures without Care; or, a Summons to all such as find little or no help by the use of Physick, to repair to the Northern Spaw ; wherein, by many Precedents, of a few late years, it is proved to the World, that infirmities, of their own nature desperate, and of long continuance, have received perfect cure by virtue of Mineral Waters, near Knaresbrough, by Michael Stanhope, London, 1632, 4to.

and being prevented from his intended and speedier return by the then northern distractions, to improve his time, as also for a more full satisfaction of his own profession, especially some worthy Doctours in the south, presents them with a treatise on these waters;"* in which he involves himself, at the outset, concerning the "original of springs," between the opinion of Aristotle, that "springs are generated of the aire shut up in the earth, and by the coldness thereof condensed into water;" and the objection to this, by Van Helmont, who proves by experiment, that "aire shut up in an iron pipe, an ell long, and compressed, again extends itself, when it should have been converted into water by the coldness of the iron, and the pressure appplied," had the doctrine of Aristotle been correct.

In 1656, Dr. George Neale, of Leeds, who together with his son, attended at Harrogate during the summer season, for the long period of sixty-seven years, wrote his "Spadacrine Eboracensis," which was never separately published,† but incorporated in the work of Dr. Short, of Sheffield, printed in 1734; which was undoubtedly the best

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* The Yorshire Spaw, or a treatise on the Four famous Medicinal Wells, viz. the Spaw, or Vitrioline Well; the Stinking, or Sulphur Well; the Dropping, or Petrifying Well; and St. Mungo's Well, near Knaresborow, 12mo. London, 1652.

† Short on Mineral Waters, Vol. 1st. p. 186, 4to, being a description

then published on this subject, and so highly was it esteemed, that it was printed at the request of the Royal Society. To it we are chiefly indebted for the history and details of the earliest writers on these waters. It is a tribute due to the memory of this last-mentioned, learned, and indefatigable physician, to observe, that his "Natural, Experimental, and Medicinal History of the Mineral Waters of Derbyshire, Lincolnshire, and Yorkshire;" ncluding not fewer than one hundred and thirty-one different springs, may still be perused with advantage and entertainment, although alloyed with all the chemical absurdities of the period in which he lived. Nothing can more distinctly shew the miserable state of chemical science, at this period, than the futile experiments and absurd deductions derived from them, by this and the preceding writers, in comparison with the good sense they generally display in their directions for the use of the waters. To some of these I shall afterwards have occasion to refer.

Drs. Simpson and Alexander also published on these springs; the former antecedently, the latter subsequently to the publication of Dr. Short.

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of Five famous Medicinal Wells, viz. 1, The Sweet Spaw; 2. The Sulphur Well; 3, The Dropping Well; 4, The Black Spring, found out by the Author; 5, St. Mungo's Well; all of which Wells, with their Situation, Operation, Virtues, &c, are described, together with the Hot and Cold Baths; as likewise Fume Baths.

Dr. Higgins likewise analysed the sulphur water in 1780; and in the 76th volume of the Philosophical Transactions of 1786, there is an ingenious paper by the late Bishop of Llandaff, on the sulphur springs.

In this paper which refers solely to the situation, origin, and impregnation of the sulphur wells, the Rev. Father is not more infallible in some of his speculations, than either his predecessors or successors. The Bishop's account of the discovery of the fourth sulphur well, amply confirms some former remarks, and is sufficiently characteristic of the proceedings which have from time to time occurred respecting these wells: "I made some inquiry respecting the time and occasion of making the fourth well, and received the following account from an old man, who was himself principally concerned in the transaction. About forty years ago, a person who by lease from the Earl of Burlington, had acquired a right for searching for minerals in the forest of Knaresborough, made a show as if he had a real intention of digging for coal, on the very spot where the three sulphur wells were situated. This attempt alarmed the apprehensions of the innkeepers and others at Harrogate, who were interested in the preservation of the wells; they gave him what legal opposition they could, and all

the illegal that they durst. At length for the sum of one hundred pounds, which they raised among themselves, the dispute was compromised, and the design, real or pretended, of digging for coal was abandoned. Sulphur Water, however, had risen up where he had begun to dig; they inclosed the place with a little stone edifice, and putting down a bason, made a fourth well." The learned Prelate is evidently tickled with this native, though more ingenious than honest, mode of extorting money from the inhabitants; any repetition of which was prevented by the Inclosure Act, of 1770, which it was in part the means of procuring. Their descendants, however, have been already repaid for the one hundred pounds, and the visitors greatly benefitted by the additional supply of water for the baths, which this well has ever since afforded.

My predecessor, the late Dr. Walker of Leeds, in 1784, published an Essay on the Waters of Harrogate and Thorp-Arch; more valuable for its medical directions and elegant composition, than its chemical accuracy or experimental research. Indeed, the medical directions and topographical observations are the only useful parts of nearly all the works I have perused upon mineral waters, published prior to this period. And, although the Doctor was a pupil, and appears to have been no

inattentive one, of the celebrated Dr. Black, still this difficult branch of chemistry was but then emerging from obscurity. The excellent essays of the illustrious Bergman, the true parent of this species of analysis, were translated into English the same year; and from this work as from a pure fountain, have the streams of real inductive philosophy irrigated and fertilized this field of inquiry.

I do not find that the late well-known Dr. Alexander Hunter, of York, published on these waters; but he was long their steady supporter, both by precept and example, having found them useful in recruiting those powers of the stomach, which a too solicitous attention to its enjoyments, as well in the Doctor as his patients, sometimes rendered highly expedient.*

The last treatise, written expressly upon these springs, is that of the late Dr. Thomas Garnett, published in 1791. It has passed through several editions, though from the premature death of the author, it has received none of those additions or improvements in the chemical or medical departments, which his talents and knowledge could not have failed to introduce. Following the fate of its predecessors, it has become peculiarly defective.

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* Vide Culina Famulatrix Medicinæ, second edition, York, 1806, by A. Hunter, M. D., F. R. S. L. & E.

It comprises only an account of three springs: the Old Sulphur Well, the Tewit Spring, and the Old Spa. With that respect to his memory which his merits deserve, I beg leave to submit his own words, when summing up the estimate of his labours:—"I have now given a faithful account of my experiments on the three waters most generally used at Harrogate, and I hope a more accurate analysis of them than has yet been presented to the public. There is a great variety of waters at Harrogate, of which I have not yet been able to make any accurate analysis. Among the Sulphur waters in the bog, above the village of Low Harrogate, there are some which are strongly impregnated with hepatic air, and which contain a very small quantity of saline matter; these I have found very useful in external applications in some cases, where those which contained more salt occasioned great pain. In one of the sulphur wells, situate in the bog, I have discovered alum, and I suspect salited clay. In a chalybeate water, near the road, [St. George's,] and not far from the Crescent Garden, the iron is dissolved in muriatic acid. Sufficient attention has not been paid to these numerous waters, and many of them, though perhaps capable of very useful application, have not yet been used. I hope, however, in the course of

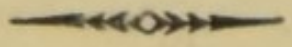
another year, to be able to lay the analysis of them all before the public." That hope was never realized; although the necessity for it must be pretty evident to the reader, who will, I believe look in vain for alum or muriate of iron in the waters referred to.

Thus from the discovery of various important springs, and the changes in others, with the general improvements which have taken place, it can in no respect be now considered as a suitable directory to these waters.

In 1820, Dr. Scudamore published the results of an autumnal excursion of the preceding year, to a considerable number of the most fashionable watering places in England, in which the principal springs at Harrogate are mentioned. That part of the work relating to Harrogate, taking into account the shortness of his visit, amounting only to two or three days, is creditable to Dr. Scudamore both in style and execution. He is too well aware of "the almost endless details of chemical analysis," to consider his labours at Harrogate as equal to the object intended by the present publication. Besides these works, all of which might be considered to have been respectable in their day, there has been of late years, a constant succession of small "water doctors," who on their first arrival,

seldom fail to pay their respects to the Old Sulphur Well in the form of a pamphlet analysis. As to hold fast the doctrine of sound words, as well as the results of an accurate analysis, has many advantages, and prevents mistakes, by subtracting a few grains from one material, and adding it to another, they very adroitly contrive to make a distinction without a difference. To such ephemeral productions it is equally unnecessary and unprofitable further to refer. Having thus briefly, and I hope candidly, noticed the labours of others, I now proceed to consider the nature and properties of the different waters.

ANALYSIS.



The mineral springs at Harrogate are now so numerous, and their contents so various, that it becomes necessary to divide them into classes. This arrangement will materially conduce to a clear understanding of their properties, while it enables the physician to order, and the patient to use, that kind of water applicable to the case. The following classes are given more in reference to their present acknowledged importance than with any regard to priority of discovery or use. They are naturally divided into four:

Class I. Springs impregnated with sulphuretted hydrogen gas and saline matter.

II. Saline chalybeate springs.

III. Pure chalybeate springs.

IV. Springs containing earthy salts, with little iron and no sulphuretted hydrogen gas.

To render this classification fully understood, it may be proper to observe that as water is the most

universal solvent with which we are acquainted, it is never in its natural state found absolutely pure * In class 1st and 4th, therefore, the term saline matter means that the water holds a larger portion than usual of saline or earthy salts in solution, while pure chalybeate in class 2nd, implies a large proportion of iron, with a comparatively small quantity of other foreign ingredients.

Of the eighteen different springs, the particular analysis of which is here given.

To Class I, Springs impregnated with sulphuretted hydrogen gas and saline matter, belong

Old Sulphur Well.
Thackwray's Garden Spring.
Crescent New Spring.
Starbeck, or Knaresborough Sulphur Spring.
Hospital Well, with the four sulphuretted springs immediately adjoining the Old Sulphur Well.

To Class II, Saline chalybeate springs.

Oddy's Saline Chalybeate or Cheltenham.

To Class III, Pure chalybeate springs.

Oddy's Chalybeate.
Old Spa.

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* The Malvern Holy Well, and the Ilkley Fountain, in Wharfdale are considered two of the purest natural springs in England : yet from Dr. Wall's Analysis of the former, and my own experiments upon the latter, they contain nearly one grain of saline matter in a pint of water.

Tewit Well.

St. George's Well.

Starbeck Chalybeate.

To Class IV, Springs containing earthy salts, with little iron, and no sulphuretted hydrogen gas.

Crescent Old Well.

Crescent Hotel Saline Spring.

Knaresborough Dropping Well.

So abundant are the mineral impregnations in this neighbourhood, that a considerable addition might be made to this ample list. During the analysis upwards of thirty springs were examined, all belonging to one or other of these four classes, particularly to the first and third. None of these however, were equal in strength to the first and second of the first class; or while these remain, are ever likely to be much used internally. Some again from situation, a loss, or supposed loss of their mineral impregnations, others from a more accurate knowledge of their contents, have long fallen into disuse. Of these a fifth class might be formed devoid of any scientific arrangement.

The same causes which rendered a classification of the different waters necessary, led to a condensed though it is hoped, sufficiently explicit plan of showing the analysis. The experiments on the water of the Old Sulphur Well are given in detail,

and as the same processes were regularly repeated upon the waters of the other springs, the results have been brought together in a tabular form.

The analysis was conducted with the greatest care; the experiments with the different tests in Table I, were performed at the wells; the gaseous contents were obtained at Harrogate. Where the results differed materially from those stated by former writers, or where substances were enumerated which we were unable to detect, the processes were several times repeated. The temperature of the air was 63°, at the time when that of the respective wells, as detailed in the table, was observed.

Old Sulphur Well.—This water is pefectly transparent, colourless, and very sparkling. To the palate, it always gives a sensation of cold; as it issues from the spring, the temperature is about 49°, but it of course approaches to that of the atmosphere on standing.

The smell is powerfully sulphurous, the taste sulphuretted and strongly saline—a mixture of flavours however to which the palate soon becomes accustomed, and which even appear to reconcile each other. The water on standing loses its smell, becomes turbid, and deposits a white sediment When boiled in an earthern vessel it entirely loses its smell, and the surface is covered with white

crystals. It discolours and corrodes metallic vessels. Silver is speedily tarnished by exposure to the sulphuretted hydrogen gas exhaled from the water, and paints containing lead, assume by degrees, a uniform slaty hue. The specific gravity is 10110 at 60°, barometer 30 inches.

The water produces, with nitrate of silver, an abundant dense precipitate of a brown colour, and the surface is covered with an iridescent pellicle. This precipitate is only partially soluble in ammonia. After boiling, the water yields with nitrate of silver, a white precipitate, insoluble in nitric or acetic acid, but perfectly soluble in ammonia.

The salts of barytes produce no effect, even after long standing, in closed vessels; I therefore consider the absence of sulphuric acid in the water as proved. In the salt obtained by evaporation, a variable quantity of sulphuric acid may be detected.

Litmus paper is reddened by the recent water; by standing, however, the blue colour of litmus, previously reddened by an acid, is restored.

Lime water is rendered turbid by mixture with the recent water.

Acetate of lead yields with the water, before boiling, a very copious brown precipitate; after boiling or long exposure, a white precipitate, soluble in acetic acid.

Carbonate of lead becomes black, when diffused through the recent water.

Tincture of soap is readily curdled.

Oxalate of ammonia produces an abundunt precipitate.

Carbonate of ammonia produces a precipitate: when this has subsided, a further precipitate takes place on the addition of phosphate of soda.

No change ensues on the addition of tincture of galls or ferrocyanate of potash.

Chloride of platina produces no precipitate in the water, however concentrated.

By these tests, it is shown, that the water contains chlorine, in combination with the bases of lime, magnesia and soda; no sulphuric acid, no iron. Also, sulphuretted hydrogen and carbonic acid gases.

Various other tests were employed to confirm, or more closely to examine, the inferences drawn from the effects on those just enumerated, but in general these were found to be fully sufficient for ascertaining the *nature* of the substances contained in each water.

The following is a table of the appearances presented with each test by the different waters.

TABLE I.—ACTION OF TESTS.

Names.	Temperature.	Specific Gravity.	Nitrate of Silver.	Litmus.
CLASS I.				
Old Sulphur Well	60	10110	abundant clotted precipitate, of a brown colour	reddened
Thackwray's Pump ..	58	10105	abundant clotted precipitate, of a brown colour	slightly reddened
Crescent New Pump	59	10051	great precipitate	no change
Starbeck Sulphur	57	10026	precipitate	no change
Hospital Well	58	10039	precipitate	scarcely changed
CLASS II.				
Saline Chalybeate	59	10076	dense precipitate	reddened
CLASS III.				
Williams' Pure Chalybeate	58	10007	precipitate	partially reddened
Old Spa	56	10003	slight precipitate, redissolved by acetic acid	reddened
Tewit Well	56	10003	very slight precipitate, wholly redissolved ..	reddened [dened
St George's Well	59	10005	slight precipitate, partially redissolved ..	very slightly red-
Starbeck Chalybeate..	57	10005	precipitate	scarcely changed
CLASS IV.				
Crescent Old Well ..	59	10033	great precipitate	slightly reddened
Crescent hotel Saline Spring	58	10094	great precipitate	no change
Dropping Well	55	10032	precipitate, almost dissolved by acetic acid	no change

TABLE I.—ACTION OF TESTS CONTINUED.

Names.	Reddened Litmus.	Lime Water.	Acetate of Lead.
CLASS I.			
Old Sulphur Well	blue colour restored	cloud ..	deep brown precipitate
Thackwray's Pump ..	blue colour restored	considerable cloud	deep brown precipitate
Crescent New Pump ..	blue colour restored	very slight cloud	brown precipitate
Starbeck Sulphur	blue colour restored	slight cloud	light brown precipitate, redissolved by acetic
Hospital Well	blue colour restored	cloud ..	light brown precipitate [acid
CLASS II.			
Saline Chalybeate	blue colour restored	green and opaque	white precipitate, redissolved by acetic acid
CLASS III.			
Williams' Pure Chalybeate	colour not changed	light brown cloud	cloud soluble in acetic acid
Old Spa	colour not changed	very slight cloud	light precipitate, redissolved
Tewit Well	blue colour restored	ditto, tinged green	precipitate, redissolved
St. George's Well	blue slowly restored	slight cloud	precipitate, redissolved
Starbeck Chalybeate ..	colour not changed	no change	considerable precipitate, redissolved
CLASS IV.			
Crescent Old Well ..	blue colour restored	very slight cloud	considerable white precipitate, redissolved
Crescent hotel Saline Spring	blue colour restored	cloud ..	copious precipitate, redissolved by acetic acid
Dropping Well	blue quickly restored	cloud ..	abundant precipitate only partially soluble

TABLE I.—ACTION OF TESTS CONTINUED.

Names.	Tincture of Soap.	Oxalate of Ammonia.	Carbonate of Ammonia.	Phosphate of Soda.	Tincture of Galls.
CLASS I.					
Old Sulphur Well	abundant curd	abundant precipitate	precipitate	immediate precipitate	no change
Thackwray's Pump ..	abundant curd	abundant precipitate	precipitate	immediate precipitate	no change
Crescent New Spring	curd ..	precipitate ..	no change	precipitate	no change
Starbeck Sulphur	abundant curd	precipitate ..	no change	precipitate ..	no change
Hospital Well	abundant curd	precipitate ..	no change	precipitate ..	no change
CLASS II.					
Saline Chalybeate	abundant curd	abundant precipitate	precipitate	cloud ..	deep purple
CLASS III.					
Williams' Pure Chalybeate	slight opacity	clond ..	no change	cloud on standing	deep brown
Old Spa	opalscence	slight precipitate	no change	no change ..	purple
Tewit Well	opacity	precipitate ..	no change	precipitate ..	purple
St. George's Well....	scarcely changed	cloud on standing	no change	no change ..	brown
Starbeck Chalybeate ..	slight opacity	slight precipitate	no change	no change ..	slight brown
CLASS IV.					
Crescent Old Well ..	curd ..	precipitate ..	no change	slight precipitate	very slight brown
Crescent hotel Saline Spring	abundant curd	precipitate ..	no change	precipitate ..	no change
Dropping Well	abundant curd	abundant precipitate	precipitate	precipitate ..	very slight brown

To ascertain the relative proportions of the saline ingredients, one pint, imperial measure, was boiled with subcarbonate of Soda; after subsidence it no longer yielded a precipitate with oxalate of ammonia, or carbonate of ammonia and phosphate of soda.

The precipitate was washed, and redissolved in muriatic acid. Sulphuric acid was then added, and the mixture boiled to dryness, and heated to drive off the excess of acid; the mixed sulphates were digested in a small quantity of water, the solution evaporated to dryness left 6.6 grains of sulphate of magnesia, equivalent to 5.3 grains of chloride of magnesium.

The undissolved portion of sulphate of lime weighed 13.2 grains, equivalent to 10.9 grains of of chloride of calcium.

The saline residuum, after the separation of the lime and magnesia, displayed the negative characters which belong to chloride of sodium.

The crystals separated on boiling, dissolved readily in nitric acid; they furnished a precipitate with oxalate of ammonia, and had the rhomboidal form of carbonate of lime. Their weight was 1.7 grains from a pint. Considered as carbonate of lime, separated from chloride of calcium by sodium, existing in water as bicarbonate of soda; 1.7 grains will represent 2.6 grains of bicarbonate of soda.

To a pint of water boiled to expel the gases, which would confuse the result, nitrate of silver was added until it ceased to produce any effect; the precipitate weighed 313 grains. This indicates 76 grains of chlorine, of which the calcium, equivalent to the sulphate of lime obtained, would combine with 7 grains. The magnesium would saturate 3.96 grains, leaving 65 for soda, indicating of chloride of sodium 108.4 grains.

To separate the gaseous contents of the water, four pints were boiled in a glass retort with slips of platina, until the quantity of gas received ceased to increase.

It was received in a narrow vessel, over a small portion of water, in preference to mercury, on account of the action of sulphuretted hydrogen on that metal.

It measured 17 cubic inches at the temperature of 60°, equal to 34 inches per gallon. A tube, graduated into hundredths of a cubic inch, was filled with and transferred to a bottle containing carbonate of lead, diffused in a small quantity of water; on agitation an absorption took place, amounting to .46 of a cubic inch, or 15.64 inches, from the gases contained in a gallon.

The residual gas was treated in the same manner with liquid potash; the absorption was 8 per

cent of the originally operated on, or 2.72 cubic inches from the gases in a gallon.

The method of gaseous analysis by absorption, is decidedly superior to the formation of precipitates; some sources of error are common to both; but the quantity of precipitate from the gas yielded by a moderate quantity of water, is so minute, that very small errors, during the several processes of formation, collection, washing, drying, and weighing, have a material influence on the quantity of gas denoted by the final result. A loss or increase of one-hundredth of a grain on the carbonate of lime, produced in operating on a pint and a half of water, would give rise to an error of one cubic inch in the calculation for a gallon. The eudeometrical method, which was pursued, is short, easy, and susceptible of great precision; an error in the carbonic acid of two whole divisions of the tube, would scarcely effect by half a cubic inch the quantity in a gallon.

