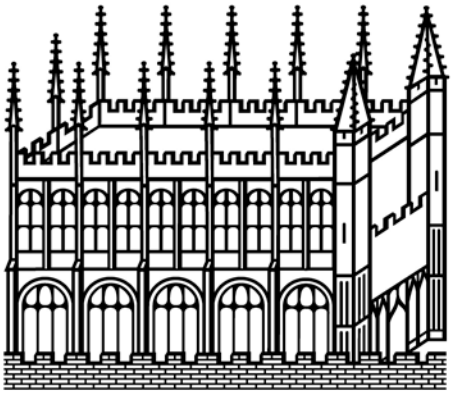


ON THE
Sea-Bathing
AND
Mineral Waters
OF
Scarborough.

Dr ALEXANDER.

VIEW OF SCARBOROUGH FROM THE SOUTH CLIFFS

ON THE

SEA-BATHING

OF

SCARBOROUGH,

WITH THE

VARIOUS FORMS OF BATHS,

AND THEIR

MEDICINAL USES:

TOGETHER WITH THE

ANALYSES

OF THE

MINERAL SPRINGS & THEIR MEDICAL PROPERTIES.

BY

WM. ALEXANDER, M.D., F.R.C.P., LOND.;

SENIOR PHYSICIAN TO THE HALIFAX INFIRMARY—AND J.P. FOR THE COUNTY OF YORK.

AUTHOR OF "THE HORLEY GREEN MINERAL WATER"; "THE SANITARY CONDITIONS AND LEVELS OF DRAINAGE OF HOLLAND"; "ON ANŒSTHETICS AND THE CHLORAL HYDRATE"; ON THE SPRINGS OF THE PARISH OF HALIFAX GEOLOGICALLY CONSIDERED, &c.

ASCLEPIADES OFFICIUM ESSE MEDICI DICIT, UT TUTO, UT CELERITER, UT JUCUNDE CURET.—*CELSUS.*

PART I.

A NEW EDITION.

(ILLUSTRATED.)

HALIFAX:

PRINTED BY JOHN WALSH, PORTLAND STREET.
PUBLISHED BY MESSRS. S. H. THEAKSTON AND CO., SCARBOROUGH, AND LONGMAN AND CO., LONDON.
1882.

TABLE
OF CONTENTS.

PART I.

CHAP. I.

Introductory Remarks.

CHAP. II.

General Observations on Bathing.

CHAP. III.

The Complaints in which Cold Bathing promises to be serviceable.

CONTENTS.

TABLE
OF CONTENTS.

PART II.

CHAP. I.

Prefatory Observations.

CHAP. II.

The Scarborough Spaw.

CHAP. III.

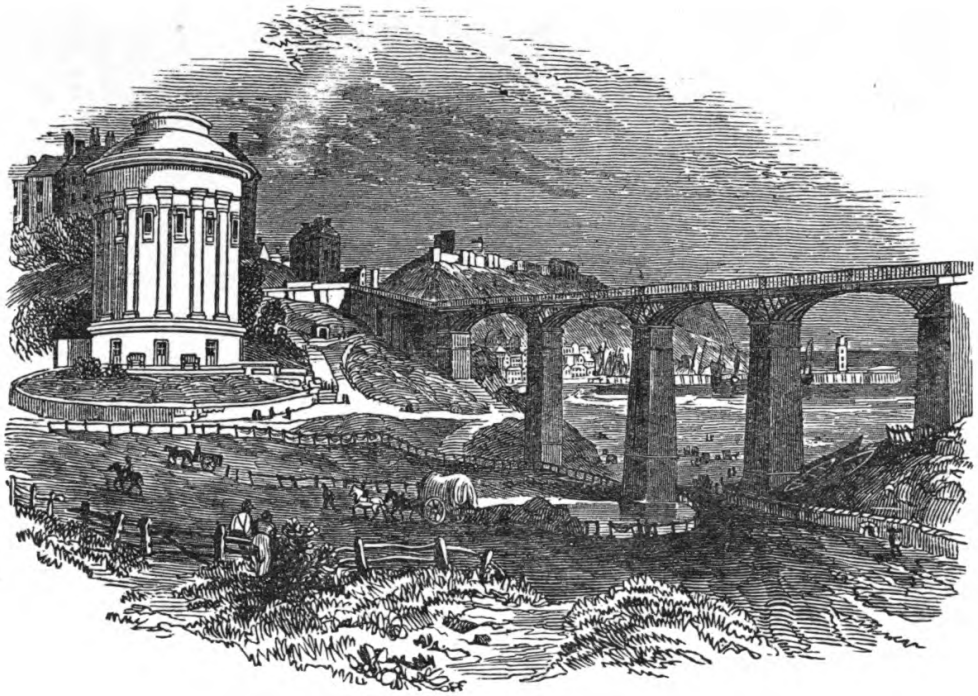
Medicinal and Physical Effects of the Scarborough Waters.

CHAP. IV.

Practical Directions.

CHAP. V.

Effects of Sea Water.



CHAPTER I.

Introductory Remarks.

DESIGN OF THE PRESENT TREATISE EXPLAINED. OBSERVATIONS RELATIVE TO AIR, EXERCISE, DIET, &C.

Non est vivere sed valere, vita. MART.

When Physic as a science was neither so extensively explored, nor successfully practised as at present, there were not wanting medical works purposely designed for general perusal, which contributed much by their wholesome directions, not only to the preservation of health, but likewise oftentimes to the cure of disease, especially when more skilful aid was not to be had; but there are persons to be found, who, actuated by a spirit of monopoly, have deemed it unprofessional and savouring of empiricism in that individual who ventures to place in the hands of the public at large any such assistance. It will be readily admitted that information derived from such sources, is sometimes liable to misapplication, and none can more truly lament the melancholy effects of the quackery and imposition daily practised,

than the author of the present little volume; and whilst he deplores this increasing evil, he feels confident of escaping censure in committing the following observations to print, by distinctly premising that his treatise does not promise to afford matter suited to every individual case, for such would be a task never yet performed by the most industrious and experienced of his fellow labourers. General remarks for the most part only will be made, and the time and patience of the reader not trespassed on in the pursuit of vague hypothesis or practically useless detail.

A work of this nature will not render unnecessary, in obstinate and dangerous cases, the advice and assistance of the intelligent and upright medical practitioner, for we must not expect to find acute disease give way to mineral waters, of whatever strength or purity, however strongly we may advocate their exhibition in other forms of complaint. Here a lukewarm practice must not be pursued, if we would hope to be successful, or avoid falling into the error of giving a fancied security to the victim likely to be deprived of life.

In writing on the nature and use of the mineral springs of Scarborough, on sea and other forms of bathing, on exercise and diet, for the consultation and reference of the invalid and general visitor of watering places, the object has been,—not to attempt any display of literary style in composition,—not to confuse with professional terms,—but to present to the reader some plain and intelligible directions for his information, and to point out at large the classes of diseases which are most benefitted by the sanative measures so admirably afforded at Scarborough, from its Topographical position. Moreover, some invalids have great disinclination

in trivial cases, to solicit advice from the physician,—still more are unwilling to do so from a conviction, that many practice the art of medicine, with equivocal motives, and it is probable not a few of the frequenters of watering places, from a necessity to study economy in their expenditure, are not able to supply the usual fees. To all, and especially such persons as are influenced by considerations of this nature, it is hoped that this treatise will not be found an unwelcome offering, nor prove an indifferent substitute for a more costly means of procuring information.