The proportion of gas, 46 per cent, which was not absorbed by carbonate of lead or by potash, was mixed with twice its bulk of oxygen, and exploded by the electric spark. On agitation with potash after the explosion 60 measures were absorbed; one third of this dimunition was carburetted hydrogen gas; viz. 20 per cent, or 6.8 cubic

inches per gallon. The residual gas, 26 per cent, was added to a mixture of oxygen gas, with more than twice its bulk of hydrogen; the dimunition after explosion was exactly three times the oxygen introduced, shewing the total absence of oxygen in the gases from the water. This portion of gas, 26 per cent, or 8.84 cubic inches per gallon may be considered as azote.

By calculation, from these data, the water of the OLD WELL is found to contain in an imperial gallon:

Sulphuretted Hydrogen	15.64 cubic inches
Carbonic Acid	2.72
Carburetted Hydrogen	6.8
Azote	8.84

Which are given out in the gaseous form on boiling:

Chlorine....	608 grs., eqvivalent to	Muriatic Acid	625 grs.
Sodium	346.6	Soda.....	462
Calcium....	28.8	Lime	40 3
Magnesium	10.	Magnesia ...	16.7
Carbonic Acid	12.		

Existing in the water as,

Chloride of Sodium	867 2 grains
Chloride of Calcium	87.2
Chloride of Magnesium ..	42.4
Bicarbonate of Soda	20.

The same processes were followed with the other waters, characterized by the presence of sulphuretted hydrogen. Sulphuric acid, when indicated

in a specimen before boiling, was separated by chloride of barium.

To ascertain the quantity of iron in the waters containing it, a given quantity was evaporated to dryness, the residuum dissolved in muriatic acid, and the oxide of iron precipitated by ammonia, dried and weighed.

Since the publication of the first edition of this work, the attention of chemists has been called by Dr. Daubeny and Mr. Murray to the existence of Iodine and Bromine in springs containing common salt; the experiments on some of these waters, have therefore been repeated, with a view to the discovery of these substances. The following is the plan which was pursued, and found most successful in their detection. Evaporate several pints until only a moist salt remains, wash this with a few drachms of distilled water, and filter; to the filtered liquor add a few drops of solution of starch, and pour over the mixture a solution of chlorine. A blue line appears at the junction of the liquids, when, by cautious addition of chlorine, and mixing well, the colour extends through the whole. Too much chlorine destroys the blue colour, and sulphuric acid with starch fails entirely in evolving it. The presence of bromine is shewn by a yellow tinge above the line of blue. If before adding the

starch, chlorine gas is passed through the concentrated water, starch produces no blue colour, but a deep yellow, from the bromine present. These appearances and disappearances of the characteristics of Iodine and Bromine arise from the complicated mixture of other substances, and from the small proportion of iodine and bromine present, too minute indeed to be very accurately estimated; but probably, not amounting to more than a grain of either in several gallons. The existence in the Harrogate Water of these newly discovered, and comparatively rare, substances is a curious chemical fact; nor can any future analysis pretend to accuracy which does not notice them.

In a medical point of view, the discovery of these substances is important. Iodine is a powerful medicinal agent. May not its presence in these waters extend our knowledge of their therapeutic effects in many of those diseases in which they have been found so singularly efficacious?

The following tables shew the results:—

TABLE II.—Saline contents, in grains, of an imperial gallon of the water of each of the sulphuretted springs of Harrogate and its Vicinity.

CLASS I.

Water of	Chloride of Sodium.	Sulphate of Soda.	Chloride of Calcium.	Chloride of Magnesium.	Bicarbonate of Soda.	Solid Contents on Evaporation.
Old Sulphur Well	867.	....	87.	42.5	20.	1016
Thackwray's Pump	802.	....	77.5	38 6	28.	960
Crescent New Pump	462.	14.	47 2	21.8	11.	556
Starbeck Sulphur Spring	122.	2.5	10.	8.25	3.	146
Hospital Well.....	329.	6.	27.6	16.8	3.	384

Gases separated from a gallon of the water of each of the same springs.

Water of	Sulphuretted Hydrogen		Carbonic Acid.		Carburetted Hydrogen.		Azote.		Total.
	per gal.	per cent.	per gal.	per cent.	per gal.	per cent.	per gal.	per cent.	
Old Sulphur Well	15.6	46	2.72	8	6.8	20	8.84	26	34
Thackwray's Pump	21.6	60	4.32	12	5.76	16	4.32	12	36
Crescent New Pump ..	5.75	24	3.35	14	4.8	20	10.1	52	24
Starbeck Sulphur Spring	5.	20	8.3	33	..	..	11.7	47	25
Hospital Well	4.5	25	5.4	30	..	..	8.1	45	18

TABLE III.—Saline contents in grains, of an imperial gallon of the water of each of the four sulphuretted springs adjoining the Old Well, marked in the plan of these springs No. 2, 3, 4, 5. The Old Well being No. 1.

CLASS I. Water of	Specific Gravity.	Chloride of Sodium.	Chloride of Calcium.	Chloride of Magnesium.	Sulphate of Soda.	Bicarbonate of Soda.	Total.
No. 2	1009	576	38	16	11	4	648
3	1011	852	83	43	2	14	994
4	1009	737	69	40	16	9	871
5*	1009	754	46	23	0	10	833

Gases separated from a gallon of the water of each of the same springs.

IN CUBIC INCHES.

Water of	Sulphuretted Hydrogen.	Carbonic Acid.	Carburetted Hydrogen.	Nitrogen.	Total Cubic Inches.
No. 2	6	$3\frac{1}{2}$	3	$11\frac{1}{2}$	24
3	7	6	0	12	25
4	3	6	0	14	23
5	$9\frac{1}{2}$	$5\frac{1}{4}$	0	$13\frac{3}{4}$	$28\frac{1}{2}$

* No 5, This is the spring on the late Mr Thackwray's property, which, on being opened by him, gave rise to proceedings in the Court of Chancery, and subsequently to the important arrangement at the Spring Assizes, at York, 1837.

TABLE IV.—Contents of an imperial gallon of the Chalybeate Waters of Harrogate and its Vicinity.

Water of	Oxide of Iron.	Chloride of Sodium.	Sulphate of Soda.	Chloride of Calcium.	Chloride of Magnesium.	Solid Contents on Evaporation.
CLASS II.						
Saline Chalybeate	5.3	576,5	..	43.5	9.65	636
CLASS III						
Williams' Pure Chalybeate	1 8	5.	3.5	6.	4.	21
Old Spa	2.5	remainder carbonate of lime				10
Tewit Well	2.	..... earthy salts				10
St. George's Well	1.	..... earthy salts				10
Starbeck Chalybeate	0.75	..... chiefly chloride of Sodium				18

TABLE V.—Saline Contents of the following Springs.

Water of	Chloride of Sodium	Sulphate of Soda.	Carbonate of Soda.	Chloride of Calcium	Chloride of Magnesium	Sulphate of Lime.	Sulphate of Magnesia	Carbonate of Lime.	Solid Contents on Evaporation.
CLASS IV.									
Crescent Old Well ..	107	27.	..	10.1	7.4	..	..	4.	156
Crescent Hotel Saline Spring	610	..	53.	44.5	44.5	..	..	..	722
Dropping Well	....	..	6.	..	..	132	11	23.	172

TABLE VI.—Gases yielded by each of those waters which do not contain Sulphuretted Hydrogen:

Water of	Carbouic Acid Gas.		Azote.		Oxygen.		Total.
	per imp.gal. cubic in.	per cent,	per imp. gal. cubic in.	per cent.	per imp. gal.	per cent.	
CLASS II.							
Saline Chalybeate	5¾	43	7¾	57	..	..	13½
CLASS III.							
Williams' Pure Chalybeate	5	36	8	57	1	7	14
Old Spa	5¼	45	6	51	¼	4	11¾
Tewit Well	5	43	5¾	50	¾	7	11¼
St. George's Well	5¼	45	5½	47	1	8	11¾
Starbeck Chalybeate	3	25	8	67	1	8	12
CLASS IV.							
Crescent Old Well	6	43	8	57	..	..	14
Crescent Hotel Saline Springs	6	43	8	57	..	..	14
Dropping Well	7	44	8	50	1	6	16

SULPHURETTED SPRINGS.

CLASS I.

SULPHURETTED SPRINGS.—These, together with several other springs of inferior importance, are, with the exception of the Starbeck Spa, all situated at Low Harrogate. Though more recently discovered than the Tewit Well, some of them were known in Dr. Dean's time, who thus alludes to their use and effects:—"The common people drink them, and they expel reef and fellon; they soon help and cure, by washing and bathing, itch, scab, morphew, tetters, ring-worm, and the like." Dr. Stanhope, six years afterwards, while acknowledging their power in the cure of ulcers and sores by washing, adds, "what are its inward uses we know not yet." Dr. French states, "the use of this water is either inward or outward;" he confirms its value in the cases mentioned by his predecessors, and adds that "it killeth worms infallibly." Many years, however, elapsed before this

the most important class of mineral waters in the kingdom, or perhaps in Europe came into general use, and it is curious to remark how cursorily they are passed over by these, and even more recent authors, who exert themselves to display the virtues and powers of the chalybeate springs. Dr. Short, in his account of the sulphur wells, chiefly relies upon the documents furnished by Dr. Neal. He observes, "this place and the forest were formerly so thick of wood, that he was thought a cunning fellow that could readily find out these spas, though there is now not one tree out of the park;" the latter part of the remark is too faithfully verified at the present day. The following statement by Dr. Neal deserves attention, first, as shewing the early state of these wells, and, again, because it proves that instead of failing in quantity or strength, as has been supposed by some, the quantity has become much more abundant; while, from the earliest analysis in which the weight of salt can be depended upon, their strength has continued unimpaired, or, rather, as I shall presently shew, from the personal observation of nearly twenty years, it has considerably increased. "Here are, and were, about twenty years ago, three springs close together, very low and scarce of water, that all of them did

not afford sufficient water for drinking and bathing. Wherefore, for the greater convenience of the drinkers, I thought it convenient to take up the uppermost spring, which is weakest and slowest of them, and made a large bason to contain several hogsheads of water, and covered it with a large stone, to preserve it from the sun and rain-water; and for a week together we rammed its sides with clay, to prevent other springs from getting in. The event answered expectation, for we had a fresh spring of much better and stronger water, which afforded as much in one hour now, as it did in twenty-four before, more loaded with the minerals than ever, and so of greater efficacy for either bathing or drinking." This was the following:—

No. 1. The Old Sulphur, or Drinking Well, which issues from the base of a considerable ascent, inclining to the south-west; and is encircled with rising grounds which are now partially and very irregularly covered with buildings in 1842, a splendid building in the gothic style of architecture was placed over this spring; it was previously covered with a large leaden dome, supported by pillars. Great improvements have also lately been made by the taking down of several old buildings and shops opposite the Crown

Hotel, and making a considerably wider carriage road to the entrance of this pump-room. The water of this well being undoubtedly the strongest hitherto discovered, has always been, and still continues to be, principally used by those taking the sulphur water. On referring to the various analyses, from the time of Dr. Dean to the present, the solid contents shew an uniformity which could scarcely be calculated upon: it would be no less irksome than unnecessary to recapitulate all these; the following, however, made within my own knowledge by Mr. West, or with his assistance, may be satisfactory, as shewing rather an increase than diminution of saline ingredients.

The Old Sulphur Well, in 1823, gave, in an imperial gallon, 1031 grains of solid contents; in 1830, 1016 grains; in 1835, 1066 grains.

The exact quantity of water which this spring is capable of yielding in a given time, has never yet been ascertained; but there is no well-founded reason for believing that it has ever materially varied.

Many have been the theories, both ancient and modern, on the impregnation of this and similar springs with mineral substances, and it must be confessed, that the speculations of the ancients are much more amusing, and little less satisfactory,

than the inductive attempts of some of the most recent chemists. There is no difficulty in regard to chalybeate waters, which are generally found in the same locality with ironstone. The principles, too, by which modern philosophy has established, in a satisfactory manner, the saltness of the ocean, and even accounted for its variation in different degrees of latitude, and on different coasts, may serve to explain the saline impregnations of inland springs; but a difficulty exists in regard to the formation of sulphuretted hydrogen gas, with or without salts, which has yet be removed. When treating of the water under consideration, Dr. Scudamore evidently declines grappling with the subject, and is contented on this point, in which real information was so desirable, and from this quarter might have been expected, to get rid of the question by the following singularly inconclusive and incorrect paragraph: "The mode in which the formation of sulphuretted hydrogen gas takes place, is a problem in the internal chemistry of the earth, which I cannot hope to solve. There are coal pits in the neighbourhood of Harrogate, and the probability may be suggested that the gas may be produced in the coal strata, as we know that it is formed during the making of coal gas. Water thus impregnated, may afterwards traverse

beds of salt, and then rise to the surface of the earth."

> "You *may* call spirits from the vasty deep;
> But will they come when you do call for them?"

"Dr. Garnett (continues Dr. Scudamore) supposes that the gas may be formed from the decomposition of pyrites or sulphuret of iron. He also suggests as a probable explanation, that the decomposition of vegetable matter furnishes hydrogen gas, and that this gas acts as a solvent to the sulphur. It does not happen that all bogs produce sulphuretted hydrogen gas. Might we not expect its more frequent occurrence, if the explanation could be referred to the decomposition of vegetable matter?"

To no one statement in the above quotation can I subscribe. While cherishing the hope that the rapid advance of geological and chemical science will enable us, at no distant period, to solve this problem, I am desirous, in the meantime, to direct the attention of able chemists to the question. There are not, nor ever were, coal pits in the immediate vicinity of these springs. About thirty years ago, indeed, coal pits that had been worked in Bilton Park, not far from the river Nidd, but nearly three miles from the spot now

under consideration, were discontinued; the quality was inferior, and it was used chiefly, if not solely, for burning lime. Whence Dr. Scudamore acquired his information I know not, but had he considered for a moment when coal was first found, or at least used, in England, and then referred to the early writers on these waters, he would have found that all the wood in the forest was destroyed in Queen Elizabeth's time for the iron forges,* which would scarcely have happened had coal either been known or used in the district. There is no coal at present discovered which has been worked to any advantage nearer than Leeds, a distance of fifteen miles. Attempts have repeatedly and very recently been made to obtain this useful mineral in the neighbourhood, particularly in the township of Birstwith, about five miles from Harrogate. These workings were discontinued, owing to the quantity of water and the numerous faults in the strata. Similar trials have been made at Spofforth, a distance of four miles, but with the same inconclusive results, the bed being too thin to repay working. The probability, therefore, suggested by Dr. Scudamore, that the gas may be produced in the coal strata, cannot for a moment be maintained. Where coal

* Short on Mineral Waters, page 286.

even to exist,* the same reasoning which he employs against the hypothesis of Dr. Garnett, that if this gas were produced by the decomposition of vegetable matter, it would be more generally found in similar situations, is equally applicable and correct in regard to coal, as there are many large coal fields where no sulphuretted hydrogen springs have been found. From the natural appearances, the decomposition of sulphuret of iron is, therefore, the most probable hypothesis yet advanced.

In reflecting, however, upon this subject, in connection with the analysis, I am almost convinced that the sulphuretted springs acquire their impregnation in passing through the thick stratum

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* To satisfy the burning desire for coal, which the inhabitants in this district not unnaturally evince, at all events to justify my own doubts on this point, I replace the following note that appeared in the First Edition of this Treatise; which note, not wishing to hurt the feelings of well-intentioned individuals (their pockets having smarted,) I suppressed in later Editions, in the spring of 1830, one of the Company writes thus:—"Birstwith, near Ripley. The Company have not the least doubt of finding coal to a very great extent. They have already sunk an Engine shaft thirty-five yards, and expect at forty-five yards to find coal, and very good. The Engine is nearly twenty-horse power."

As there is now only ten yards of earth between these fair expectations and the removal of all doubts, I may, perhaps, have an opportunity of noticing the result before these sheets go through the press. Long chimnies and coal generally rise together; those, therefore, who admire the former as ornamental features in the landscape, may wish the company success: sufficient for me that the geology of the district points to a conclusion of the affair not dissimilar to the mining operations of that worthy Baronet, Sir Arthur Wardour, and his coadjutor, Dausterswivel, in the Antiquary.

of shale already mentioned. It has been satisfactorily proved by experiment that sulphate of soda, dissolved in water, is decomposed, under some circumstances, by vegetable matter; the water yields oxygen to the carbon of vegetables, forming carbonic acid, part of which, with the soda formerly in a state of sulphate, constitutes carbonate of soda, and the remainder is found in the state of gas. The hydrogen of the same portion of water, and the sulphur from the sulphuric acid, form sulphuretted hydrogen. If we suppose that the carbon of carbonaceous shale performs the same office, it will account for the production of the sulphuretted hydrogen and the carbonic acid gases. And it deserves to be mentioned, in corroboration of this view, that those springs at Harrogate which yield most sulphuretted hydrogen, contain no sulphates, while in those in which, from the absence of that gas, such a process has evidently *not* taken place, the sulphates abound. Indeed, sulphate of soda, except where much sulphuretted hydrogen is present, generally accompanies the muriate or chloride.

The diseases in which this water, and others of the same class, have been found beneficial, will be afterwards enumerated, together with proper directions for their use.

No. 2.—Thackwray's Garden Spring, or Crown Spa, is situated about two hundred yards from the Old Sulphur Well, nearly in a line with it, and in the lowest part of the valley in the garden at the east-end of the Crown Hotel. It was discovered about thirty years ago, and the water was used to supply the baths, until analysed, in 1823, by Mr. West. The result of that analysis, corroborated by the present, proves that it is greatly superior in strength to any other of this class, except the Old Well. Both contain the same ingredients, solid and gaseous; the New Well has the greatest impregnation of the gases, the Old Well contains more salt. Over this valuable spring the late Mr. Thackwray, the proprietor, erected a small but handsome building, in the style of a Chinese Temple, and changed the garden and some surrounding land into pleasure grounds.

Its qualities being so similar to the former, it is almost unnecessary to add that its effects are the same. Being private property, it is protected from those acts of wantonness and mischief, to which, from their exposed situation, it is to be regretted, the other wells are occasionally liable.

No. 3.—Crescent New Pump.—This is in the garden, immediately to the west of the Promenade Room, and about one hundred yards from the Old

Well. I was induced to analyse this spring with great care, from an impression at one time received by tasting the water, that it was almost free from saline contents, and merely impregnated with sulphuretted hydrogen gas; thus resembling the springs at Dinsdale, Croft, Middleton, Askern, and some other places which have acquired considerable reputation from this impregnation alone. The taste which it at that time conveyed, might have been occasioned by over water in the well; yet not only from the taste but the analysis, it is at present much stronger in saline contents than the water at any of the above-mentioned places. It is seldom used internally, but forms an excellent water for baths. Where water, weaker in salt than the two former, and well supplied with the gases, is judged proper, this can with propriety be recommended.

No. 4.—The Knaresborough or Starbeck Spa, though the weakest in mineral contents, is by no means the least important water in this class. It is the only sulphur spring used which is not at, or immediately adjoining, Low Harrogate. At nearly an equal distance from Harrogate and Knaresborough, it is situated in the latter township, about two hundred yards from the road, and close to the beck of the same name. Though

probably the first sulphur spring known and used in the district, being mentioned by Dr. Dean, it appears gradually to have been neglected as the wells at Harrogate increased in celebrity.* Its waning honours, however, were not allowed the melancholy consolation of undisturbed retirement. In a small *brochure* written by its zealous guardian, Mr. Calvert, it is pretty distinctly intimated, that from a species of self-interest or rivalry, almost too petty to be noticed, unless from the effects produced, the ancient covering and stone basin were removed, and the spring itself, if not sown with salt, was at least literally ploughed over, and the water drained into the adjoining rivulet. "The gifts of the Supreme Being are not to be thus perverted (observes Mr. Calvert); in process of time the spring again made its way to the surface, and some individuals, finding it useful

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* There is some doubt whether the following racy passage from old Fuller in his "Worthies of England," published 1662, was intended for this or the Old Sulphur Well—it is in some respects applicable to either. "Not far off, ("the Tewit Well,") is a Sulphur Well which "hath also the qualities of saltness and bitterness; the stench whereof, "though offensive, (patients may hold their nose and take wholesome "physick,) is recompensed by the virtues thereof: inasmuch (as my "author, Dr. French saith) *it heateth and quickneth the stomach, "bowels, liver, spleen, blood, veynes, nerves, and indeed the whole "body, insomuch that it consumes crudities, rectifieth all cold dis- "tempers in all parts of the body, causeth a good digestion, cureth "the dropsy, spleen, scurvy, green-sickness, gout.* And here it is "high time to hold still, for if this last be true, let that disease which "formerly was called *dedecus medicinæ*, be hereafter termed *decus "fontis Knaresburgensis.*"

for their purpose as bathing water, formed a pond for the purpose of leading away the water as occasion required." No sooner was it found useful than the rival townships, or their legal guardians laid claim to its possession. How long or with what weapons it was disputed we need not now enquire. The inclosure act, to which I have alluded, seems to have given the award to Knaresborough, the inhabitants of which ancient and loyal town contented themselves by occasionally staking out the ground; but nothing further was done during forty years, until the spring of 1822, when a grand movement was made, principally, I believe, at the unwearied instigation of Mr. Calvert, by the whole town of Knaresborough in its behalf. A numerous public meeting was held, subscriptions collected, and on the 23d of May, the foundation-stone of the present neat and now permanent fabric was laid with due masonic honours. I have pleasure in recording this united and systematic effort, which has led to the erection of the most complete edifice of the kind in the neighbourhood. A cottage, with shrubberies and garden, kept in excellent repair, hot and cold baths at a moderate price, and a chalybeate spring, to be afterwards noticed, complete the establishment of Knaresborough Spa.