The great vocation of the medical profession, has always been to make sick men sound, and perfection in the healing art is an expeditious, easy, and permanent restoration to health or annihilation of disease. Medicine happily is no longer a mystery, concocted and retained to serve the ends of interested men,—the cloak is shaken off, and no longer affords shelter for ignorance. To those, however, who would affect to despise a work of this kind, (the importance of which will not be questioned, when it is considered that there are few watering places of note or general resort without some such aid,) it may be observed, that it is intended for the public eye, and professing neither to furnish any new light to the well informed practitioner in medicine, nor to explain the *rationes medendi* of maladies, it is hoped that it will receive some indulgence, and escape that criticism which its defects no doubt would otherwise incur.

Many there are whose scepticism is only equal to their folly, who argue thus;—can there be much difference in the air of these favoured spots, and others nearly similarly situated in point of latitude; the mountain heath may

protect them from the severity of an easterly or north-easterly wind to be sure, they may possess the advantages of proximity to the sea, affording opportunities for bathing,—but is the water under such circumstances absorbed? No: a natural inference then is, that the sea possesses no advantages for bathing over the dam, river, or spring water, save its acknowleged stimulating effects upon the skin. How comes it that the far famed mineral waters have been so highly valued? can a glass or two, which contain but a few grains of saline matters, have the virtues that are ascribed to them,—have some of them even so much as sensible effects? no! they work wonders and perfect cures then by magic!

With such cavillers, who refuse credence to everything that cannot have in its operation some incontrovertible reason assigned, and heedlessly denounce what must be referred to ultimate facts, it suits not our purpose to contend; for if they be blind to reality, or that which is daily cognizable to their senses, and can practically be confirmed by the experience of thousands, they would lend but a deaf ear to volumes that might be written on the subject. It may be noticed, however, in favour of facts over hypothetical argument, that the proximate cause of hunger has never yet been satisfactorily ascertained, whilst by happy experience we know that a hearty meal puts an end to the uneasy sensation.

It would be well if fashion in her whim, were always so prudent to follow the dictates of reason, as she has been in establishing it as a *sine qua non*, that an annual visit should be paid to some favoured place, in search of renovation to the langour inseparable from the previous excitement of late

hours, heated rooms, free diet, and dissipated life, so much courted by her votaries. With such persons, Scarborough has long held a justly merited reputation, as well with the farmer, the merchant, and the mechanic. To those engaged in sedentary employments, it serves for a change from the sameness and want of interest necessarily attendant on such avocations, and finally for the convalescent valetudinarian, independent of its incalcuable medicinal stores, Scarborough furnishes him a residence neither too gay nor too dull, neither too hot nor too cold, not exorbitantly extravagant, and possessing every advantage the most fastidious could desire. It obtains a preference to Cheltenham and other places containing similar mineral springs to itself, in affording an opportunity for sea-bathing, in many cases so desirable an acquisition and assistance in the cure of complaints, for which the waters only would otherwise have been employed, and a return to health as a necessary consequence protracted.

The paramount importance of attention being made to pure air, due exercise, timely evacuations, and a proper diet, although confessedly hackneyed themes in popular, alike with medical writings, have not received more consideration as to their various operations and effects in the animal economy, than these several comprehensive subjects demand.

The concentration of the effluvia of living and dead animal and vegetable exhalations, in crowded and densely populated towns (although recently denied by the French) cannot fail to exert noxious effects on the human frame, and accordingly we find that citizens are attacked with maladies, from which residents in the country are almost exempt, and the plague when it has appeared in Europe, may be cited as

a familiar instance, in illustration of this fact. But what is more commonly observed, is the striking modification which disease assumes according to local situation, rendering the treatment of the same necessarily different, and sometimes totally opposite in one place to that which is successfully pursued in another : thus in London, Erysipelas too often presents from the first accession, a typhoid character, which of course precludes the active depletion, so uniformly and advantageously practised in the country ; and to sedentary habits, with excessive loads of stimulating food and defective nutrition, may perhaps be the fact referred, that purely inflammatory affections, are by no means so frequently witnessed in large towns, as in agricultural districts ; that there should be found such difference and disease so modified is not surprising, when we consider the respective habits of the two, and when we reflect that air is indispensable to all vertebrated animals,—that it is rendered impure by inhalation owing to having undergone a chemical change, during its contact with the widely extended surface of the delicate mucous membrane of the lungs, and no longer fitted for respiration.