The water was about the same time analysed by Dr. Murray. The result does not materially differ from the present analysis; and from this it is not difficult to collect its general properties. The quantity of water discharged from the font is about one gallon in a minute, affected, in some degree, by long continued rain or drought. Being an exceedingly pure, light water, it remains easy on the stomach, and is certainly less disagreeable to the palate than the stronger sulphur water. Subject to the same changes which all sulphur water shews on standing, it is more suitable to some delicate constitutions, or where there is great irritability, than the more powerful waters of the same kind, and is, therefore, particularly useful for tender females and children. To those who are ordered the sulphur water twice daily, I cannot recommend any thing more likely to prove useful than taking the Old Sulphur water in the morning, and driving to Starbeck for the afternoon's draught. The action being so much milder, it passes off, particularly in the afternoon, by the kidneys, and the system will, therefore, remain much less loaded towards the evening than with an equal quantity of strong sulphur water. Besides, the exercise, to those who are fortunately able to take it, claims no inconsiderable regard.

In cutaneous diseases, from the same cause, washing or bathing with this water forms an excellent remedy. Indeed, were there not so many other more powerful springs in the neighbourhood, this would alone be invaluable, standing as it does at the head of any other sulphuretted springs yet known in the north of England.

No. 5.—The Hospital Well.—This claims considerable attention from several circumstances. It is situated in that piece of moss or bog, from which all the sulphurous springs have been long supposed to derive their source, and is, therefore, connected with that interminable subject, the origin of these springs, which has exercised the ingenuity of each succeeding writer on the subject. It likewise, with several other springs, adjoins and supplies the hospital, which is built upon the edge of the bog. This piece of moss, about two acres in extent, forms the *corrie* to several small rivulets of water, which join here, and for about five hundred yards run down a narrow, and, in some places, deep ravine, and pass near to the Old Well. In the water of the ravine, however, there are no traces of mineral or sulphurous impregnation; and as the moss is nearly triangular, and surrounded with an irregular ditch, of which the upper extremity may be said to form the base

of the triangle, the water of the ravine does not come in contact with the several stagnant pools of both sulphurous and chalybeate water with which the moss abounds.

If, then, the sulphurous springs now in use derive their origin from this moss, the water must sink in those different ponds where it has previously risen to the surface, and permeate the subjacent strata much deeper than the channel of the ravine, and again rise at the Old Well and the other places where we now find it. To a common observer of the moss, nothing appears so easy and self-evident as that the water should gradually collect and traverse the ravine in open day, and so form the low wells. It must be confessed, too, that the bog exhibits a formidable appearance in support of this opinion; to nothing, particularly a few years ago, could it be better compared than to a great laboratory or brewing apparatus of nature, where mixture, decomposition, and fermentation, seem to be constantly at work in the preparation of these waters. With all this array of natural appearances, however, and the most self-satisfied and dogmatic statements of my predecessors, and the firmest conviction of the inhabitants themselves, that *the moss is the mother of the waters;* I am compelled, from careful ex-

amination, to come to a different conclusion, that if the moss were swept away, the mineral qualities of the water would not be deteriorated.

From Dr. Dean to Dr. Scudamore, the same unvaried idea is handed down, and latterly, in nearly the same language. Dr. Walker (p. 83) says, "The four sulphurous springs appear to take their rise from a large bog, situated about four or five hundred yards from the wells. This bog consists of a dark-coloured thick fœtid water, and is encompassed on all sides by small dry hills, composed of calcareous earth, pyrites, &c., so that, as Dr. Short observes, no other springs can get into it; and from it there is but one outlet by which the water can discharge itself. From thence it runs softly along an easy gravelly descent, till it is lost and swallowed up under a hedge, at the head of some enclosed fields. From this place the water seems to be filtered under ground, for the space of four or five hundred yards, and then springs up again perfectly transparent in the valley below."

Dr. Garnett, using almost the very words, observes, "The four sulphur springs at the village evidently take their rise from the bog, which is three or four hundred yards above them; from thence the water seems to be filtered under

ground between strata of shale, and springs up perfectly transparent. This bog has been formed by the rotting of wood, which is every where distinguishable on digging, is, in many places, four or five feet in thickness, having a stratum of clay and gravel every where under it." Dr. Scudamore's words are, " The bog may be stated to consist of the remains of decayed vegetable matter, forming a black, fœtid, half-fluid mass, in many places four or five feet in thickness, which every where rests on a bed of clay and gravel. From hence the water appears to pass under ground through strata of shale; and having undergone a natural filtration in its passage, it rises perfectly transparent to the surface." Dr Walker may have been at the moss, though, from his quoting Dr. Short in what is evidently incorrect, it is much to be doubted. Dr. Garnett had seen and examined it; but his great object was to prove the formation of the sulphuretted hydrogen gas from this decayed vegetable matter; the practice, therefore, of taking for granted what is wished for, had probably caused him to overlook the natural appearances presented; while I am convinced Dr. Scudamore would not have written the preceding quotation if he had seen or surveyed the moss with any attention. The Bishop

of Llandaff says, "I ordered a well to be dug in the forementioned bog, sixteen yards to the south of the Sulphur Well, which is near the rails, and to the same depth with it; the water with which it was presently filled was chalybeate, but in no degree sulphurous. I had another well dug at about thirty yards distance from the three sulphur wells, which are situated at the lower extremity of the bog. This well, by the declivity of the ground, was ten or twelve feet below the level, but its water was not so sulphurous." Yet, with these facts of his own procuring, which go far to settle the question, he gives a partial assent to a communication between the springs at the moss and those of the Old Sulphur Well, from some ill-authenticated statements of Dr. Short.

My limits do not permit me to enter more at large upon this subject. It was one, however, of the principal objections urged at the time against the erection of the Hospital on its present site, which consequently directed my particular attention to the question; and if by the impartial consideration now given to it, I shall succeed in removing every prejudice on the part of those who may render the Charity essential service, my time will not have been bestowed in vain.

I consider the mineral springs found in the

moss to rise in the same manner as those at the village; this is favoured by the relative position of both situations; that from rising in a soft marshy spot the water becomes more diffused, and the different mineral springs, sulphurous as well as chalybeate, mixing with each other and the over water, occasion that inky appearance which is observed. Drains have likewise of late been cut through the bog, which has thus been rendered much drier, and deprived of its apparent decomposing properties; while the escape of the gases from the open wells is common to these, with all other water of a similar character wherever situated. As for the filtration and transparency so much insisted upon, the water of the spring now under consideration, and of these in the moss, when kept free from mixture, is as clear and pure as any at the old wells. The analysis, too, affords another direct proof. This water being weaker than the Old Well, it is evident that, were those waters the same, the Old Well must acquire nearly one-half more strength in salts between the bog and the spot where it now rises. The water likewise at the moss is carted in large quantities to supply the baths. In some instances in summer, the different wells are quite emptied; yet this loss at no time affects the springs at the village.

That such would be the case has often been surmised, and the water has accordingly been taken from these springs with greater caution. Prejudices, surmises, and fears, ought not, however, to stand in competition with long-experienced facts, supported by reason, illustrated by the analysis, and confirmed by the stratification and a careful examination of the ground.

I shall conclude these inquiries with the following beautiful passage from the distinguished author last referred to, which will, I hope, with the candid reader, be my apology for the space I have occupied upon the origin and impregnation of these waters :—

"Whether nature uses any of the methods which I have mentioned of producing the air by which sulphurous waters are impregnated may be much questioned; it is of use, however, to record the experiments by which her productions may be imitated; for though the line of human understanding will never fathom the depths of divine wisdom, displayed in the formation of this little globe which we inhabit; yet the impulse of attempting an investigation of the works of God is irresistible: and every physical truth which we discover,—every little approach which we make

towards a comprehension of the mode of His operation, gives to a mind of any piety, the most pure and sublime satisfaction."

CLASS I. Continued.

Table III.

No. 2. Though the situation of this and two other of the succeeding Sulphur Springs have been long known and described, no modern analysis of them has hitherto been given. Dr. Short, in 1734, states the locality of this and the following one, No. 3, with great accuracy :—

" A yard east of this (No. 1, Old Well,) is the second; and five yards and a half east of this rises up the third."

From his remarks, in comparison with the present state of these wells, I ascertain the following not unimportant points :—

1. He states, " Neither rain nor drought increases or decreases their springs."

2. The relative proportion of solid contents remains the same.

3. The actual quantity of water which rises in these springs, according to the nearest approximation which can be made, continues undiminished.

This spring, though within a yard of the old well, is little more than half the strength—but the most singular peculiarity, as showing their distinct source or impregnation, is, that this contains a portion of sulphate of soda, which the old well does not. Being so much weaker than the others, it was seldom used at any time.

No 3. Is situated about five yards from the former, and is much stronger, containing 994 grains of solid contents in the imperial gallon. In it likewise is found a minute portion of sulphate of soda. The quantity of water which rises in this well is very considerable, and being of a good quality, and like the others at this spot, public property, is extensively used for baths, and is also bottled to a great extent, and sent all over the kingdom.

No. 4. Situate about three yards from the latter, is the well referred to by Bishop Watson, of which (page 26) I have already given some account, as having been discovered by the pretended search for coal, by which the inhabitants were mulcted £100 by the crafty experimenter. This, like the former, is a valuable water, and is used for the

same purposes. As is shown by the table of analyses, it contains 871 grains of solid contents, and a larger portion of sulphate of soda than the preceding well.

No. 5. This spring, though only known to the public within the last five years, has already obtained great notoriety, and has occasioned more altercation and expense, not in physic, but in law, than all the other mineral waters at Harrogate since their discovery. Its medicinal powers yet remain to be tried. From the accurate analysis made in the winter of 1835, Table III, page 48, it differs in no respect from the three preceding wells, unless in not containing any sulphate of soda. The solid contents in an imperial gallon are 833 grains. It is situate in a house the property of the late Mr. Thackwray, in nearly a direct line with the old well No. 1, and distant from it 82 feet. The distance from No. 5, and 4, is 54 feet. I cannot with propriety in this section attempt to introduce the shortest possible sketch of the voluminous proceedings which led to a decision, in His late Majesty's Court of King's Bench, respecting this well.

It is now only necessary to compare the contents of these springs with those of other places, to shew their superiority over every water of the

same class in Great Britain. For this purpose I subjoin the following account, taken from the most recent analyses which are at present in my possession. The results are calculated from an imperial gallon of the respective waters. The Harrogate Old Sulphur Well contains 34 cubic inches of the gases, and 1016 grains of alkaline and earthy salts. In the water of Moffat, Dr. Thompson states* the gases at 21 inches, the salts at 210 grains. In the same paper this eminent chemist likewise gives the analysis of Strathpeffer water, which contains 14 inches of the gases, and 138 grains of salts. In a pamphlet, of no small pretensions, published by Dr. Peacock, on the Dinsdale Spring, in 1829, Dr. A. Fyfe, who furnished the analysis, found 16 inches of gaseous contents, and of saline matter 192 grains. The water of Askern, as analysed by T. La Gay Brewerton, Esq., in 1818, who published an able treatise on this subject, is stated to contain of gases 16 inches, salts 139 grains. Dr. W. Reid Clanny, of Sunderland, published, in 1816, an interesting account of Gilsland, in Cumberland, and its sulphuretted spring, which contains nearly 28 inches of gaseous contents, and 34 grains of solid residuum.

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* Glasgow Medical Journal, Vol I., No 2, 1828.

From these it will be observed that besides these sulphurous springs in the north of England, there are two of considerable notoriety in Scotland; Moffat, in Dumfrieshire, and Strathpeffer, in Rossshire, situated almost at the two extremities of that part of the kingdom. The former has long been considered the Harrogate of the north, while the latter has of late years been much resorted to by the native population beyond the Grampians.

A laudable desire of increasing the number of sulphuretted springs, has for some years actuated the inhabitants of Harrogate, principally in reference to obtaining a more ample supply for the baths. Their labours have in several instances been crowned with success; and it is satisfactory to know that at no former period was the supply for this purpose so ample, although the demand has of late very greatly increased.

SALINE CHALYBEATE SPRINGS.

CLASS II.

These are WILLIAMS' (late ODDY'S) SALINE CHALYBEATE or CHELTENHAM SPRING; and were discovered some years ago in the garden of the Crown Hotel near the baths, which is now conveyed into the pump-room of the Sulphuretted Spring. This Saline Chalybeate has not hitherto been mentioned, and from the unavoidable omission of the analysis in the proper place, an account of its contents and properties will be found in the Appendix.

The Royal Promenade and Cheltenham Pump Room, into which the water of the former, as already stated, has been conveyed, is situated in the grounds of the Lodge at Low Harrogate. It has a north-east aspect, and from the Room is obtained a pleasant view of the Lodge and adjoin-

ing grounds, which are now tastefully laid out, and ornamented with a fine sheet of water, gravelled walks, and clumps of trees.

This, together with the Chalybeate Spring immediately adjoining, was discovered in the autumn of 1818, when boring in search of sulphur water to supply the increased demand for the baths. Water was found at the depth of eight yards in the lowest part of the narrow valley, and at a few yards from the fence adjoining the road. The alluvial earth being removed, a layer of clay was found, beneath which was a bed of sand covering a dark bluish stratum of shale, from under which the water issued. A cistern was afterwards prepared for its reception, and when the value of the water became known, a neat Pump Room, now removed, was built, and other suitable improvements effected.

The water, when taken from the spring, is transparent, and has a sparkling appearance when poured from one glass into another; its taste is distinctly chalybeate, and also considerably, yet not unpleasantly saline.

It was the discovery of this spring which first attracted my particular attention to the waters at Harrogate, and in the summer of 1819, I published an account of this and the Chalybeate Well.

Bearing a strong resemblance in its sensible properties to the waters of Cheltenham, I ventured reasoning from analogy, to point out the class of diseases in which it would most probably be found beneficial; the experience of eighteen years, in several thousand cases, has amply confirmed this opinion. The present analysis, compared with the former, shews its saline contents were then underrated, or they have since materially increased. The work of Dr. Scudamore, to which I have alluded, must likewise have tended to extend its reputation. He states, "This water is unquestionably the second in importance among the various springs of which Harrogate has to boast. It appears to be a water possessing an excellent combination of saline ingredients, and of oxide of iron, held in solution by carbonic acid." Agreeing fully in this statement, I confess I am greatly surprised with the deductions drawn from it, in the following passage; "The muriates of lime and magnesia are substances of decided medicinal power, and are combined in the water in sufficient proportion to be allowed the claim of efficacy, while the iron is even in larger proportion than in the Chalybeate Water at Tunbridge Wells. In most instances, however, when desiring the full action of a carbonated chalybeate, I should be disposed to give the

preference to the spring of Tunbridge Wells, on account of its slight impregnation with other ingredients, and its greater consequent capability of acting as a chalybeate medicine. I advise that the patient take this water as a chalybeate, and that he increase the doses according to the degree of tonic and exciting action produced on the stomach and general system, not looking to its aperient effect upon the bowels; for if he proceed with such a view, he would indiscreetly be taking too large a quantity of iron. I repeat, that the principle on which the doses of the water are to be increased is with entire reference to its action as a chalybeate stimulant."

This appears to me a very extraordinary, and from the "I repeat," a very dogmatic assertion. From the shortness of Dr. Scudamore's stay at Harrogate, he could not ascertain its effects. If it is only useful as a chalybeate, and if Tunbridge pure chalybeate is in most instances to be preferred, this, "the second most important spring at Harrogate," would be of little use whatever. It is singular too, that the pure chalybeate of Tunbridge should be preferred, since Harrogate abounds with pure chalybeate springs of precisely the same qualities, though in general stronger than that of Tunbridge, and one of them was at that time

actually within ten yards of the spring now under consideration.*

In my former account of this water, I stated, that from the analysis, it appeared to hold a middle rank between the waters of Leamington Priors and the Saline Chalybeate Wells at Cheltenham, and referred to the analysis of the former by Dr. Lamb, and of the latter by Dr. Jameson. I shall now however, lay before the reader Dr. Scudamore's analysis of these three waters, and that of Tunbridge to which he refers.

In the imperial gallon of Williams' Saline Chalybeate, Harrogate, Dr. Scudamore found,

Of Muriate of Soda	360.48 grains.
Muriate of Lime	26.4
Muriate of Magnesia	11.88
Sulphate of Lime	2.23
Carbonate of Lime	8.04
Carbonate of Magnesia	.96
Oxide of Iron	2.88
Residue, consisting chiefly of Silex	.48
	413.35

* The following note, which I still choose to retain, was inserted in my first account of this spring.—"Let me not be understood as wishing to exalt Harrogate to the detriment of Cheltenham or any other place; for though it is both proper and natural to wish well to the town and neighbourhood in which we live, yet I have no object in view but the elucidation of truth, and a desire that this water should be tried. Like every thing else it will then find its level; if really useful, the public reap the advantage; if otherwise no attempt on my part shall ever be made to rescue it from merited oblivion."

This trial has now been made and with a success which has established the sanative properties of the water upon a basis which can scarcely be less permanent than the continuence of its present contents.

It will be seen by referring to the analysis, inserted at p. 49, that some difference exists between it and the preceding; it is believed, however, that the former will be found most correct.

In the original Spa, or Old Well, at Cheltenham:

Of Muriate of Soda	558.7 grains.
Muriate of Lime	59.6
Muriate of Magnesia	24.4
Sulphate of Soda	139.8
Oxide of Iron, a minute portion	
	782.5

In the Royal Pump Room water at Leamington:

Of Muriate of Soda	516.
Muriate of Lime	275.
Muriate of Magnesia	193.5
Sulphate of Soda	75.5
Oxide of Iron, a trace	
	1060.

In that of Tunbridge:

Common Salt	1.5
Sulphate of Soda	1.768
Chloride of Calcium	1.848
Chloride of Magnesium	0.348
Carbonate of Lime	0.328
Protoxide of Iron	2.748
Manganese, Silica, &c.	0.528
	9.068

In the excellent article on mineral waters, by Dr. Thomas Thomson, in the Cyclopœdia of Practical Medicine, he states, referring to the

above analysis, "It is evident that the only constituent to which Tunbridge Wells owes its activity as a medicine is the carbonate of iron. The other saline constituents exist in such minute quantity that they must be quite insignificant in a medical point of view."

From these results it is evident how much more correct it would have been to have stated the effects of the Saline Chalybeate as similar to these springs, than to have compared it with the pure Chalybeate of Tunbridge. To the caution that any one taking this water is not to look to its aperient effect, lest, if he proceed with such a view, he should indiscreetly be taking too large a quantity of iron, a Physician so conversant with the subject might surely have added, for the guidance of the uninformed, that either by allowing the water to stand exposed to the air for a short time, or by heating it a few degrees, the iron would be precipitated, and the danger, if any existed, of taking too large a quantity of iron, entirely removed.

It is universally admitted by the profession, that aperient medicines are frequently necessary to regulate the constipating effects of pure chalybeate water; and Dr. Scudamore when treating on the Tunbridge water, observes, "The bowels

usually become constipated and require the assistance of medicine ;" and adds, " in many instances it may be found advisable to add 20 or 30 grains of sulphate of magnesia to the water." Such being the case, no possible combination can be formed more suitable for this purpose, than the neutral purging salts which the water contains, and which here, as in the instances of Cheltenham and Leamington, having rendered it so exceedingly useful to the invalid. These remarks are forced upon me by the statements of Dr. Scudamore, which from the comparisons taken from his own work, cannot be considered correct.

It may be taken with proper management either as a tonic, an alterative, or aperient, and therefore becomes more especially useful in a wide range of complaints connected with biliary derangement and atony of the stomach. There are many who, after having taken the sulphur water at Harrogate, are recommended to proceed to Cheltenham, a journey unpleasant to some and inconvenient as well as expensive to others. This step, so far at least as concerns the relative properties of the waters, is evidently unnecessary, and may be entirely superseded by a similar course of this water upon the spot. In the article on mineral waters already referred to, Dr. T.

Thomson thus sums up the comparison between Leamington and Cheltenham :—"It is obvious from this that the waters of Leamington will be useful in the same diseases as are cured or alleviated by Cheltenham waters. The two watering places are so nearly on a par that invalids may repair to each with equal advantage. Convenience or caprice, therefore, may be left to decide the difference between them." Directions for its use, and an enumeration of the diseases in which it has been found most beneficial will be afterwards detailed.