In prosecuting this subject further, we might insensibly be led into an interesting, though perhaps an unprofitable inquiry, as to the manner in which an impure atmosphere acts in producing disease, and disseminating contagion, which neither our advanced acquaintance with chemistry, nor any other science, has yet been able conclusively to unfold ; for it must be admitted, that after the most persevering investigations, pursued by some of the most eminent Philosophers, the result is, that such phenomena are known to us only by their effects ; but experience amply testifies and demonstrates the

position, that a pure air is often an incalculable aid in the cure of certain classes of diseases.

The agitation of the ocean, and though in a less degree that of rivers and lakes, has been observed to purify the atmosphere, and render it more congenial to animal life, as examples of which may be mentioned, the occurrence of hurricanes at Barbadoes and other West India islands, immediately putting an end to epidemic pestilential disorders; and the familiar fact, that sailors and others when at sea, are singularly free from attacks of illness, particularly of that fertile kind commonly said to arise from cold.

The disengagement of oxygen, by the decomposition of air and water, in the processes of vegetation, is likewise said to purify the air on the main land; but this is more than questionable, since plants are proved to emit carbonic acid gas during the night, and even supposing that they gave out more oxygen through the day than they absorbed in the night and so disturbed nature's equilibrium, but a scanty supply would be procured, and as a drop in the ocean in an atmosphere upwards of forty miles high from the level of the sea.

To the *temperature* of the air I am inclined to attach much importance, for this regulates so generally, that most essential function to our well-being, cutaneous transpiration.

It might be presumed, a *priori*, that we should breathe with greater facility in low states of the thermometer, and accordingly I was prepared to expect in India that the breathing would often-times be oppressed, since there would be

smaller quantity of oxygen in a given bulk of air admitted within the chest, and that respiration would require to be more frequently performed as a natural consequence; but such reasoning was proved to be in opposition to the fact, for not only healthy subjects breathe with freedom and ease, but morbid states of the lungs and air-tubes were strikingly rare. That such should be the case, contrary to our anticipations, is calculated to exalt our estimation of that Author of nature, who has so wisely ordained that the temperature of the world in the various regions of the earth and water, shall exert no baneful influence, but be rendered habitable by man.

It is generally admitted, that Islands enjoy a more equable temperature than Continents; thus places on the sea-coast, may be said in some measure, according to their respective locality, to possess the same; for the caloric which the sea had during the summer acquired from the sun's rays, will in winter be disengaged and wafted by the wind over land, parting with its heat until it gradually assumes the temperature of surrounding objects; while on the other hand, as aqueous vapour possesses a greater capacity for heat than the source from which it sprang, cold is by the change of form produced, and therefore the evaporation of the sea, caused by the strength of the sun's rays in summer, serves to reduce the temperature of that atmosphere exposed within its influence. Thus Islands, for instance, may be said to be cooler in summer and warmer in winter, than remote inland places in similar altitudes and latitudes. But it may reasonably be doubted, how far the sea operates in winter in making the neighbouring land warmer, for in losing a part of its latent heat, it is presumed to do so in the form of vapour,

so that this very change from liquid to airiform state, may prove sufficient, not only to absorb all that is evolved, from the greater capacity for heat of the latter than the former, but absolutely to make the air colder, except, indeed, it were again immediately condensed in the production of rain. It is however, received as a fact, that winds which traverse extensive tracts of sea are less cold in winter than those coming over land. And again, it merits mention as a fact in relation to the sea rendering the air cooler, that the author has often been under a vertical sun during his voyages to India, when not a breath of air could be perceived, and yet the thermometer never rose higher than 86 deg. F. in the shade.