CHALYBEATE SPRINGS.

CLASS III.

This is the most numerous, and was long considered the most important class of mineral waters. There is scarcely a county in England, and no kingdom with which we are acquainted, which does not possess simple chalybeate springs. Iron being the most universal metallic agent in nature, is found mixed in various forms and proportions with almost all unorganized substances, and is intimately combined with living organized bodies. It is acted upon by air, acids, and water, and it is in combination with these that we have now to consider its properties and effects. Chalybeates are remarkably uniform in their qualities: the iron is generally found in the state of protoxide, held in solution by carbonic acid; occasionally however, as at Moffat, it is combined with the sulphuric acid, which dissolves a much larger

quantity of iron than has ever yet been found in combination with the carbonic. Dr. Thomson states, that an imperial gallon of the Moffat Chalybeate contains protosulphate of iron 36.743 grs. The quantity of iron which the carbonated chalybeate springs contain seldom exceeds five grains in a gallon of the water, while in most instances it does not amount to one or two grains; yet from this minute quantity the most astonishing effects are frequently produced by a well regulated course of chalybeate water. It is uniformly stimulant, tonic, and diuretic, and where the carbonic acid exists in considerable quantity, is highly exhilarating. That one-eighth of a grain of carbonate of iron should exert such a sensible influence upon the system is only to be accounted for by its being diffused by a mild acid through a large quantity of water, in which state it is readily taken up by the absorbents, and thus penetrates the most minute vessels of the body, imparting vigour and strength, and improved spirits to its exhausted powers.

The effects of concentration, combination, and dilution in various substances connected with the materia medica are well known to the profession, and become an important study to the successful practitioner. The medical virtues of an ounce can be concentrated into a grain; a simple inert

substance combined with another becomes a virulent poison, while by dilution the action of many others are increased in a tenfold ratio, and should the solvent coincide with the intention of the remedy, its power upon the system is again greatly augmented. It is with such views that the effects of mineral waters, more especially of chalybeates, ought to be considered; for although no difference can be distinguished between a grain of iron obtained from a chalybeate spring, and that procured from any other process, and their action, when given in artificial combination, is the same; yet a very great difference may, and as experience proves, does exist in their relative powers, when the single grain is used in natural combination with the water.

The sensible properties of the chalybeate waters at Harrogate, and wherever I have examined similar springs, or remarked their description by others, are equally uniform with their mineral contents. The appearance of the water when first taken from the well is remarkably clear and bright; there is no perceptible smell; it sparkles gently when poured from one glass into another when at rest air globules slowly separate, and adhere slowly to the sides of the glass; the taste is light, cooling, and refreshing, neither acidulous

nor saline, but distinctly chalybeate, and to some, a little subastringent. After standing a few hours exposed to the air, the Harrogate chalybeates grow turbid, the sides of the vessel becomes covered with minute globules, a brownish iridescent pellicle, like a very thin scum, encrusts the surface, and in twenty-four hours the water loses its chalybeate properties; the same effect is produced when the water is heated.

No. 1.—Williams' Chalybeate Spring, was discovered and analysed at the same time with the Saline Chalybeate in 1819. Its situation has already been referred to as adjoining to the latter. From the greater importance which was attached to the Saline Chalybeate, this spring was never much used, and the flow of water being small, the present proprietor has most unadvisedly covered up the well.

The Analysis which I have allowed to remain, proves that it contains nearly two grains of iron in the gallon, with rather more saline matter than is usually found in pure chalybeate springs.* Being now destroyed, it is unnecessary to add more than that when taken formerly it produced

* In the former analysis of this spring, from an error of the press, 10.50 grains of carbonate of iron were given, instead of 1.5. This I corrected at the time in the copies of the work within my reach.

the same effects as the other chalybeates, though the greatest resort of those using this kind of water, is to

No. 2.—The Old Spa, or Sweet Spa, as it was called by Dr. Michael Stanhope, who discovered it in 1631, situated on the common at High Harrogate, near the Granby Hotel, and adjoining to the Knaresborough road. It was enclosed with a small circular building, erected in 1786, by Alexander Lord Loughborough, who possessed some property in the neighbourhood; this was removed and a very handsome stone building placed over it in 1842.

This well has been for many years the principal chalybeate used at Harrogate, and affords a fair specimen of the general appearances of this class. It has been noticed by all the writers on these waters since Dr. Stanhope, and retained the name of Sweet Spa, from some imaginary difference between it and the Tewit Well, until the light of chemistry dispelled these fancies, by shewing that their ingredients were nearly the same, which might have been known by their sensible properties alone, had not some favorite hypothesis intervened in defiance of taste, appearance, and effects.

The Public, as the following account will shew, is indebted for the preservation of this well to

the pains-taking Dr. Neal, of Leeds, who seems to have assumed a fatherly charge of these springs.* "The Sweet Spa rises very pleasantly, on a fine ascent, for a mile or more of ground, bubbling up with a good stream, enough to suffice thousands of drinkers. I was at the first opening of the ground when the trenches were digged, which was done without due consideration so as to draw from upper grounds all rain water, by digging so deep upon the west and north-west side, that all the spring was drawn away, and the basin empty in an afternoon, when there was the greatest appearance of water-drinkers of all ranks I ever saw. I was not a little troubled at the capriciousness of the person who carried on the whole design to aggrandize himself with the benevolence of the benefactors; and with tears in my eyes presently got workmen to fill up the trench, and sodded it over at last, or we had lost our spring. For it got vent into the bogs west and north-west from the fountain head and ruined us." He considers it to contain "Nitre, Vitriol, and *Mars*, which are the usefullest principles any mineral can be impregnated with"

"As to the virtues of this spring there is scarce any disease incident to mankind wherein its

* Short on Mineral Waters, p. 287.

inward or outward use may not be of service. I have been an eye witness of its effects nearly forty years, and I have not neglected drinking it myself any one season all that time; and though I am now in my 66th year, yet I am strong and vigorous, free from the complaints of old age. But because a general and just commendation of this spring will not be satisfactory, without condescending to enumerate the diseases wherein it's proper.– It's good therefore, to restore a lost Appetite and Digestion, to mitigate the Scurvy, correct all acid Humours in the Lympha, Blood, nervous and pancreatic Juices. It cleanses the Kidnies and Ureters of Slime, Sand, Gravel, and great Stones, and is very assistant in curing Ulcers in those parts. It removes the Hyppo's Melancholy, opens Obstructions of the Lungs, Liver, Spleen, Mesentry, and Glands. It purifies the Blood, and renders the Spirits in the body more cheerful and lively. Several short-winded, Ashmatic, weak, and lame People, have had their Lungs and Limbs restored to their former strength and usefulness. It relieves inveterate Head-Aches, especially if at the same time you use the Cold Bath. It is also very serviceable in the Gout, by restoring the use of lame Hands, Knees, Legs, and Feet. It revives the Memory, clears the Brain from vicious Humours,

and helps the Eyes, by drying up Rheums. It relieves sharpness of Urine, Stranguary, and Disury, if there is no large Stone or other stoppage in the urinary passages. It corrects Acidity in any part of the Body; as in the Heart-burn, Belchings, Sourness at the Stomach, Gripes, Cholic, and Borbarigmos. It opens the Breast and Lungs, cuts tough Flegm, promotes Expectoration, and has often been successful in the Cure of Blood-spitting, Hectic Fever, too great Heat and Dryness of the Skin and Body."

This is a tolerably fair specimen of a few of the miseries of our ancestors, which were cured or alleviated by the use of this water; and although the sulphur and saline springs have been found more effectual in many of these complaints, yet in others this water continues to be used with the greatest advantage.

No. 3.—TEWIT WELL.—There are circumstances connected with this spring which might afford matter for much curious, if not interesting reflection. It was the first of the mineral waters discovered at Harrogate, and was frequented nearly three hundred years ago by "innumerable herds of People." Many volumes have been published on its virtues, qualities, and effects; and the cures performed by it are stated to have been "the most remarkable

filed up in the authentic records of physic;" yet with its waters running pure, translucent, and unimpaired, it is now almost entirely neglected, and its site unknown to many of the inhabitants who owe to it a local habitation and a name. Though not disposed with Dr Neal to mingle my tears with the water in lamenting the pristine honours of this little well; I approach it with a feeling in some measure allied to that of the Yorkshireman, who when at Rome, made his obeisance to the statue of Jupiter, and begged that if ever he happened to get his head above water in this his ancient capital, he would be pleased to remember that Mr. ———— had paid his respects to him in his adversity.

It is situated at the extreme eastern corner of the common, near the Leeds and Harrogate road, in a rough and swampy piece of ground. The Cupola which was removed from the old sulphur well, has been placed over it, and a neat cottage, in the gothic style of architecture built a few yards distant from the well, for the residence of the person who attends upon those frequenting the spring.

The strength and sensible qualities of this water have been already stated in the analysis and general account of the chalybeates. In its general effects it is inferior to none of them, as I have

both witnessed and been creditably informed by those, who like lapwings, continue to frequent the spot. Its having become

> " Deserted in its utmost need,
> By those its former bounty fed,"

or caused to feed, has chiefly arisen from the Old Spa, being nearer the inns and lodging-houses at High Harrogate, and the kind patronage bestowed upon the Old Spa, by writers and others ignorant of their contents. I shall here give an elaborate Analysis, by Dr. Jones, of its celebrated prototype the Sauveniere Spring at Spa, situate in the mountainous tract of Belgium which constitutes a part of the forest of Ardennes.

In an imperial gallon of this water he obtained

Sulphate of Soda	0.06 grains
Common Salt.....	0.30
Carbonate of Soda	0.72
Carbonate of Lime	4.20
Carbonate of Magnesium....	0.72
Protoxide of Iron	2.52
Silica	0.48
Alumina	0.12
	9.12

By referring to the Analysis in Table IV, it will be observed that the quantity of protoxide of iron is nearly the same in both, the Sauveniere being a little stronger. The earthy salts, as already

stated in reference to Tunbridge, are common to both, as to almost all Chalybeate Springs. Here too the quantities are very nearly the same; there being 10 grains in the imperial gallon of the Tewit, and 9.12 grains in the Sauveniere.

Having, under No. 1, the Old Spa, enumerated those complaints for which the chalybeates were formerly, and in many of them still continue to be employed, I shall close the account of this well with a few of those memorable cures related by Dr. Stanhope, which are strictly in keeping with the preceding catalogue. It is presumed that they will be equally gratifying to the general reader, the names being given at length, as the more recent cases of A. B. and S. T., appended to some works on mineral waters, for what purpose I shall not at present stop to enquire.

"But to the cures. In 1626, Mrs. Rolf, of Hadley, in Suffolk, fell into the Gravel, got the best Advice she could; but found no relief, till she was brought to the Tuewhet Well; in a fortnight's time she voided an hundred Stones of several sizes; her pain went off, she recover'd, and continued well. Henry Curra, of Wharfdale, in the West of Yorkshire, aged about fifty Years, Servant to Sir Peter Middleton, was a great Sufferer for many Years,—could neither ride, walk, nor move: He

came here, and in a Month's time, by the Use of the same Spaw, he voided many Stones, several of them as big as Peas: He also recover'd a firm state of Health. Henry Rowley of Linton, near Wetherby, aged sixty Years, was long tormented with a stoppage of Water, till this Spaw opened the Flood-Gate, and let off great quantities of Mucus and Gravel, whereby he was restor'd to Health. But most remarkable, and next to a Miracle, was the recovery of Mrs. Barker of Dore in Derbyshire, aged thirty-four Years: she had long a dangerous Ulcer in the Kidnies, a very obstructed, weak, emaciated Body, could not walk over the House, without one or two to support her, had neither Appetite nor Digestion, no, for the smallest Broths. In this weak, low, hopeless state she was brought hither; she, to her poor, small Ability drunk the Water; in a few days after, she discharged an incredible quantity of purulent Matter, whereby she was so relieved, that she got strength, recover'd Appetite, and her Obstructions open'd, and in five Weeks was restored to a healthy strong Habit of Body, and next year returned to the Spaw perfectly well. In Melancholy, and splenatic Illnesses, few, if any at all have missed of perfect Cure; instance, Mr. Sacheverell, near Hopton, in Derbyshire, who had long led a most

miserable, languishing, despairing Life. Mr. Ayre of Ramton, in Nottinghamshire, in the like most wretched Condition. Mr. Wallis, aged fifty Years, was cured of an Asthma by this Water. Mr. Thompson, Post-Master of Wetherby, who had been ill twenty-eight Weeks of a Hectic; and in spite of the best and most suitable Advice, was given up for Death; yet applying himself to this Water in the middle of Winter, was entirely cured in a Fortnight. The Countess of Buckingham (all other means failing,) repair'd hither for the cure of a severe Asthma, and went back cured. Mrs. Fairweather, of York, having long been troubled with a Swimming in her head, finding no Relief from the best Advice and Means, till she came hither, and met with a very acceptible cure. The Lady Hoyh of York, after she had born four children, in her 5th was taken with a swelling, redness, and Knobs in her Face, about the Eleventh Week after Conception; the pain whereof was so great that she miscarried of this, and two other conceptions successively: After some years spent in this languishing Condition, Physick availing nothing, she came to this Spaw, was cured and had several Children after. Mrs. Sadler, the Daughter of that Famous Lawyer Edward Coke, came hither for a long and violent Pain of her Head, and found

Relief. The Lady Vavasor had lost in a manner the use of all her limbs, through what distemper I know not, but she was brought to such a degree of weaknesse, that child-like, she was rockt in a cradle: There were no means unassayed which might reinable her, but all in vain. In this estate she was brought to the Spaw Water, by the use whereof, (by God's mercy,) she was restored to strength and health.

These cases are sufficient to show the powerful effects of this water under the ancient diet and regimen, and there are many instances at the present day no less satisfactory, where the same attention is devoted to those collateral means which so highly conduce to the cure of disease under any form of treatment.

No. 4.—Saint George's Well, is about 50 yards from the Royal Promenade Room, on the outside of the fence, and close to the road. I have retained the Analysis, although, as in the case of Williams' pure Chalybeate, this spring is now entirely neglected; from some repairs which the road has lately undergone the spring seems either diverted from its course or destroyed. The water was pure and light, but weaker in iron than any of the former; it has been known many years, but at no time much used internally; it had acquired

some celebrity however as a wash for sore eyes, for which purpose it was well adapted. As chalybeate water has long being a favourite popular remedy for a wash in various weaknesses, and chronic affections of the eyes, it is proper to state that John's Well, the Tewit Spa, or the succeeding one at Starbeck, are the only three chalybeates which can at present be recommended for that purpose. The Saline Chalybeate which has been of late occasionally inadvertantly used, contains too much salt to be employed with advantage in such cases.

No. 5.—STARBECK CHALYBEATE, has been already noticed as adjoining the sulphuretted spring of that name. In its general properties it coincides with the preceding; but the neat state in which it is now kept, and the perfect brightness which the water shews when taken from the well, together with the idea of purity and cleanliness which it conveys to the mind, make it frequently be preferred to the others.

SALINE SPRINGS.

CLASS IV.

No. 1.—Crescent Old Well, is situated in the garden behind the Crescent Inn, and immediately adjoining the Promenade Room. In recording the changes which have taken place in the use of some of the former springs, from novelty or fashion, without any alteration in their properties, the same causes cannot be applicable in this instance, since either the water has materially changed, or the encomiums bestowed upon it by Dr. Garnett, who first analysed it, are very much overcharged. In this I agree with Dr. Scudamore, who observes, "If the analysis of that chemist was correct, it follows of necessity that the spring has greatly degenerated in its properties." It is almost certain that both circumstances have occurred. Dr. Garnett states, that one gallon contained 13.6 cubic inches of sulphuretted hydrogen gas, and 2 grains of carbonate of iron. Even with his acknowledged partiality for the reputation of this spring

on which he published a separate treatise, he could scarcely be mistaken from the smell alone in respect to the sulphuretted hydrogen, but the iron said to be found in the water at the same time, convinces me that some great error must have been committed: carbonate of iron may exist in water with sulphuretted hydrogen, but the simple experiment of mixing a wine glass of any one of the sulphuretted springs with one of a chalybeate, when the mixture becomes as dark as ink, shews that the two substances cannot exist together unchanged, at least in any material quantity. The smell of sulphuretted hydrogen gas in the Crescent water is only occasional and very slight; and of iron there does not exist a trace; as has been remarked also in the analysis, the diminution of saline matter is likewise considerable. From these causes the numerous virtues attributed to it must be viewed with great suspicion; and such statements as "of all the waters of this place, this seems the best suited to strengthen the stomach and promote digestion," if ever applicable, when republished in 1829, in the last though not amended addition of his work, not only serve to mislead the reader, but are an act of great injustice to the invalid. Being on rather more elevated ground than the other sulphur springs, by which it is nearly surrounded, it is probable

that the sulphuretted hydrogen gas may have found another channel. It is private property, and if ever its character is to be regained, it must be by removing the pump, and instituting a minute examination into the state of the sides and bottom of the well. In some affections of the stomach (as heartburn) it may still be considered useful; but for the present truth compels me to leave it greatly shorn of its former reputation.

No. 2.—KNARESBOROUGH DROPPING WELL, with which so many ancient and modern associations are connected, has long been more famous as a natural curiosity, and for its petrefactive powers, than for its medicinal virtues, though these have at different periods been held in considerable estimation. It is mentioned in Leland's Itinerary, who after describing its properties, adds, "Ther was ons a conduct of stone made to convey the water from the well over Nid to the priory of Knaresburgh, but this was decayed afore the dissolution of the House." It is likewise noticed by Camden in his Brittania, and was particularly described by Dr. French. It must indeed have been known in the earliest ages, as the stalactites formed by the water, when suffered to remain assume many singular appearances, and could not fail to attract attention.

Knaresborough, from it peculiar situation and

vicinity to Aldbrough, the capital of the ancient Britons, must have been a place of much greater consequence than at present. The manor was bestowed by William the Norman, who conquered England, and wrested crown and life from the brave monarch of the land, upon one of his vassals, Serlo de Burgh, who built the Castle, thus described by Leland :—" The Castel standeth magnificently and strongly on a rok, and hath a very depe diche hewing out of the rok, wher it is not defended with the ryvir of Nidde that there renneth in a deade stony bottom." The massive fragments which still exist attest its former grandeur, and exhibits a lamentable example of party rage and the devastations of time.

My subject scarcely permits me to glance at, much less to enlarge upon, the martial achievements connected with this stronghold of feudal power. In 1170 it afforded a safe place of refuge to the assassins of Thomas a Becket, a man whose powerful mind, but unconquerable obstinacy and ambition, made him alternately the dearest friend and the most formidable opponent of his sovereign, and finally led to his own unhallowed destruction at the foot of the altar. Richard II. was for some time imprisoned here, before his removal to Pontefract, where he soon afterwards met the too common fate of deposed monarchs, in

being murdered by the partizans of his successful rival, Henry IV. Being a Royal Castle, in the demesne of the Duchy of Lancaster, it was held for Charles I. during the civil war, and after the fatal battle of Marston Moor was besieged by Lord Fairfax with the Parliamentary forces. The garrison, consisting chiefly of the townspeople, made a noble defence, and at last only surrendered on honourable terms. The loyalty of its successive possessors having rendered them exceedingly obnoxious to the ruling powers, it was afterwards dismantled by command of Oliver Cromwell and his Parliament, who, according to the approved practice of the time, (which some more versant in such matters than I profess to be, think has been revived to a consideroble extent in our own day,) sent down 'a commission' and sequestrators, and thus speedily effected their purpose to the entire satisfaction of their employers. The family of Cavendish, Dukes of Devonshire, who possessed the freehold of a great majority of the burgage tenements, long held paramount political rule in Knaresborough. It was, like Aldborough, a nomination Borough, and while the latter could count in the list of its representatives a Chatham and a Sadler, the former long rejoiced in sending a Mackintosh, a Tierney, and other distinguished men to Parliament.

Not wishing to protract this digression, I must very briefly notice the fine old church, dedicated to St. John the Baptist, the duties of which have been for upwards of forty-two years efficiently performed by the present respected vicar the Rev. Andrew Cheap. The voices of a numerous choir of children, who are carefully instructed to take a part in the vocal department, harmonize beautifully with the solemnity of the service in this ancient sanctuary, and must make a deep impression upon every well disposed mind.

The other objects which usually attract the passing notice of the stranger, are Fort Mentague, the laborious work of a poor artisan and his son, who found a kind patroness in the late Duchess of Buccleugh, a lady whose many excellent qualities, rendered her beloved and venerated almost to adoration in the South of Scotland.—St. Robert's Chapel and Cave. The latter was the scene of a despicable murder in 1744-5, which, after being concealed for thirteen years was accidently discovered, and led to the capital punishment of Eugene Aram, whose literary acquirements and ingenious defence on his trial have rendered him the *beau ideal* of similar offenders, and excited sympathies on his behalf which would have been more becoming in a better cause; one gentleman of considerable talent having published an

essay to prove his innocence when the culprit had confessed his guilt, while another, with a peculiarity of taste which I shall not attempt to define, has made him the hero of a novel.