Although it must be allowed, that the ingenuity of man has not hitherto discovered any scale by which the comparative healthiness of the atmosphere in different regions of the earth can precisely be determined, yet as to the salubrity of the sea breeze there exists not any discrepancy of opinion; for those that possess this advantage, are said to be generally healthy and long-lived, and our defective knowledge in this matter is not perhaps to be so much lamented, since experience speedily, (though too often purchased at the sacrifice of human life,) discovers to us those places which are inimical to the maintenance of health.

The invalided foreigner sets not too high a value on a visit to his native atmosphere, and the specific virtues of a change of air in hooping cough and some other maladies, are too well known to require comment.

Exercise is undoubtedly one of the most essential requisites to the preservation of health, for it counteracts the

otherwise pernicious effects of the repletion which the usages of society have established, and when moderately taken, by aiding digestion,—by conferring tone to the muscular fibre,—by promoting the functions of the skin and secretions generally, and accelerating the circulation, is attended with the most favourable results, in prolonging life and rendering us less liable to attacks from disease.

True indeed it is, that the records of longevity furnish instances of persons having been bed-ridden, or moved from couch to chair by adventitious aid, for terms of twenty, nay thirty and forty years, without the health becoming at all impaired; but such examples are to be regarded only as striking exceptions to a general rule, and as showing the wonderful power possessed by the living body of accommodating itself to external circumstances.

Persons visiting watering places are frequently induced to take the air, who if at home would confine themselves to the house; and this change may exert no trifling effect upon invalids, for with exercise taken in public, the mind comes into play, which may be said to superintend the performance of the bodily functions, diverting the attention, exhilerating the spirits, and throwing the train of thought into other channels.

Exercise itself, may be considered as a term of relative signification, for what would be proper in one case would assuredly not suit another,—as the strength, nature of the illness, and previous habits of the patient, must be consulted, ere that which would be most appropriate can safely be determined.

The older medical authors attached great importance, and entertained a just estimate of the value of this treatment in approaching convalescence, and in many cases where the strength did not admit of greater, the invalid's couch was moved about the room, from time to time, as exercise.

The robust of the male sex, need little exhortation to induce them to put their limbs in motion according to their respective stations in life, for while the multitude do so to gain their bread, the more fortunate yield to the temptation of field sports, and those who would attain a vigorous manhood and a happy old age, should tread in the path prescribed; and the more necessary it is, if their worldly occupations lead them into confinement and sedentary habits, that they should bestow a portion of the day to relaxation and motion, which would be found in the end, not to have been misspent.

Except in diseases of the heart and lungs, *walking*, where the defective strength and period of convalescence do not prohibit it, may be said to be most beneficial and natural to the animal frame; but in many cases characterised by debility, carriage exercise at first is to be preferred, where circumstances allow of it; for it is attended with less exertion, does not so much excite the circulation, and protects alike from the power of the sun's rays, and the commotion of the elements.

Sailing is another advantage which Scarborough affords to the invalid of taking gentle exercise, in an open and uncontaminated air, and where sickness is induced many cases of bilious indigestion are cured which have previously

resisted medical treatment, by dislodging bile from the stomach, improving in quality this secretion, and emulging the hepatic ducts. But sailing, more particularly when agreeable to the feelings and inclination, may be extended to a large class of complaints, and those commonly called nervous, are much benefitted by it; for which purpose a cheerful friend should be selected as a companion, in the morning's excursion:—thus with a view of the ever varying hue of the widely extended waters, and with amusing conversation, much may be done towards exhilerating the spirits, and beguiling the attention from the afflictions of the body.

Riding on horseback has been much recommended as a very efficacious mode of gestation, but from its not having become general amongst both sexes, it is of less practical application to individual cases, and need not therefore be much dwelt upon, further than throwing out a hint, that in functional affections of the stomach, debility of the lower extremities, or where the breathing by walking is embarrassed, it will prove very useful.