> "A holy spot 'tis said in days of yore,
> But something ails it now—the place is curst."

The water of the Dropping Well rises in a deep narrow dell, about fifty yards from the rock, over the projecting ledge of which it trickles and falls from a height of ten feet, giving a very good idea of a natural shower bath, for which purpose, *ceteris paribus*, it is very well adapted. It is over against the Castle, on the south side, and near the edge of the river Nidd, along the picturesque banks of which at this part, between the bridges, there is a beautiful and romantic walk, which, after passing the well, leads the visitor to a house—fit situation for such a personage—in which, about the year 1500, woned the celebrated Mother Shipton, the Johanna Southcote of her day, whose prophetic gifts were considered little inferior to those of Merlin; and some have even gone so far as think them equally correct. The manuscripts of her oracular sayings are stated to be reposing in the Archives of Beverley.

There is no modern analysis of this water with which I am acquainted. Dr. Walker appears to have made a few experiments upon it, which are

peculiarly unsatisfactory. By referring to table V. it will be observed, that it contains considerable portion of earthy salts, existing in the water chiefly as sulphates and carbonates of lime and magnesia. The large proportion of sulphates is peculiar to this water, not being found to nearly the same extent in any of the other springs. It also contains a considerable proportion of carbonate of lime, and on this principle depends its petrifactive powers.

When the water is exposed by slowly trickling over any surface, the carbonic acid gas flies off, and the carbonate of lime, which by its means was held in solution in the water is deposited in a solid form. The sulphate of lime, a salt of little solubility, and easily separated from water, also assists in the effect. The concretions, on analysis furnish carbonate of lime, sulphate of lime, carbonate of magnesia, and a trace of the muriates. Many curious articles are subjected to its action, which are soon encrusted with earthy matter giving rise to a petty home commerce between the visitors and the keeper of the well.

Dr. French gives the following account of its action: "If any stick or piece of wood lye in it some weeks, it will be candied over with a stony whitish crust, the inward part of the wood continuing of the same nature as before; but any soft spongie

substance, as moss, leaves of trees, &c. into the which the water can enter will thereby in time become, seemingly to be, of a perfect stony nature and hardness. Now the cause of this petrifying property is, as philosophers call it, *Succus lapidescens*, i. e. a stony matter which is in its *principiis solutus*, for indeed the *principia soluta* of all things, whether animals, vegetables, metals, or minerals, are in a liquid form, and are concreted by degrees, by a natural heat separating from them all accidental humidities, and fixing them into their proper species."—The view which he takes of its medicinal properties is however much more consonant to common sense and the analysis, than this absurd specimen of reasoning. Should this fall into the hands of any of my professional brethren of Knaresborough or the neighbourhood, they may try it as an antisceptic, astringent, and tonic. The chief virtues ascribed to it by Drs. French and Stanhope, of which there are some notable cases on record, are "to allay acid, gnawing and hot choleric humours, and to stop all fluxes proceding from thence." It is also celebrated in menorrhagia and uterine weakness, and it might be tried in cholera morbus; while, from the contents of the water, I consider it may under proper management become a valuable remedy in some cases scrofula, atrophy, and rickets.

MISCELLANEOUS SPRINGS.

Having thus given an accout of the different springs particularly analysed, to complete this part of the subject it will be necessary for me briefly to notice those of which it has been stated that a fifth class might be formed, without much regard to scientific arrangement. In addition to those already mentioned, belonging to the first class, there are four more at the moss near the Hospital, two upon the premises of the Crown Hotel, and one in Bilton Park; the latter, though one of the earliest known, being mentioned by Dr. Dean, has long fallen into disuse. It is situated about half a mile north of the Starbeck Spa. The Bishop of Llandaff, who seems to have been indefatigable in his search after these springs, enumerates several others; one about a mile south of Starbeck Spa, discovered in 1786; a second at a place called Hookstone Crag; and lastly, "On the other side of the hill, above the bog, and to the west of it,

there is another sulphur well, on the side of a brook; and it has been thought that the wells, both at Harrogate and in the bog, are supplied from this well." Here is another important admission on the origin of these wells; by the same chain of reasoning, if another well was discovered beyond this, or on the summit of Harlow Hill, it, as being the highest, would supply all the others below.

There are likewise many other chalybeate springs besides those mentioned; four at the bog, of which we have seen the bishop of Llandaff was the means of discovering two. The mixture of the sulphur and chalybeate waters, which is constantly occuring at this place occasions that dark inky appearance which so greatly surprises those unacquainted with the subject, and presents the necessity of filtration so strongly to their minds. At Low Harrogate their are several, and also upon the Common, none of which however can it serve any useful pupose to particularize.

Those springs under the name or patronage of the saints, which ages before either the Chalybeate or Sulphur Springs were discovered, occupied such a prominent place in the public attention, and are even said to have performed such wonderful cures, have long been deserted. Dr. Dean, who appears to have been as violent an anti-romanist as could

be wished for, describes the natural qualities of these springs very correctly, as "clear, limpid, and pure simple waters;" and adds "of such we have plenty, and of such reputation that two of them are sainted, viz. St. Mungo's and St. Robert's well; to which have flocked for bathing, innumerable herds of people, for these last two years, though they contain no mineral, and are of no credit at present; for superstition and their reputation live and die together; their great and famed cures having been rather feigned and imaginary than real." Here the worthy Doctor in his indignation against the *name* had lost sight of the many excellent *effects* produced by a cold bath of clear, limpid, pure water. It may however amuse, if it does not greatly instruct the reader, to see what one of his contempories says on the subject.

Dr. French observes: "Whether Magnus or Mugnus be the true and original name of this well, could never yet be ascertained. Nor whether this well was sainted from its real vertues, or only supposed vertues attributed to it, because first sainted, I will not stand now to dispute. Dr. Dean will not have any greater vertues attributed to it than to common springs, allowing it only a bare name and title. It seems the Doctor was no Catholick, or if he were St. Mugnus must not be his intercessour."

He then goes on to show "that water often times are impregnated with mineral vertues, and spirits too, although insensibly," and that handling of snow "heats the hands and causes them even to burn by drawing out the natural heat. From all which it is apparent that if any one enter into this water to bathe and abide their but for a quarter of an hour, he will as soon as he comes forth, presently become very hot, (his body being all over red,) and to continue a long time, although he walk in the cold air; nay, although he put not on his clothes." This is proving too much, and shows that Dr. French had never made the experiment, or perhaps, never seen it tried. Few of the most healthy or robust could remain so long in any of these cold springs without serious injury, and to invalids the results must prove, if not fatal, highly dangerous. I do not remember an instance in the voluminous records of the 'lives of the saints' where any of them condescended to assist the most ardent of their votaries out of a cold bath. One poor man perished a few years ago in St. Winifred's Holywell, on the borders of Wales, greatly to the annoyance of those who held that the excellent effects of that fine pure water could only be attributed to miraculous interposition. This unfortunate case, which occasioned considerable discussion

at the time, threw a cloud over the acknowledged beneficence of St. Winifred. The following according to the same author was the mode of bathing practised by our female ancestry: "Nay, many tender women who dare scarce wash their hands in cold water, will adventure to go into it (St. Mugnus Well) although it be colder than ordinary water, with their linen about them, and when they be come forth go to the next houses, and lye in their wet linen all night, and towards morning begin to sweat, and by that means are cured of many old aches and swellings, and hard tumors and agues." He very properly adds, "Before any attempt the use of this cold bath, let them first consult some able Physitian." Although I am inclined to believe that it would be rather difficult to persuade many ladies of the present day to submit to this plan of treatment; or, if any were so foolhardy, would they find many of my professional brethren to recommend it; yet the principle has been known and acted upon time immemorial, as the Highlanders of the olden time, when about to bivouac on their native heaths, dipped their plaids in water, and so enveloped laid down to sleep, convinced that the moisture retained the heat.

The attempts of Dr. French were insufficient at the time to rescue this well from the oblivion

which alike overtakes saints and shrines, their supporters or maligners. Camden's Britannia and Chalmers' Caledonia enable us to ascertain the history and period of the saint whose name it bears. St. Mungo's Well is so called from Kentigern, a Scotch Saint, much honoured hereabouts, who left the more classic regions of Iona, to convert the foresters on the banks of the Nidd, and whom his tutor, Servanus, Bishop of Orkney, out of affection for him, called Mongah, which in the Norse or Norway language, signifies a dear friend.

St. Magnus Well or Bath, is situate at a short distance from St. Ann's Well, adjoining what is termed the 'Cold Bath Road,' beyond Binns' Lodgings, leading from Low Harrogate to the Otley road. The Bath, and some surrounding land, have lately become the property of Mr. Joshua Wordsworth of Leeds, who has been actively engaged in improving the estate. He has already erected a large lodging-house, with suitable bathing rooms, and every other accommodation for bathers. It will, doubtless, prove useful to the public, and I hope advantageous to himself. The bath and premises connected with it were previously in a very dilapidated condition. Though a dissenter, I believe, of the first water, he has done more by these measures to resuscitate the former notoriety

and usefulness of St. Mungo's Well than all the saints and others since the time of the founder who have adverted to the subject. The following is an accurate Analysis of the solid contents of this well. The gases contain nothing remarkable. The water is clear, pure, and very soft to the taste. The specific gravity is 1000.5, to distilled water at 1000. An imperial gallon of the water when evaporated left 17 grains of solid residuum, which was found to consist of the chlorides of lime and magnesia, with a small portion of soda. It may therefore be considered a very pure water, well adapted for a cold bath in cases similar to those in which the waters of Ilkley,* and other natural cold baths, are indicated.

The subject of bathing in all its varieties is referred to its proper head. Including St. Magnus Well, there is now ample accommodation for "innumerable herds of people," in the language of the day 'the masses,' if they choose to use them.

St. Robert, scarcely less famous in his day, had a cell, a chapel, a cave, already referred to, and to equal his predecessor it behoved him to have a well, all in the neighbourhood of Knaresborough. The Well is situated about a mile from the town,

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* Hunter on Ilkley Fountain.

on the right hand, and near the road going to Wetherby. It is still used as a cold bath, for which purpose, being very pure water, from personal examination I consider it well qualified.

St. Ann's is situated a few hundred yards east of the New Church, at Low Harrogate. From her modesty, perhaps inherent, and so becoming in her sex, the fountain honoured with her name has never given rise to any noted discussion; even Dr. Dean appears to have respected the female saint. The spirit in the water, however, or that with which it is infused, has long been most actively engaged in adding real or fancied comforts to the Fair, and is now in much more general use than either of the preceding, being allowed on all hands to be the best water for making TEA, and more extensively used for that purpose than any in the neighbourhood of Harrogate.

DIRECTIONS FOR TAKING THE WATERS.

Mineral Waters whatever may be the nature of the impregnation, possess so many properties in common, as allow any directions for their use to be in some measure applicable to almost every known variety. This is particularly the case in regard to those possessed of aperient qualities. The following observations, therefore, though chiefly directed to the sulphuretted waters, are in many respects applicable to the other classes, especially the saline chalybeates, and so far as general statements can avail may be acted upon, unless when otherwise mentioned. No general directions, however, can fully meet the varieties of constitution, temperament, and disease, which, under judicious management, might reap benefit from these waters. To discriminate these varieties is the peculiar province of the physician, and the individual who is really indisposed, will of necessity rely upon his judgment.

An annual excursion to some watering-place has become an almost universal custom among all classes of society; and to those living in large towns, or otherwise engaged in sedentary, studious, or enervating occupations, a change from their wonted haunts and employments is frequently of inestimable advantage, even though their health does not seem absolutely to require it. This numerous class, however, not contented to enjoy the full benefit of a change of scene, air, and relaxation, frequently injure themselves either by taking those waters which they do not require, or with a perfect indifference to those rules of diet and regimen which long experience has shews to be necessary. Hence they frequently suffer from the unadvised use of the same means which to others are extremely beneficial.

The Sulphur and Saline Waters are taken with greatest advantage at the well, in the morning before breakfast, using gentle exercise between the intervals of drinking. A glass containing half a pint should be taken, and repeated once or twice at an interval of fifteen minutes, or half an hour. In a great majority of cases this will be found sufficient. But when the bowels are more than usually constipated from previous disease, or any other cause, a larger quantity is required, and two

or three pints may be taken, not only with safety, but advantage. These waters were used by all ranks in former times, and by the lower orders to this day, in larger quantities than is here recommended. The cures have sometimes been very surprising, but the bad effects arising from such immoderate doses have likewise been sufficiently serious.

Some practitioners are accustomed to recommend a mercurial or other aperient pill to be taken during the whole course of the sulphur water. However beneficial this practice may be at the commencement, I consider it in most instances unnecessary after the action of the water is established, and the system becomes reconciled to its effects. By those using the pure chalybeate water, aperient medicine is frequently required during the whole course. As a general rule the aperient taken should coincide as nearly as possible with the intention of the water, and the removal of the disease.

There are many who suffer considerable uneasiness from the quantity of cold water taken into the stomach. The most delicate invalids, and those on the other hand to whom pure water in any form is a rare beverage, are the greatest sufferers from this cause. To obviate these

distressing sensations, the doses of the water should either be small, and repeated at longer intervals, or a portion of it be made hot, should be added to each draught. This is found to be more frequently necessary for those using the saline chalybeate. As these waters lose part of their medicinal powers by being heated, it is better to add a portion of hot water to the cold, at the moment when it is taken than that the whole should be exposed to the action of fire. When this is found insufficient, a teaspoonful or two of some light spirit or aromatic tincture may be added to the water.

I shall not endeavour, as has been gravely attempted by some, to persuade any one that water loaded with sulphuretted and carburetted hydrogen gases is pleasant to the taste; yet, however nauseous or disgusting at first, it is generally allowed that it becomes much less disagreeable by use. A bite of plain bread or biscuit will take off the fetor, and reconcile the palate as effectually and more harmlessly than any spice or aromatic, though to these there is no objection, which are frequently used for this purpose.

I fully agree with those who consider some preparation necessary before commencing to take the sulphur water. The more robust the individual the greater the propriety of such a measure.

This consists in the use of a milder diet, opening medicine, and if the patient be of a very sanguine and plethoric habit, losing a little blood. These precautions when properly attended to, will in almost every instance answer the intention; yet it frequently happens that on commencing a course of mineral waters, many are effected with drowsiness, vertigo, obtuse pain in the head, nausea, flatulence, oppression of the stomach, prickling heat, itching, and various other uneasy sensations as if arising from general fulness of the whole system.* A brisk purgative by those able to bear it, with the use of a warm bath, will generally remove these sensations. Those recently arrived from a long journey, or using food different from that to which they have been accustomed, or who indulge too freely in the use of stimulating liquors, are most liable to these attacks. So irregular is the first action of mineral waters, that effects are sometimes produced directly opposite to their known qualities. These anomalous symptoms are common to the waters under consideration, and are now with every appearance of reason attributed more to the greater than ordinary quantity of water taken, than to any peculiarity in the

* Fothergill on Cheltenham Waters; Jameson p. 144; Saunders on Mineral Waters, p. 451; Pearson on Buxton Waters, 210.

mineral ingredients. This is rendered still more probable by the same effects being produced from an excessive use of the purest water,* and further confirmed by their disappearance as soon as the system becomes habituated to the liquid, or when some sensible effects are produced upon the bowels, skin, or kidneys. Should these symptoms be unusually severe or protracted, carminative aperient medicine will accelerate the action of the water; while a few drops of ether, sal volatile, or any other antispasmodic, will relieve the flatulence and other disagreeable feelings which sometimes supervene.

General consent, and the usages of society, have established that the summer is the season best adapted for a course of mineral waters. There is nothing, however, so peremptory in this arrangement as to prevent their use at any other period. From three to five weeks is commonly stated as a sufficient length of time, but such statements are merely arbitrary, as this must depend entirely upon the nature and progress of the disease, a

* Dr. Wall, in his account of the Malvern Water, observes, "I cannot close this treatise without mentioning one effect of this water, that at first it frequently makes persons drowsy, and sometimes gives them a dull pain in the head. Symptoms like these are common upon the use of chalybeate waters, but there is no metallic principle in this spring. I think these effects must be owing to the ready and easy admission of the water into the blood, whereby a plethora is brought on, *pro tempore*."

The same effects have been observed from the Bristol Waters, also remarkable for their purity, and have been repeatedly mentioned to me as a cause of great discouragement by those using the water at Ilkley.

trivial and evanescent alleviation, instead of a complete and permanent cure, being too frequently the consequence of an early discontinuance of their use. Almost all diseases in which mineral waters prove of advantage are of a chronic form, have been gradually stealing upon their unwary, thoughtless, ignorant victims, and the constitution is often undermined in the spring of youth, more frequently indeed, than in mature age, before the parties themselves, or those most interested in their welfare, are sensible of its having sustained any serious injury. It cannot therefore be supposed that drinking any quantity of the most powerful mineral water for a few weeks, will be able in every instance to penetrate, resolve, and remove those obstructions in the different organs which have been accumulating for years, or are ingrafted in the system from our earliest infancy.

After remaining at Harrogate for a few weeks, many have the sulphur water sent to their own residences, and large quantities are brought to the neighbouring towns for those who have not the opportunity of leaving home. It bears carriage better than any other kind of mineral water, and when well corked and sealed up, retains its powers in considerable perfection, seldom failing to produce its known effect upon the bowels. It ought

if possible to be taken on the spot; yet, its use in that way, as I have witnessed in many cases, has proved of advantage. The directions already given should, however, as far as circumstances will permit, be carefully attended to. Of late years it has become an object for almost every town or village to have its mineral spring, which is commonly a weak chalybeate, and it has sometimes been held out as an additional recommendation that the Harrogate Sulphur Water is procured for those who might visit these places. If taken alone, this is all well, but it should not be used under any circumstances within six or eight hours of taking the chalybeate, which, as has been shown, when mixed with the sulphur water, produces an immediate decomposition.

When the sulphur water is intended to act as a decided aperient, the quantity necessary should be taken before breakfast; when as an alterative, at twice or thrice in the morning, about noon, and at bedtime, if the supper is light, and eaten some time before retiring.

The Saline Chalybeate, or Cheltenham, is decidedly less aperient than the Sulphur Water, yet is a sufficiently powerful evacuant to produce a considerable action upon the bowels. The iron it contains, though in many cases a most valuable

addition, renders it to a certain extent less active as a purgative. This however, is easily obviated, either by adding a little sulphate of magnesia, or concentrating a portion of the water. By the latter process the carbonic acid, which holds the iron in solution, will of course be expelled, the iron precipitated, and the water become purely saline; but, as the invigorating qualities of the iron and carbonic acid are thus lost, it is preferable that a portion of the water highly concentrated be added warm to each glass, which not only relieves the stomach, but secures its more certain operation. It acts in a mild and effectual manner, without occasioning gripes, or inducing the languor which sometimes follows the action of more acid cathartics; and may be taken by the most delicate individuals for a considerable length of time without inconvenience, as from the tonic effects of the iron, additional strength is commonly acquired during its use. In small or alterative doses, it promotes the secretion of urine, and in this respect alone is frequently found of great service.

This water is known to be beneficial, and ought to be persevered in, if after using it for a short time the appetite begins to be increased, food to be relished, and digestion performed with greater ease than formerly. And no doubt can exist of its

salutary tendency, when the complaint for which it is prescribed gives way to returning health.

The Saline Springs, as the Crescent Hotel Saline, are taken in a similar dose and manner as the former. They are more peculiarly indicated in acidity of the stomach and those affections of the urinary system connected with a tendency to the formation of stone, as red sand or gravel. They are in general moderately aperient, resembling in this respect the pure saline springs at Leamington. When this water is taken in the morning, a draught of any of the pure chalybeates may frequently be had recourse to in the afternoon.

Pure chalybeate waters are strictly alterative in their effects, and can only be used for this purpose. It is a very common, and dangerous error, to consider these waters as a simple remedy, which may be taken by any one, without either advice or precaution. This is by no means the case, as no class of mineral waters requires more attention from the invalid. Much irreparable mischief has occurred from their improper use, in those complaints where they are really indicated, or their indiscriminate exhibition in others where they are manifestly injurious. The preparatory measures already mentioned are in no class less indispensable. After a previous use of the sulphur water,

therefore, if the case requires it, or a proper regulation of the stomach and bowels, which ought carefully to be attended to during the course, by occasional doses of aperient medicine, the patient may commence the chalybeate water by taking from two to three pints during the day, but at different intervals. It should if possible be taken upon an empty stomach, at the well, as it loses its properties by exposure or carriage. The first dose should be taken early in the morning, before breakfast, if the strength of the patient permit; the second about noon, so as not to interfere with any meal; and the third, if ordered, in the afternoon or evening. The average quantity to be taken, is about a pint at each of these periods; this may be divided into two glasses, allowing a short interval with gentle exercise between the draughts.

Dr. Saunders observes, "The prescribed method of using the Tunbridge Water," which is very similar to the Harrogate chalybeates, "is judicious; the whole of the quantity daily used is taken at two or three intervals, beginning about eight o'clock in the morning, and finishing about noon." This implies, however, that either the whole quantity must be taken before breakfast, or that the breakfast must be very slight, not to impede the effects of the water. It may be mentioned here

that tea is an improper beverage for persons using the chalybeate water; any one may be satisfied of this by adding an infusion of tea to a glass of the water, which will immediately be decomposed; coffee is less exceptionable, though to a certain extent, liable to the same objection. The breakfast recommended, and commonly used by those drinking the chalybeate water at Tunbridge, is bread and milk, or cocoa, or chocolate. Where tea cannot be dispensed with, two or three hours should be allowed to elapse between its use and that of the water. As an alterative the directions given above appear to me more suitable, and have always been followed at Harrogate.

When this water agrees, it soon excites a pleasant sensation of warmth in the stomach, improves the appetite and digestive powers, and tends to exhilarate the spirits: its most apparent action is as a diuretic, if the temperature is cool; in hot weather it tends to excite perspiration. The general operation consists in increasing the power of the lymphatics, and imparting strength, tone, nervous energy, and vigour to the system.

I shall conclude these directions with the following remarks of Dr Saunders: "All the preparations of iron, and these waters, among the rest are known to tinge the feces black, a circumstance

apparently of no importance in itself, but of which the patent should be apprised, to prevent him from taking any groundless alarm." Chalybeates are of eminent service in an impaired or capricious appetite, and weakness of the assimilating organs, irregular digestion, flatulent distention of the abdomen, anxiety about the præcordia, difficult respiration from sympathy with the stomach, and occasional vomiting of viscid mucus. In those weaknesses peculiar to the female system, which deny the hope of offspring and undermine the constitution, these waters have often been productive of the best results.

Having shewn the propriety of some degree of caution in commencing the use of all these mineral waters, it is equally necessary for those who wish to retain the benefits they may have procured from their use, either to discontinue them gradually, or to be careful for some time afterwards, on their return home, that no reaction takes place. Moderate diet and an occasional aperient will prevent that tendency to plethora which is frequently induced by the sudden discontinuance of large evacuations.

DISEASES IN WHICH THESE WATERS ARE APPLICABLE, AND THEIR EFFECTS, &c.

It is now fortunately unnecessary to enter into any discussion as to the healing powers of mineral waters in a wide range of the most serious complaints; these having been long uncontrovertibly established. At the same time in numerous instances, it would be extremely difficult to shew the precise benefit derived from their exhibition unaccompanied by the change of air, relaxation from business, early hours, regular exercise, agreeable company, and the thousand and one concomitants of a well-frequented watering place. Such a place indeed bears no bad analogy to a medical prescription, the mineral water being the principal ingredient, though there are several others added to increase its powers and regulate its effects.

The catalogue of diseases which have been benefitted by these various waters comprises a very numerous list, and when applied to them all, affords some foundation for the assertion of Dr. Neal, in regard to one. To enter upon the medical history of these diseases would be to write a treatise upon the general practice of physic; a mere enumeration of the symptoms would be equally unsatisfactory to both the professional and general reader: the former being already acquainted with the symptoms peculiar to each, while the latter would receive little instruction, even in his own case from their most elaborate detail. An enumeration of the principal diseases in which they have proved successful, together with a few remarks on the action and effects of these waters will tend to direct the practitioner less familiar with the subject to their proper application, and restrain the patient from applying all the symptoms of every disease he reads of to his own immediate complaint.

Diseases have been long divided into two classes, acute and chronic; these terms sanctioned by habit and often useful in practice, are in many instances merely conventional, as the same disease at different periods, assumes either appellation. This division is particularly suitable to the present

subject, as it is to the latter of these, that mineral waters are almost solely applicable as a remedy. Acute diseases are now happily under the control of medical agents, when the treatment is prompt, vigorous, and judiciously applied; in this class the utility of the remedy is apparent, the relief obtained decisive, and the triumph of medical science complete. Here mineral waters give place to more active measures, and can in very few instances be required until the previous violence of the disease is subdued. In chronic affections, unfortunately, the picture is much less flattering, the most careful and attentive exhibition of the best means in our power is frequently unsuccessful, or only attended with partial relief. The number of remedies employed for the same disease too evidently shews the uncertainty which prevails; for were any two of all the numerous remedies employed in gout, equal to the lancet and abstinence in a case of inflammation of the lungs, medicine might rank as a pure science, whose results were fixed by unerring laws. Nor is the want of success in many of these cases to be attributed either to the inefficacy of the medicine, or its improper application. Chronic diseases are generally insidious in their approach, and become more complex as they advance; derangement of function

is gradually but surely followed by disorganization of structure, until the system is so much weakened as to be unable to bear up against the progress of the disease, and the action of the remedies necessary for its removal. Most remedies in such cases must excite an action in the system which it is unable long to sustain; it becomes therefore of the greatest importance to select those means which, while they gradually subdue the disease, rather add to than impair the strength. It is in such cases, where the vital powers and strength are so nearly balanced, that the mineral waters at Harrogate, and similar impregnations elsewhere, become so truly important. Many diseases in the early stages, for which they are taken and recommended, are daily treated at home with success; but under the circumstances already stated, they are unrivalled, and to these mainly owe the permanency of their character as medicinal agents, which with those who have watched their effects, no extravagant praises on the one hand, or unqualified detraction on the other, can either materially exalt or destroy.

It has been proposed to divide chronic diseases into two classes, one where mineral waters are beneficial, the other where they are injurious or of no service. This may indeed be worthy of con-

sideration where there is only one kind of water referred to; but after careful examination and several attempts to separate those diseases which could be proved to be aggravated by every kind of mineral water, I have been led to conclude that there is scarcely any chronic disease which has not been benefitted by their use when judiciously applied. In attributing such extensive powers to this class of remedies, my opinion is grounded not only upon what I have witnessed, but likewise upon the statements of authors of known respectability, whose name and situation raise them far above the suspicion of any interested views as connected with different watering places. As the same disease is frequently occasioned by many different causes, so the action of mineral waters will, like other remedies, sometimes remove one of these exciting causes, and thus cure the disease, while it will in another be altogether unserviceable. Thus it appears to me extremely improbable that any mineral water will succeed in some cases of epilepsy, while in others proceeding from worms, or derangement of the primæ viæ, it is certain they have been completely successful. In mania the same remark is applicable. In all those diseases which may be considered to arise from congestion, and to be increased by its effects, or from irregularity of the

digestive functions in any of its parts, a proper selection of mineral water will scarcely fail to procure relief. In some diseases of the lungs, it has been supposed that mineral waters are peculiarly unsuitable, yet there are not wanting authorities of the highest order, who have testified to their beneficial effects. Haller states that by the use of the strongly carbonated waters of Germany, aided by a milk diet, he had cured many cases of pulmonary consumption considerably advanced. Dr. Armstrong was equally sanguine in the efficacy of sulphuretted hydrogen gas for the same purpose; he observes, "all the measures hitherto recommended by authors having proved most fallacious, it becomes a question of the greatest importance to society, to ascertain precisely the powers of the sulphuretted hydrogen gas, both in the insipient and confirmed phthisis; and as I have formerly shewn, that the closest sympathy exists between the lungs, skin, and kidneys, and as I have also ascertained, that this physical agent acts most powerfully on both these organs, the consideration of it has still stronger claims to our regard. Besides, numerous trials have fully convinced me, that in all chronic inflammations of an ordinary nature, this gas has one common and specific operation; and as it

cannot be denied that phthisis is an inflammatory affection, we might surely expect it to have some influence. It may however be urged, and justly too, that the inflammation attendant on the tubercular consumption is not of an ordinary, but of a peculiar kind: yet in answer to this objection I can state, that the internal and external use of the sulphureous waters are far more efficacious in scrofula than any other remedies: for after all the common modes of treatment had failed, I have seen scrofulous affections cured by drinking these waters, and using them as a tepid bath. Now if phthisis really be scrofula of the lungs, as is my firm opinion, why may it not also prove serviceable in that affection, as well as in others of a similar character, though of a different seat? Dr. Rollo was the first, so far as I know, who suggested the internal use of the sulphuretted hydrogen gas in phthisis, but as he did so in common with some successors, on merely speculative grounds, the remedy has been disregarded." Agreeing with him in the sedative effects of the sulphuretted and carburetted hydrogen gases in various cases of sub-acute and chronic inflammation, no instances which have come under my own observation, enable me to speak so highly of the action of these gases in the disease now under consideration.

The result of those trials made with fictitious airs by Dr. Beddoes, Rollo, and others, were by no means favourable, yet in this formidable disease, where so many other remedies have proved unavailing, we ought not to remain contented with former experiments, but continue the investigation with all the additional aids which the many important improvements in pathology afford. There are many cases of consumption connected with hepatic or other organic affections, in which these waters have been eminently serviceable, when taken before the constitution was too much impaired: but no kind of mineral water, or any other remedy can avail in the advanced stages of the disease; while I am convinced that no small number of cases have been recovered, not only in common practice, but by the means now under consideration, when proper opportunities were afforded for their early and well regulated exhibition.

Before enumerating the diseases in which almost all preceding writers have concurred in celebrating the effects of these waters, it may be proper to state that although my opportunities have been very considerable, I have not witnessed their action in every variety of disease: at the same time, I have introduced none which are not authenticated by

two or more of these authors. In almost every kind of cutaneous affections, accompanied with the use of the warm bath, I have repeatedly witnessed the most marked results; and in complaints connected with the biliary and stomachic derangement, their use of late years has become greatly extended.

Although well aware that nosological arrangement has latterly been very much disregarded, and even discouraged by some celebrated lecturers, I have long been convinced of its utility, not only in the study but practice of medicine. Allowing that in many instances the classification is imperfect, and founded upon hypothetical reasoning, the abstract question of its correctness seldom interferes, or will soon cease to have any influence over the mind of the practitioner; while the arrangement of observations under their respective heads, greatly facilitates inquiry, and gives accuracy to the deductions obtained. With this view, as intended for the medical reader I shall briefly glance at the nosological arrangement of Cullen, in relation to these waters. As alterative aperients, they will be found chiefly applicable in the chronic forms of most of the diseases included in the class pyrexiæ and other phlegmasiæ; in the sequelæ of most of the exanthemata; and in the hemorrhagiæ. In class second, neuroses, order

second, adynamiæ, these waters possess great power. In almost every one of the third class cachexiæ, they are no less useful. Likewise in a considerable number included in the fourth class, locales.

The *Sulphur Water* speedily and safely carries off the effects of intemperance in those who, having spent the winter and spring in festivity, resort to Harrogate with their system loaded with impurities, from the excesses of the table, and whose stomachs are debilitated by these and similar causes. Its use is acknowledged in those predisposed to apoplexy. In chlorosis or green sickness, it has been usual to drink the sulphur water for some time, and then take the chalybeate. In diseases of the skin, especially the order squamæ of Willan, who mentions his having seen some very obstinate cases of lepra, alphos, and psorasis, completely cured by this water; in porrigo, herpes, and the impetigines; scrofula, scurvy, secondary syphilis, and ulcers, its use has been equally efficacious. In gout also, in both its principal divisions of regular and irregular, or atonic; in the first, the constitution is sound and vigorous, the fits are severe and regular, and there is generally plethora and inflammatory diathesis: in the second, the constitution is debilitated and diseased; the

fits irregular; the aliamentary canal, head, breast, and urinary passages, affected with various complaints, alternating with fits. In the former the water may be taken as an habitual laxative; in the latter, its use requires considerable caution, the warm or vapour bath in conjunction with it will frequently prove useful. In the numerous list of complaints now comprehended under the term dyspepsia, or indigestion; in many of which, however, the saline chalybeate water is preferable. In flatulent and bilious cholic, habitual costiveness, hypocondriac affections; jaundice; hemorrhoids or piles; worms; in chronic rheumatism, with the warm bath; and lastly in some cases of dropsy, by active purging. In stone and gravel, the weaker sulphur water at Starbeck has been much extolled.

Having already detailed the properties of the *Saline Chalybeate Water*, its general effects will be readily understood. In most of the diseases already mentioned, where the sulphur water is found to occasion relaxation or sickness, or where the strength is not recruited under its use this will be found a proper substitute. In all female weaknesses, I am disposed to give it the preference. In chlorosis; atonic gout; hepatic and nervous affections; diabetes; and some cases of tic doloureux, it has likewise been of the greatest advantage.

The effects of the *Saline* or *Leamington Waters*, have likewise been stated, it is unnecessary therefore that I should further advert to them.

The action of the *Pure Chalybeates* is more distinctly tonic than either of the former. In all cases, therefore, where the system is relaxed, these waters properly administered, produce the happiest effects. When the sulphur or saline waters have carried off the previous obstructions, a short course of one of the chalybeate springs will brace the solids, and give tone and vigour to the system.

In concluding this section I may remark, that it would have been easy to have lengthened these observations to an indefinite extent, but from what has been already stated, it will be apparent that it would not be within the scope of this publication; I shall therefore only add, that Harrogate now fortunately possesses Mineral Springs similar to those of the most fashionable and celebrated Watering Places in England, while the sulphur Springs remain altogether unrivalled by any in the Empire.

THE BATHS.

The external application of the Sulphuretted Water at Harrogate, is inferior only to its internal use as a remedial agent. In almost all the diseases already mentioned, particularly in cutaneous affcetions, it should never be omitted, as it will be found a most important auxiliary to the cure.

Bathing is one of the most ancient, and is to this day, perhaps, the most generally applied remedy known. The agreeable effects resulting from it in health, and the advantages derived from it in disease, have made its use familiar to us in the annals of all nations. As the the first account of the human species is derived from Asia, so we find the use of the bath coincident with their earliest records. It formed a part of the ceremonial law of the children of Israel, and is equally enjoined to the followers of Mahomet and Brahma. The ancient Egyptians may claim the introduction of its varieties among the Greeks, who luxuriated in its

use; from them it was carried to Rome, and enjoyed by the conquerors of the world with the most boundless extravagance.* The Romans discovered or at least used, the natural warm baths at Bath and Buxton, been long familiar with the qualities of such water from their natural Thermæ at Baia, Albano, and other places in the empire. Without further pursuing the history of bathing through all nations, ancient and modern, the accounts of which however are highly amusing and interesting, I shall briefly notice the action of water upon the system, when applied externally, the varieties of the baths in use, and offer a few remarks upon the specific effects of baths impregnated with mineral or medicated substances.

The action of water, when applied to the surface of the body, has occasioned much difference of opinion among writers on the subject. This appears to have arisen more from a partial and limited view of the effects produced by the fluid under different temperatures, the length of time it is continued, with the variety of constitution and disease to which it has been applied, than from any real misconception of its general results, which in most instances, are sufficiently apparent. The

* Warm Baths were called by the Romans Balnea Laconici.

stimulating and debilitating powers of water are only relative terms, since both can be procured from it by continuing for a shorter or longer period under its direct influence. This is more especially the nature of the cold bath, though water, at any degree of heat in which it can be applied to the body, will produce the same effect—as the undue action of the most powerful stimuli will ultimately exhaust the frame and destroy the powers of life. By the term stimulant, I wish here to be understood an increased action in the arterial system, the heat being for the moment diminished; this acceleration of the circulation becomes necessary to supply the heat so rapidly abstracted by the sudden immersion in cold water. When the temperature of the bath exceeds that of the body, the stimulant effect arises from a cause directly opposite, the circulation being excited to expel the increased heat, by the cooling process of perspiration; and thus the body is so constituted as to provide against the undue extremes of either heat or cold.

As the action of water differs so materially under various degrees of heat, the principal object to be studied in its application, is the change produced upon the system by these varieties of temperature. For this purpose water, from the

highest to the lowest degree of heat in which it can be safely applied externally, may be divided into hot, warm, tepid, and cold baths; to which may be added vapour and shower baths; with the more partial application of the water, under any of the above degrees of temperature, to some particular part of the body, as sponging, semicupum, or pediluvium.

There are several other kinds of baths which do not belong to the present subject, such as sand-baths. earth-baths,* dry-baths, medicated vapour baths, and baths or rather poultices, formed of different substances, as the pulp of olives in Spain, the mud which accumulates in some natural hot springs, and others composed of substances too disgusting to be mentioned, which as relics of barbarism, have been solely upheld by the efforts of empiricism in this country, not less remarkable for the general good sense than the inexplicable credulity of the inhabitants on medical subjects.

A bath is termed *hot* when the temperature of the water is permanently higher than that of the

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* It was probably from a knowledge of this practice, and of the exploded doctrines of Celsus, that the noted empiric Graham obtained his notions of the salutary effects of what he called earth-bathing; a practice which in the way he used it, consigned some of the many foolish persons of all ranks who consulted him to a perpetual mansion of the same material under the ground.

body in a state of health. It ccmmences therefore at 97°, and is seldom carried above 109°. On entering the hot bath a strong and permanent sensation of heat is experienced, the surface of the body becomes reddened, the face flushed, the pulse excited in force and frequency, the respiration grows hurried and occasionally laborious; these feelings continue increasing till profuse perspiration breaks forth, which lowers the violence of the action produced. Where no increased cuticular discharge is induced, the excitement commonly gives rise to such anxiety and general feeling of suffocation, as threatens apoplexy, or other alarming symptoms, and obliges the patient to leave the bath. It is seldom employed in this country by people in health, or by them only with the view of exciting perspiration; the person using it, therefore, generally retires to bed soon afterwards, by which any danger arising from sudden exposure to the air is prevented. Even in a state of disease this remedy is rarely applied. It is chiefly required in paralytic affections, and similar obstinate chronic complaints, or in habits rendered unusually torpid, by a long residence in hot climates, or where perspiration has failed to be excited by other means.

The *Vapour Bath* is rapidly superseding the

former in this country, and has long been a most important agent among other nations both in health and disease. As a remedy it may be traced for upwards of five hundred years before the Christian æra, and in Egypt, Arabia, Greece, and Rome, it was exensively practised: while in Persia, Turkey, Russia, and over the whole of the East, it is at this day almost considered necessary to existence. It has recently attracted general, and, it is to be hoped, permanent notice, among the people of the South and West of Europe. *I cannot here enter into a minute description of the construction and particular application of vapour baths,* but in connection with medicated water in general, and in the diseases to which sulphuretted hydrogen gas is applicable, they will be found of the highest importance.

The vapour bath can be used at various temperatures, according to the object in view; in exciting perspiration, removing chronic pains, stiffness of the joints, and general rigidity of the system, when accompanied with shampooing or friction, it is superior to every other kind of

* The reader who is desirous of information on these subjects, is referred to the work of the Hon. Basil Cochrane, 1809. Transactions of the Society for the encouragement of Arts, p. 181, vol. 30. Essay on bathing by Sir A. Clarke, M.D. 1819. A Treatise on the Vapour Bath, by J. Gibney, M.D. Brighton, 1825.

bathing, and perhaps to every other known remedy. The following animated, though somewhat voluptuous description of this bath, by M. Savary, in his Letters on Egypt, will show how highly it is prized in that country: "The first apartment on going to the bath, is a large hall, which rises in the form of a rotunda, and is open at the top to give a free circulation to the air. A spacious estrade, or raised floor, covered with a carpet, and divided into compartments, goes round it, on which the bather leaves his clothes. In the middle of the building is a *jet d'eau*, which spouts from a basin, and agreeably entertains the eye. When you are undressed, you tie a napkin round your loins, take a pair of sandals, and enter into a narrow passage, where you begin to be sensible of the heat, the door shuts to, and, at twenty paces, you enter another, and go along a passage at right angles with the first; here the heat increases; they who are afraid of exposing themselves suddenly to a strong degree of it, stop in a marble hall in the way to the bath, properly so called. The bath is a spacious and vaulted apartment, paved and lined with marble, around which are four closets. The vapour, incessantly arising from a fountain and cistern of hot water, mixes itself with the burning perfumes, and produces the

most agreeable effects. Extending on a cloth spread out, the head supported by a small cushion, the bathers stretch themselves freely in every posture, whilst they are enveloped in a cloud of odoriferous vapours, which penetrate into every pore. After reposing there for some time, until there is a gentle moisture over the whole body, a servant comes, presses you gently, turns you over, and when the limbs are become supple and flexible, he makes all the joints crack without any difficulty; he masses and seems to knead the flesh without making you feel the least pain. This operation finished, he puts on a stuff glove, and rubs you a long time. During the operation, he detaches from the body of the patient, which is running with perspiration, a sort of small scales, and removes the imperceptible impurities that stop the pores; the skin becomes soft and smooth like satin. He then conducts you into a closet, pours a lather of perfumed soap upon your head, and retires. The closet is provided with a cistern and two cocks, which supply hot and cold water—here the bather washes himself. Soon after the servant returns with a depilatory pomatum, which in an instant makes the hair fall off the places to which it is applied; both men and women make general use of it in Egypt; it is composed of a

mineral called rusma, (supposed to be an oxide of arsenic,) which is of a dark brown colour. After being well washed and purified, you are wrapped in hot linen, and follow the guide through the windings which lead to the outer apartment; this insensible transition from heat to cold prevents you feeling any inconvenience from it. On arriving at the estrade, you find a bed prepared, and when you are laid down, a child comes and presses every part of your body with its delicate fingers, in order to dry you thoroughly. The linen is changed a second time, and the child grates the callosity of the feet with pumice stone; he then brings a pipe and mocha coffee. Coming out of the stove, surrounded by hot and moist vapour, where the perspiration gushes from every limb, and transported to a spacious apartment, open to the external air, the breast dilates, and you breathe with voluptuousness; perfectly massed, and as it were regenerated, you experience an universal comfort, the blood circulates with freedom, and you feel as if disengaged from an enormous weight, together with a suppleness to which you have hitherto been a stranger; a lively sentiment of existence diffuses itself to the very extremities of the body, while it is lost in delicate sensations; the soul sympathizing with the

delight, enjoys the most agreeable ideas—the imagination wandering over the universe which it embellishes, sees on every side the most enchanting picture, and every where the image of happiness. If life be nothing but the succession of our ideas, the rapidity with which they then recur to the memory, the vigour with which the mind runs over the extended chain of them, would induce a belief, that in the two hours of that delicious calm that succeeds the bath, one had lived a number of years"

Mr. Madden, a more recent traveller, corroborates the above in his account of the application of the Turkish bath: "Of all remedies the vapour bath is the first and most efficacious in rheumatic and cuticular disease. I have seen them removed in one fourth part of the time in which they are commonly cured with us. In such cases I cannot sufficiently extol the advantages of the Turkish bath. The friction employed is half the cure, and the articulations of every bone in the body are so twisted and kneaded, that the most rigid joints are rendered pliant. I have trembled to see them dislocate the wrist and shoulder joints, and reduce them again in a moment. Their dexterity is astonishing! In further elucidation of the almost universal adoption of vapour bathing,

we are informed* that it is much in request in the towns in Canada, and found of much service during winter, when the cold seals the pores and checks perspiration. They build the bath of rude stones, by the banks of a lake or river, and in it kindle a fire, and keep it up until the stones be hot; they then sprinkle some water, and bring forth the patient, having stretched him or her in the rude bath; water is poured against the hot stones, which flies hissing on the body: when this is done the individual is wrapped up in buffalo skins, and a profuse sweat thereby obtained."

There are few practitioners in this country who have not witnessed the beneficial application of steam to particular parts of the body, and its use is rapidly on the increase. The vapour bath ought to be considered an indispensable appendage to all general bathing establishments, and public medical institutions.

Descending in the range of temperature, the *Warm Bath* next demands our attention, which has been hitherto more frequently used than any other, when the body is labouring under disease. Though perhaps strictly limited to ninety-six degrees of heat, it may be said to vary from 85° to

* Mactaggart's "Three Years in Canada, 1829."

97°, according to the feelings of the patient, water appearing warm to some, when it is comparatively cool to others, or even to the same individual under different circumstances. This is the state in which water is commonly most agreeable to the feelings, the body being only transferred into a denser medium of the same temperature with itself. No immediate sensible action is therefore produced by the warm bath, as is found to be occasioned by sudden immersion in very hot or cold water. But the heat of the bath being usually greater than the surrounding atmosphere, the action of the extreme vessels is increased, and the skin at the same time softened and relaxed, while the blood is gently propelled towards the surface: thus the general circulation becomes fuller and slower, and respiration is carried on with greater freedom: while a gentle perspiration is induced, which may be kept up, or restrained at pleasure.

To enumerate the diseases in which the warm bath has been either generally or locally applied, would be to exhibit a catalogue of almost the whole nosology, there being very few complaints where its judicious administration has not been attended with considerable advantage. But while the warm bath is so universally useful as a remedy, I differ from those who consider it equally

advantageous in the healthy subject. For notwithstanding it is a favourite dogma with many recent authors of celebrity, that the "warm bath is in reality a tonic, and fortifies the system against cold," I am fully of opinion that its long continued use, where no disease is to be combated, tends to relax and enervate the system, and that catarrhs, and other complaints arising from checked perspiration, more frequently supervene from its indiscriminate employment, than from any other manner of bathing. When there is a want of vigour to support the reaction of cold bathing, the warm or tepid bath is preferable, this very weakness being an almost certain indication of diseased action. It is undoubtedly serviceable, also, when the body, otherwise in health, is exhausted by fatigue; but the beneficial effects in such circumstances, arise from its equalizing the circulation, relaxing the density of the fibres, and inducing a state of repose. The body, when allowed to rest, thus resumes its wonted energy, and so far the warm bath, by removing irritation, may be said to possess secondary tonic powers: but in our variable climate, if the usual occupations of the day be resorted to immediately on leaving the bath, the consequences will not unfrequently be injurious. It is consistent with reason

and experience, that when the pores of the skin are relaxed and perspiration induced, the system is more susceptible of cold than at any other period; if the warm bath therefore, as it certainly does, occasions the former, it must inevitably lead to the latter. In Clarke's Essay, it is remarked, "that the body debilitated by fatigue is parting with its heat rapidly, by increased perspiration: in the other, the warm bath being surrounded with a medium of nearly its own temperature, the heat of the system is prevented from escaping, and has rather a tendency to accumulate. By this means the body is better able to resist the action of cold, immediately after coming out of a warm bath, than perhaps in any other given situation." The former part of this observation is sufficiently evident, and forms no bad comment on the latter, the effects in both cases being not dissimilar. That no danger can accrue from cold, as long as the body remains in the warm bath, is unquestionable, and that the animal heat is prevented from diminishing below the temperature of the water, is equally certain; but I am not aware how many degrees of heat the system can accumulate from water of the same temperature with itself. Heat has a tendency to diffuse itself through all bodies, and were it to accumulate in

the present instance, perspiration, which in most instances occurs, would reduce it to the natural standard. Granting, however, that on leaving the bath, some of this conveniently accumulated heat did remain, it must very soon be given off to the surrounding atmosphere, and the languor, and the relaxed state induced, will then enable the cold air to act much more decisively. This is proved every day by those who confine themselves in heated apartments being more susceptible of cold than others constantly exposed to its action. In countries where the warm bath is in general use, the climate is either much hotter than ours, or they guard against the consequences by using the tepid or cold bath immediately afterwards, by which a real tonic effect is produced.* The numerous instances of catarrhs and similar affections, which supervene on the first use even of the natural tepid bath, as is daily witnessed at Buxton, go further to establish what has now been advanced, than a hundred volumes written in its support.

In justice to those who advocate the direct tonic powers of the warm bath, I shall here insert the interesting account given of his own case, by the

* An interesting account of the Russian manner of bathing is given in the Journal de Physique, tom. 25, and in Granville's Travels in Russia.

celebrated Count Rumford, who observes, "Being at Harrogate, on account of my health, I at first went into a bath heated to about 96 degrees every third day; at first I went in about ten o'clock in the morning, and continued in it from ten to fifteen minutes, and immediately on coming out, went to bed, having been well warmed *to prevent taking cold.* Having pursued this method for some time, and finding myself frequently feverish and restless after bathing, I accidently, in conversation, mentioned the circumstance to an intelligent gentleman who happened to lodge in the house, and who had long been in the habit of visiting Harrogate every year. He advised me to change my hour of bathing, and to avoid going into a warm bed on coming out of it. I followed his advice, and shall have reason all my life to be thankful for it. I now went into the bath regularly, every third day, about two hours before dinner, and in coming out of it, instead of going into a warmed bed, I merely had myself rubbed perfectly dry with warmed cloths, and, dressing myself in my bedgown, I retired to my room, where I remained till dinner time. The good effects of this change were too striking not to be regarded aud remembered. I was no longer troubled with any of those feverish heats after bathing which I experienced before,

and so far from feeling chilly, or being particularly sensible to cold on coming out of the bath, *I always found myself less sensible to cold after bathing than before:* I even observed, repeatedly and invariably, that the glow of health, and pleasing flow of spirits, which resulted from a full and free circulation of the blood, which warm bathing had brought on, continued for many hours, and never was followed by anything like that distressing langour which always succeeded to an artificial increase of circulation, and momentary flow of spirits, when produced by stimulating medicines. I regularly found that I had a better appetite for my dinner on those days when I bathed, than on those I did not, and also that I had better digestion and better spirits, and that I was stronger to endure fatigue, and less sensible to cold in the afternoon and evening. As these favourable results appeared to be quite regular and constant, I was induced to proceed to a more decisive experiment. I now began to bathe every second day, and finding all the advantageous effects which I had before experienced from warm bathing, still continued, I was encouraged to go one step further, and I now began to bathe every day. This experiment was thought to be very hazardous, by many persons at Harrogate, and even by the physicians,

who did not much approve of my proceedings; but as no inconvenience appeared to result from it, and as I found myself growing stronger every day, and gaining fresh health, activity, and spirits, I continued the practice, and actually bathed every day at two o'clock in the afternoon, in a bath at a temperature of 96 or 97 degrees, during thirty-five days. The salutary effects of this experiment were perfectly evident to all those who were present and saw the progress of it; and the advantages I have received from it have been permanent, and the good state of health which I have ever since enjoyed I attribute to it entirely." Though this case, from the high character of the philosophic writer, is entitled to every consideration, yet I by no means agree with those who consider it entirely decisive of the question. Count Rumford, whose name was Thompson, was an American, and like his countrymen not altogether unacquainted with the marvellous. In the first place, he was in bad health, and would therefore be at all times on his guard against cold; he kept his room for two hours after the bath; again, his being restless and feverish at night, might be occasioned by the evening exacerbation of fever; or, if perspiration was not excited, the restlessness complained of would in most instances supervene. With many

others, he seems more disposed to attribute peculiar effects to one remedy or its manner of application, than to the action of the disease or the habits which engendered it. A case in some respects similar to this is recorded by the celebrated John Wesley in his journal, who in the words of Dr. Paris, "while he commemorates the triumph of 'sulphur and supplication' over his bodily infirmity, forgets to appreciate the resuscitating influence of four months' repose from his apostolic labours; and is more disposed to attribute his cure to a brown paper plaster of egg and brimstone, than to Dr. Fothergill's salutary prescription of country air, rest, asses' milk, and horse exercise." Count Rumford's restoration to health, therefore, may be fairly attributed to the general efficacy of the place, the waters, and the baths, more than to the time when the latter were used. The case, however, is an important one, pleasingly told, and deserves the attenton of the invalid.

The warm bath therefore I consider principally useful in a fatigued, debilitated, or diseased state of the system; it may however be used by any one, proper precautions being adopted. Under these views, no particular time can be specified for its application. If perspiration be excited and its continuance be wished for, the patient of

course goes to bed; where sleep is the object required, the evening naturally suggests itself. The frequency of its use must depend upon the effects produced, and the intention for which it is applied. Those unaccustomed to the warm bath ought not to remain in it above five or ten minutes at first, and gradually increase the time, as the constitution can bear it; from twenty minutes to half an hour will in general be found sufficient.

The *Tepid Bath* includes a much wider scale of temperature, than those already mentioned; as it may vary from 60° to 90°, and according as it approaches one or other of these extremes, the nearer its effects resemble the cold or warm bath. The body, when submitted to the action of the tepid bath, in most cases suffers no perceptible change, the pulse, heat, and respiration remaining unaffected. Its properties are, therefore, more strictly negative than any of the others, and benefit is received, more from the impurities of the surface being removed by the detergent qualities of the water, and flexibility restored to the general system, than from any specific effects of temperature. From this its use must be obvious. It becomes valuable when the body is in such a weak, languid, or irritable state as neither to bear the reaction of cold water, nor the excitement of the warm bath.

Thus, in phthisis the tepid bath is generally to be preferred; and in most cutaneous affections, where a higher degree of temperature is seldom necessary. As immersion may be continued for a great length of time, without occasioning much subsequent lassitude, it seems particularly indicated after attacks of rheumatism and gout, with similar complaints, in which some febrile irritation and sporadic pains continue to exist, after the violence of the disease is subdued. It is no less advantageous in the febrile affections of children, where it almost invariably affords relief; and in relaxing the growing rigidity of old age.

In early infancy, the daily use of the tepid bath is most eligible, but after a few months have elapsed, washing a child in cold water is much more efficacious in invigorating the system and laying a foundation for future health. Though it has become customary of late to decry this practice, and to raise imaginary terrors in the minds of mothers respecting the danger of cruelly submitting the "*delicate feeble frames*" of children to the action of cold water—an incontrovertible mass of experience, both ancient and modern, proclaims it not only safe, but highly salutary. However much the inhabitants of civilized countries excel in mental acquirements and other artificial accom-

plishments, they commonly yield, cæteris paribus, to their less informed neighbours in health and physical power. This arises principally from the different manner of rearing their children. In those nations which have been particularly distinguished for muscular force and agility, this practice has been generally employed. In the medical annals of almost all nations, it will be found that as luxury and effeminacy increased the temperature of their baths arose by the same scale.*

It has been argued, that from the disproportion of some of the organs in childhood, congestion and inflammation are apt to take place. In answer to this it may be observed, that the washing or plunging a child in cold water is so momentary as to allow of no congestion taking place, and again, that the system of children is too elastic to permit such congestion to continue; while from it being early accustomed to it, there are always sufficient powers of re-action. This, as far as my own experience goes, I have uniformly found to be the case; nor was I ever able to trace disease to, or

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* The Roman History exhibits a beautiful illustration of this: the baths became hottest during the Reign of Nero; they were checked by the wisdom of Adrian, and regulated by the conqueror Severus.

Heir: Mercur: L. 1, Cap. 10, Gibbon's Decline and Fall of the Roman Empire, vol. 5, p. 280.

discover any bad effect from, washing or immersing a healthy child in cold water, but on the contrary, a hardy race is fostered, capable of undergoing future hardship and exertion. With this belief, I must with due deference suggest to the whole phalanx of Spine Professionalists, regular and irregular, that instead of multiplying processes already sufficiently numerous for any useful purpose, and explained and understood centuries ago, they would lend their influence and judgment to recommend those measures in early infancy and youth, which would in most instances render their subsequent interference unnecessary. When disease occurs, the tepid bath becomes much more serviceable. After the child is washed, it ought immediately to be well dried, and dressed, or put to bed, as the time requires. I would therefore recommend mothers to continue this practice, as the best means of rearing a strong, healthy, and vigorous offspring.

The advantages of the more partial application of warm or tepid water, may be gathered from what has been already remarked. Bathing the feet in warm water is frequently of great service in allaying general irritation, or slight febrile action. From the powerful sympathy which exists between the feet and abdominal viscera, warm water applied to the former, often relieves the

most distressing symptoms of the latter. In the commencement of colds, from whatever cause, nausea, spasms of the stomach, diarrhæa, or cholera morbus, this remedy, so simple and easily procured, ought not to be neglected; as it will sometimes afford ease where more complex measures have failed.

Having thus noticed a few of the general effects of bathing, it remains briefly to consider the application of the baths impregnated with sulphuretted hydrogen gas. In nothing have the improvements at Harrogate been more efficient in respect to invalids and the public, than in the baths, which are now conducted in the most approved manner. There are baths connected with all the principal hotels, and some of the lodging-houses, though from the establishment of two public suits of baths already referred to, those are now comparitively seldom used, unless in cases of serious indisposition; while those absurd customs in regard to the sweating-beds, and rooms, which called forth the sarcastic remarks of Smollet, and the facetious auteor of John Buncle, as well as the more grave remonstrances of Dr. Alexander, and others, have for many years been entirely abolished.

I have from time to time procured information respecting the number of baths taken in one season, but as I wish to avoid every appearance of

partiality, having indeed, nothing in common with the local jealousies or interests of the parties, it is unnecessary to enumerate such particulars. It is certain, however, and more satisfactory to know, that their use of late years has greatly increased; and enough has already been stated to show their value in most diseases in conjunction with the internal use of the water.

The action of the sulphur water at Harrogate, when applied externally, is considerably more stimulating than a bath of pure water of the same relative temperature. Much diversity of opinion still continues to exist as to the absorption of the water and its ingredients by the skin; the older writers on this subject, particularly Drs. Alexander and Garnett, support this doctrine to a great extent. The former observes, "the human skin is exceedingly porous, even more so than is almost within the reach of credibility. This being premised it is easy for the meanest capacity to conceive, that a human body, put into a warm bath, must in proportion to the time it remains there, suck up a proportional quantity of the water of the bath, with every ingredient that happens to be dissolved in it;" and states the well-known fact, that the body weighs heavier after coming out of the warm bath, and that the water likewise loses part of its weight. The latter remarks, "besides the effects

of the bath in cleaning the skin, and deterging the cutaneous vessels, a large quantity of medicated water is taken into the blood, perhaps in a more active and less altered state than when taken in by the stomach." Dr. Scudamore, does not acquiesce in the latitude of this opinion, but declines to discuss the question, as it would engage him in physiological arguments too extended for his enquiry. "It is sufficient for our present purpose," he observes, "to know that the water used as a bath has a very marked operation on the system; more specific in its nature than the simple warm bath. Enough, I conceive, is admitted to explain its effects, in considering that its strong impregnation with saline and gaseous matters causes it to act very decidedly on the sentient surface of the body, and indirectly by sympathy upon the internal organs." Now this is by no means satisfactory, even were it correct, which, in a physiological point of view, is not the case, for it would be insufficient to explain its effects; since it would be extremely difficult to show what kind of sympathy such an agent could exert either directly or indirectly upon the internal organs. The doctrines of sympathy no less in affections of the mind than of the body are governed, I conceive by very different laws.

Those eminent anatomists and physiologists

William and John Hunter, who chiefly elucidated the lymphatic system, insisted most strenuously upon its absorbent power in all its parts. The more recent experiments of Magendie, give an additional absorbent power to the capillary vessels of the venous system; while they seem to disprove cuticular absorption altogether. Dr. Milligan, in the notes to his translation of Magendie, after detailing several well executed experiments, gives the following lucid view of the subject: "All parties are agreed on two points; *first*, that the cutis vera enjoys a very high absorbent power; *secondly*, that the internal surface of the lungs, whether covered or not with a thin cuticle, possesses the same faculty in an eminent degree. The fact then of cuticular absorption may be stated as follows: the cuticle has no absorbing orifices opening on its surface, and the substances hitherto supposed to be taken up by these, really make their way into the body by the action of the absorbing vessels of the lungs and cutis vera: yet from the imbibing faculty common to the cuticle with dead or unorganized matter, many substances may, by long MACERATION or EXTERNAL VIOLENCE, find a passage through it to the absorbing orifices of the cutis vera, without any laceration of the cuticle being visible." The experiment of Seguin in the Annales de Chimie, led to the conclusion very generally assented to at the

time that no absorption of water, under any circumstances, occurs in bathing. Professor Berthola repeated these experiments with great care two years ago, and proves as satisfactorily as the nature of the subject can admit that absorption does take place to a very considerable extent. In a quarter of an hour, he states, the increase of weight at 4dr. 45gr.; in three quarters of an hour 1oz. 4dr. 45gr.; and in one hour 1oz. 7dr. 30gr. The absorption by the lungs is at all times considerable, and large quantities of sulphuretted and other gases which escape from the heated water, must be inhaled while in the bath; in cutaneous diseases where the cuticle is often abraded to a great extent, absorption will occur: while the capillary porosity or sponginess of the epidermis or cuticle allows of the same action. The simple imbibation of fifteen square feet of porous surface, when aided by the high temperature at which the bath is commonly used, together with the other causes, fully warrants the conclusion, that a very considerable quantity of fluid, unchanged by the action of the stomach is thus taken into the system. The precise changes, produced by the fluid so absorbed or imbibed, cannot yet be satisfactorily explained, and my limits do not permit me to enter fully into the subject, but the final result is obvious in renewed health and strength

EXERCISE.

From the earliest records of physic to the present day, exercise has always been considered one of the principal means intended by the Author of our being for the preservation of health and alleviation of disease. In the early stages of society, when locomotion is absolutely required for procuring daily subsistence, we find few or none of those diseases recorded which a more complex and artificial order of things has engendered among mankind, and entailed upon their posterity. But as almost every good in this life has its attendant evil, the object is by no means to deprecate those improvements which the ingenuity and labour of man have been able to accomplish, but to caution against their abuse, and to point out how they may be employed in prolonging life, and adding to health, comfort, and happiness. So essential is exercise to the enjoyment of health, and health to the enjoyment of every other blessing, that the man is inexcusable who neglects the former, and yet expects to retain the latter.

The rules laid down by one of the earliest writers on this subject have scarcely hitherto been surpassed:—"Sanus homo, qui et bene valet et suæ spontis est, nullis obligare se legibus debet: ac neque medico neque iatralipta egere. Hunc oportet varium habere vitæ genus: modo ruri esse, modo in urbe, saepiusque in agro; navigare, venari, quiescere interdum, sed frequentius se exercere; siquidem ignavia corpus hebetat, labor firmat; illa maturum senectutem, hic longam adolescentiam reddit. Prodest etiam interdum balnea, interdum aquis frigidis uti."* A sound man, who is both in health and his own master, ought to confine himself to no (medical) rules; and neither requires physician or apothecary. It behoves him to vary his manner of living; to be sometimes in the country, sometimes in the city, and oftener in the field; to sail to hunt; to rest occasionally, but more frequently to exercise himself: as indeed indolence enervates the body, labor strengthens it. the former induces premature old age, the latter gives a long period of youth. It is of advantage also sometimes to use the warm bath, occasionally the cold.

Early hours are always conducive to health and longevity; and though it has been observed that men of every temperament and manner of living,

* Celsus lib. 1 p. 14.

have had their lives protracted beyond the period usually allotted to mankind; yet it has also been remarked that they were almost uniformly early risers. The morning and forenoon are certainly the most proper times for the invalid to take exercise, yet too great stress has been laid upon this circumstance; for though it is better not to take violent exercise immediately after meals, the injury said to be produced, depends more upon the stomach being loaded with too much food, than upon the exertion; which is no more likely to prove hurtful after a moderate dinner, than after breakfast. The common labourer, the navigator, or the artisan, is not found to suffer from resuming his employments after his usual frugal meal. The advantages to be derived from walking, riding on horseback, or in a carriage, as the patient's health, strength, inclination, or circumstances will permit, are too well known to require any exhortations for a steady perseverance in their use. If the patient be a sufficient length of time in the open air, or otherwise actively employed, I am less solicitous as to the manner in which it may be accomplished, though riding on horseback has been preferred. Dr. Fothergill observes, "Of all exercises, walking is the best, as it is the most natural for man in health. All sorts of exercise are wholesome and

best before meals, especially riding. Riding on horseback is the best exercise to recover lost health, and walking the best to preserve good health."

To those to whom the sensual gratification of drinking deep, or the tooth-picking lounge upon the sofa, afford little pleasure, the ball-room is both a pleasant and healthy mode of spending the evening. Than dancing, there is no species of exercise which can be taken within doors more cheering to the mind, and renovating to the body; and though usually considered a fatiguing recreation, it seldom produces any bad consequences. The music* alone has a remarkable power over many individuals in soothing the mind and equalizing the passions; and a placid state of mind becomes in its turn a powerful auxiliary in the treatment and cure of no small number of the most inveterate diseases. The weak and delicate ought not to exert themselves like the strong and vigorous, and in no instance should the body when overheated be suddenly exposed to the cold air. The warm bath, though from the usages of society rarely compatible with dancing hours, is a real luxury after this exercise, and will frequently induce sound and tranquil sleep.

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* Dr. Jones, in the year 1572, after advising the visitors at Buckstone to get acquainted with the air, adds, "and have Melody, for it refreshes the wit, increases the strength, and melancholy it puts to flight."

DIET.

From the earliest authentic records which we possess of our species, the sacred writings of Moses, who paid much attention to the subject, down to the present time, to deter mankind from intemperance has employed the authority of the lawgiver, the tongue of the declaimer, the pen of the satirist, the reasoning of the philosopher, and the religion of the divine; and all with less success than could have been wished or expected. Much has, indeed, of late been attempted and even affected to reduce the people of this country to a sober consideration of this matter; yet I am not aware that any modern guardian of the public purse has attributed the descending ratio of the national income to the 'Temperance Societies' or to the 'Tee-totallers' *en masse*. Such a view of the case would have been complimentary on both sides, and must have recalled to the leaders of these systems the words of the poet, 'the angry spirit of the water shrieks.' In connection with

these ancient and modern auxiliaries, my remarks on this head may be much shortened, when the very great number of works on dietetics, regimen, and homæophatics recently published are considered. The physical and mental condition of the species have in some of those works been treated with much ingenuity. Man is now no longer 'a cake half turned,' but has been viewed, turned, recast, and reformed, in almost every state of individual and social relation.

Moderation in eating is at all times highly commendable, but more essentially necessary during a course of mineral waters. For the largest proportion of cases which require their use, has been either originally excited, or subsequently confirmed by a too free participation in the luxuries of the table. As there is no class of diseases in which a proper regimen is found to be of greater importance, so there is none in which medicine is unfortunately less efficient. Aware of this, it is imperative upon all who either value the health they enjoy, or seek to regain that which is lost, to abstain from those things which their own experience, or that of others, has ascertained to be injurious; and to have recourse to such plain food as will nourish the body, without oppressing the organs of digestion. The number of distinctions,

and the variety of detail which this important subject involves, preclude the possibility of laying down rules suited to every case, or entering minutely into a consideration of the different kinds of aliment.* Nor is it the mere *quality* of food which is generally of most importance; the *quantity* and *variety*, the time it is taken, and the manner of preparing it, are the objects most worthy of regard.

As the complaints for which these waters were anciently used have been already enumerated, the diet for the same period may be no less interesting, which proves that whether cooks were as scientific as at the present day, it was not for want of good materials. Dr. Dean, in 1626, says, "let the drinkers use a moderate quantity of meat and drink, of light and easy digestion, good and wholesome, affording laudible juice; but such as breed crude and bad humours must be refrained, and also variety of dishes eaten at the same meal; and all pickles spices, sauces, and fat in dressing. They must also avoid all salt meats, beef, bacon, pork, lard, and larded meats, hare, venison, tripes,

* The reader is referred for further directions to Fothergill's Rules for the preservation of Health; Cheyne on the natural method of curing disease of the Body and Mind, 4to edit.; Willich's Lectures on Diet and Regimen, Arburthnot on Aliments, 4to edit.; the works of Drs. Kitchener, Paris, Combe, &c. &c.

and all other entrails of beasts, blood-pudding, geese, pigs, swans, teale, mallard, and all other water fowl, being of hard digestion and ill nourishment. And among fish, salmon, eels, lamprey, herring, and salt ling, all salt fish, sturgeon, oysters, anchovies, cockles, muscles, and shell fish. I likewise disallow of the white meats, milk-curds, cream, old cheese, custards, white-pots, pudding pies. Of fruits, apples, pears, plumbs, codlings, gooseberries, and all summer fruits, either raw, or in tarts and pyes; and all peas and beans, cold sallads, raw herbs, onions, leeks, chives, cabbage, coleworts, pompions, cucumbers, and the like; nor should they use much exercise after dinner; nor sit heavy, sullen, dull, musing, or slumbering; but a little gentle walking, or cheerful conversation. Let therefore their diet be hens, capons, pullets, chickens, partridges, pheasants, turkies, and generally all wood and mountain fowls; veal, mutton, kid, lamb, rabbits, young hare, and leverets, rather roasted than boiled, except use or constitution require the last. Of fish, trouts, perches, loches, and all scaly brook and river fish; smelts, soales, dabbs, whitings, turbut, gurnet, and all such other that are not heavy and unwholesome. These may be altered with mint, hysop, or anise. Also cray-fish, crab-fish, lobsters, and the like;

raisins with almonds, bisket-bread, and marshpan stuff suckets, well kneaded and leavened white bread, old well-brewed beer, but not stale, tart, sharp, or soure; nor by any means let it be mixed with spaw water. Instead of cheese at meals, eat candyed lemon, or citron peel, or comfits of anise, fennel, carvy, or coriander, to warm and strengthen the stomach, and expel wind; sweet butter and new cream cheese." There is much good sense in these remarks, but the Faculty of the present day allow the use of various kinds of shell-fish, which are not considered injurious to the action of these waters.

Nothing is more common than to hear persons complain that they have no appetite for *breakfast.* This frequeutly arises from taking a good supper, naturally a social meal, and indulging in bed till a late hour in the morning. To those who rise early, and eat little or no supper, the breakfast is generally a pleasant, and ought to be a hearty meal. We are thus enabled to undergo the fatigues of the day, and in a great measure prevented from having recourse to that ambiguous repast, the *lunch;* against which even bonvivants are wont to exclaim. Tea and coffee are now in such general requisition for breakfast, that it would be difficult to find a substitute more agreeable, or up-

on the whole, less hurtful. Milk, where it can be taken, is certainly more nourishing and wholesome, and ought to be preferred by those drinking chalybeate waters,* not only in regard to its chemical properties, but as it coincides more powerfully with the curative character of the water. Plain dry toast, with a little cold butter, is easier of digestion than either roll or muffin. To a person in health this is of little consequence, but where the stomach is relaxed, or nicely balanced, the difference is very perceptible.

To enumerate the various dishes commonly presented for *dinner*, at those places where people resort for the avowed purpose of recruiting their health, would to me be a task neither easy nor agreeable. Much must be left to the judgment, and something to the habits of the patient. He will best consult his own health, and the intended effects of the waters, who partaking of one or two plain dressed dishes, allowes the others to disappear as they enter. Most boiled vegetables may be eaten with safety: salads, and every species of raw vegetables are often prejudicial, at best but

* If the use of tea be so objectionable when drinking chalybeate water, Dr. Short is equally severe against the use of ale with the sulphur water. "This water mixed with ale, certainly makes the most intolerably nauseous draught in nature. A stranger to the trick would certainly call for an attorney to make his will, if he had not done it before." p. 290.

equivocal, totally uncalled for, and not to be recommended. The rod, which occasioned so much distress to honest governor Sancho, ought with inexorable sweep to be extended over every species of baked meat, pastry, and the whole train of confectionary agrements. The indiscriminate use of these deleterious substances, and their frequent exhibition to children is indeed matter of serious regret, and cannot be too severely deprecated; for they tend, in no small degree, to produce and prolong those scrofulous and cutaneous affections which render the period of childhood a perpetual scene of trouble, and too frequently of premature dissolution. Even when some few thus indulged survive to adolescence, the malady which before had a disposition to the cuticular and mesenteric glands, now fixes on the more vital pulmonary organs, and lays the foundation of those complaints, which annually destroy, in the most interesting period of their lives, thousands of the "sweetest and fairest" of the British Isles.

The quantity of butter consumed, and of most other sauces of which it forms the basis, is also highly objectionable. Animal food is in itself sufficiently nutritious; and where butter is taken with fish or vegetables, it ought to be plain and in small quantity. Though butter in its natural

state is highly nutritious, and with many easy of digestion, yet the changes it undergoes when subjected to heat in the different culinary processes, render it frequently as noxious as rancid oil, and when united with flour, isinglass, and similar substances, it becomes still more indigestible.

Jellies, plain pudding of rice, or flour and milk, baked fruits, with the omission of the pastry, are light and easy of digestion, and often constitute an important part of the invalid's dinner: but before using too great a variety of these and similar articles, after a meal of more solid food, it may be well to remember the words of the poet:

——"The stomach, crammed with every dish,
A tomb of roast and boiled, and flesh and fish,
Where bile, and wind, and phlegm, and acid jar,
And all the man is one intestine war."

Water is the element, wisely afforded us by nature, for allaying thirst and diluting our solid food; and the art of man has hitherto been unable to produce any substitute better adapted for the purpose. The only reasonable objection to its use arises from its occasional hardness and impurity; these, though said to exist much oftener than is really the case, may be easily obviated by previous boiling or distillation; the chance of obtaining good beer is much more precarious. But where small beer has been the common beverage, the

mere drinking of Harrogate Water, except some other cause intervene, does not preclude its ordinary use.*

Wine has been termed the bane of youth, the comfort of middle life, and the milk of old age. Taken to the extent of two or three glasses it promotes digestion, and increases perspiration. But the valetudinarian ought to be particularly on his guard not to exceed this quantity; the temptation of agreeable company, leisure hours, and the habits he has formerly indulged, make this caution doubly necessary: and though occasional excess in drinking is with justice admitted to be less injurious than in eating, yet the destructive influence which the liberal and daily use of vinous liquors produce on the vigour and stamina

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* Hoffman has thus recorded his sentiments respecting water: "Pure water from a clear stream, drank in such quantity as is sufficient to quench the thirst, is the best drink for persons of all ages and temperaments. By its fluidity and mildness it promotes a free and equal circulation of the blood and humours through all the vessels of the body, upon which the due performance of every animal function depends: and hence water-drinkers are not only the most active and nimble, but also the most cheerful and sprightly of all people. In sanguine complexions, water, by diluting the blood, renders the circulation easy and uniform. In the choleric, the coolness of the water restrains the quick motion and intense heat of the humours. It attenuates the glutinous viscidity of the juices in the phlegmatic, and the gross earthiness which prevails in melancholic temperaments; and as to different ages, water is good for children to make their tenacious milky diet thin and easy to digest; for youth and middle aged people to sweeten and dissolve any scorbutic acrimony or sharpness that may be in the humours, by which many pains and obstructions are prevented; and for old people, to moisten and mollify their rigid fibres, and to promote a less difficult circulation through their hard and shrivelled pipes."

of the constitution is too universally known and feelingly experienced to require any additional comment.

There are, as in many other cases, two methods of cure after excess in wine, both of which have their theoretical and practical advocates: the one is to lie still in the morning and drink slops, with all the other accompaniments; the other to be roused early from bed under all feelings, and spend two or three hours in the open air; the latter, though requiring the greater exertion, is unquestionably the most conducive to health.

All must be aware that the use of ardent *spirits* is liable to greater objections; and their immediate and powerful action upon the coats of the stomach, the gastric juice, and biliary system, is till more active and pernicious. When the stomach feels heavy or distended after dinner, a cup of good coffee is better calculated to remove these feelings and promote digestion, than any quantity of wine, or weak mixture of spirit and water, which has of late been frequently recommended, and is often taken for that purpose; a draught of pure spring water is still more effectual.

Fruit in this country seldom forms a regular meal. Taken, either before or after dinner, in moderate quantity, it rarely proves troublesome,

and is generally wholesome. When used in large quantities with wine, immediately after dinner, it is apt to produce acidity, and occasion spasms in the stomach and bowels. Where this occurs it should of course be discontinued.

From no meal does the constitution suffer such general injury as from a heavy *supper*. When dinner is taken at four or five o'clock, and a proportionate quantity of wine, fruit, and cakes, is consumed afterwards, it becomes impossible for the stomach, worn out with previous fatigue, or rendered torpid from the burden of unassimilated aliment, to digest an additional quantity of solid food: even though the false appetite excited by the afternoon's wine should seem to demand it. Besides, the stomach thus distended presses in the recumbent posture upon the diaphragm, impedes the action of the lungs, and gives rise to difficult respiration, troublesome dreams, and other unpleasant sensations, nor can the food pass readily from the stomach in the horizontal posture. Remaining, therefore, in the first passages of the alimentary canal, the absorbents are stimulated to undue action, the grosser particles of the chyle, which exercise would otherwise expel, are carried into the general circulation, and the blood becomes thickened and impure. A vitiated mass of fluids

is thus accumulated in the system, which, being unable to pass by the excretory vessels, gives rise to apoplexy, gout, obesity, scrofula, stone, dropsy, consumption, and similar complaints. The feelings of the supper-eater are still less enviable in the morning. Obtuse, compressed, pulsating pain in the head, hot dry tongue, tainted breath, teeth loaded with sordes, general lassitude, and giddiness amounting sometimes to syncope, are, in a greater or less degree, his first sensations; while the person who wisely retires to bed without supper, or is contented with a little light refreshment of the mildest kind of food, soon sinks into a calm and undisturbed sleep, awakes next morning refreshed and vigorous, his spirits animated, his head clear, with a mind and body prompt and active to execute the evening's resolutions, and undertake the labours of the day. Where an early dinner has been made, I would recommend a more than usual quantity of bread at tea-time, omitting supper altogether; or when much exercise has been taken in the afternoon, a little light food may be necessary, and should be taken an hour or two before retiring to rest.

After all that has been written on this subject it is undeniable that there are pleasures attending good generous living which few are found to

despise, and a still smaller number able to resist. When a rich and luxurious diet is counterbalanced by much active exertion, the consequences are neither so immediate in their approach, nor so destructive in their effects. Unfortunately, however, the majority of those who give way to such enjoyments gradually become averse to exertion. This aversion gains ground, while the former propensities continue undiminished, or increase as the body grows unable to resist them. Thus the escape of to-day only encourages the hazard of to-morrow. But though the powers of the stomach are confessedly great, and are long able in an astonishing manner to withstand those excesses in which the folly and depraved appetites of men have been accustomed to indulge; yet a broken constitution, a premature old age, and all the harassing feelings of a weakened and diseased mind, will sooner or later show that the laws of sobriety are not to be invaded with impunity: and that well-regulated temperance is the rock on which we must establish the basis of robust and energetic youth, build the solid fabric of manhood, and support the tottering structure of declining years.

The Harlow Sulphureous Alkaline SPRINGS AND BATHS.

These Springs and Baths, which promise to be of eminent service to a large class of Invalids resorting to Harrogate, are delightfully situated in the Valley called Harlow Car, beyond the Tower, on the Otley Road, less than a mile and a half in a direct line from the Brunswick Hotel, and only one mile and one fifth from the Old Sulphur Wells at Low Harrogate, measured on the ancient Foot-path up the Bogs Lane.

The situation is highly romantic and picturesque, and the surrounding estate being well-wooded, and presenting a most inviting aspect on which the Owner has built a House for the accommodation of Visitors, and a suite of Baths immediately adjoining the Spring, and been at considerable expense in laying out the grounds, making walks, and cutting Avenues through the Plantations to diversify the scenery, and to render the "Harlow Sulphureous and Alkaline Springs," when nature has lent her powerful aid, one of the most delightful retreats in this neighbourhood.

The various Springs have recently been analysed by an eminent Chemist, whose Observations and Analyses, together with the favourable Tes-

timonial of a Harrogate Physician are given below for the candid perusal of the reader.

ANALYSES, &c.

I have analysed the water of three Sulphur Springs in the Grounds of Mr. Wright, at Harlow Car, near Harrogate, and find them to contain, in an Imperial Gallon, the following Salts, expressed in Grains; also the following Gases, expressed in Cubic Inches, per Gallon.

THE SULPHUREOUS SPRINGS.

SPRING No. 1.

	GRAINS
Muriate of Lime	4,73
Sulphate of Magnesia	1,15
Carbonate of Magnesia	6,93
Carbonate of Lime ..	5,88
Carbonate of Soda ..	14,11
Total Solid Contents	32,8

	CUBIC INCHES
Sulphuretted Hydrogen	3,15
Carbonic Acid	6,05
Nitrogen	8,34
Total Gaseous Contents	17,54

SPRING No. 2.

	GRAINS
Muriate of Lime	8,85
Sulphate of Magnesia	2,91
Carbonate of Magnesia	8,43
Carbonate of Lime ..	.12
Carbonate of Soda....	17,64
Total Solid Contents	38,

	CUBIC INCHES
Sulphuretted Hydrogen	2.8
Carbonic Acid	5,75
Nitrogen	7.97
Total Gaseous Contents	16,52

SPRING No. 3.

	GRAINS
Muriate of Lime	4,77
Sulphate of Magnesia	1,56
Carbonate of Magnesia	8.23
Carbonate of Lime ..	5,84
Carbonate of Soda....	12,9
Total Solid Contents	33,3

	CUBIC INCHES
Sulphuretted Hydrogen	2,92
Carbonic Acid	6.1
Nitrogen	7,98
Total Gaseous Contents	17,

These Waters are extremely similar, and might for medicinal purposes be considered as the same; the similarity is much greater than is represented by the figures, the total of the Lime and Magnesia being nearly the same in each, though in somewhat different combinations.

It is quite plain from these Analyses, that these waters differ materially from those of the Old Well, and other Saline Sulphureous Springs; they contain little Saline Matter. They will have their own medicinal properties, depending on the pre ence of Sulphuretted Hydrogen and Carbonate of Soda, and the absence of Muriate of Soda. I am of opinion that they may form an useful addition to the variety of important Mineral Waters of Harrogate.

WILLIAM WEST.

Harlow, 13th of 5th Month, 1844.

THE CHALYBEATE SPRING.

	GRAINS		GRAINS
Protoxide of Iron	2.16	Carbonate of Lime ..	2.93
Muriate of Lime	1,62	Carbonate of Soda....	1,27
Sulphate of Magnesia	.77		
Sulphate of Soda	1,65	Total Grains	10,4

I consider it to be of a very desirable strength. There are other Chalybeate Springs very near, but they are not so strong.

WILLIAM WEST.

Harlow, 13th of 5th Month, 1844.

DR. KENNION'S TESTIMONIAL.

"The trial which I have already made, pretty extensively, of the Harlow Sulphureous Alkaline Waters, lately brought into notice, fully authorizes me to express my opinion of the benefit which may be derived from its use, in a variety of cases where the 'Old Sulphur Water' is inadmissable.

"It is not, therefore, to be considered at all as a rival to the latter, but, from its peculiar composition, it may be regarded as a most valuable addition to the Spas with which this place is already so much enriched."

GEORGE KENNION, M. D.

Harrogate, July 31st, 1844.

FINIS.

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INDEX.