Gentle exercise may in this climate be prudently taken at any hour of the day, whenever the state of the weather or other circumstances do not prohibit it in particular cases; yet it will be found more salutary before meals than afterwards in general, and a very hearty repast requires quietude and rest. But the valetudinarian who restricts himself to a spare diet, either from want of appetite, or uses this regimen as a remedial agent, need observe no laws with respect to time; but as convenience, inclination, and the state of the atmosphere, may serve him. Early hours, however, and a ramble before breakfast on fine clear mornings, should not be

overlooked; for they are highly serviceable, not only in improving health, but prolonging existence, by rendering youth robust, manhood mature, and age vigorous and strong.

Of timely intestinal evacuations little need be said, since, happily for mankind, their influence in the maintenance of health is now universally understood; but care is still necessary in the selection of the medicinal agent to be employed, when nature suspends, for a time, her operations and stands in need of foreign aid. As a general rule, applicable to those substances familiarly known to the public, it may be observed, that rhubarb and jalap are much used in disordered states of the stomach, aloes and colocynth suit torpor of the bowels, where the presence of hæmorrhoids or piles do not forbid, carbonate of soda or magnesia, as ante-acids; and the various salts where depletion or speedy effect is desired. Castor oil acts, not as the rsinous cathartics, but more mildly, with less excitement to the system, and simply empties the alimentary canal. It is therefore, indicated, where the secretions are not defective, but from absorption and retention having taken place towards the extremity of the tube, induration of fæces and constipation are the consequences.

The virtues of purgatives in the prevention and cure of disease have not been over-rated, but a part of their operation and effects can alone be comprehended by the un-initiated in the art of physic; and it must suffice here to say, that independent of their well-known sensible qualities, they possess a powerful action equally upon the vascular and nervous parts of the animal fabric. Many prejudices exist with regard to them, severally and combined; but whilst we have sometimes occasion to deplore their abuse, let us bear ample

testimony to their importance, as medicinal agents, in the palliation and cure of large classes of complaints, some of which are, confessedly, the most serious to which "human flesh is heir."

On *Diet* I shall be disposed to say very little, and much less than I should otherwise have been satisfied with, did I not feel assured, that notwithstanding it is a popular subject, yet it is well known to be passed indifferently over, without that scrupulous care and adherence to rules to be observed in regard to it; and in a path that has been trodden from time immemorial, fruitlessly alike by the divine in his exhortation to sobriety, and physician in his prescription to abstinence, it would be vain indeed, to hope for success.

Much, however, as has been said and written, a happy medium has not been sufficiently pointed out; and authors in their zeal to impress their readers with the evils of indulging their appetites, have unwisely gone into the extreme, and omitted to inform them, how far they might harmlessly pursue the ordinary mode of living; and, although many there are, who suffer much from occasional excess, yet, if we look around, we by no means detect the general bad effects from a free diet, which had been gravely predicted and propounded to us:—the truth is, that to the healthy performance and continuance of the bodily functions a stimulus is required from without, in consequence of the wear and tear of the circulation, which momentarily, by its several duties, diminishes the quantity of blood, and stands in need, therefore, of perpetual supply to preserve the natural equilibrium. Thus the robust and strong, who take a good deal of exercise, may happily arrive at a long age without suffering materially from

free living; not so the invalid however, for he must be early apprised, that an appropriate diet, with oftentimes a scanty allowance of food, forms a very important part of the means used towards his restoration to health. For individual cases there can be no general line of diet here prescribed, as disease presents itself in so great variety of shapes, and assumes so many modifying circumstances, that what would be suitable for one person would not be so for a second, although suffering from a malady which obtains the same name; and, moreover, with the same individual, what is proper at one time may not be so at another:—thus, dieticians have ever had great and insurmountable difficulties to contend with in determining this particular. Usage and familiarity with the practice followed by medical men in the ordinary experience of life, however, furnish people of common observation with a very good idea, as to the aliment which ought to be taken, and its quantity in particular cases; but as general rules are at least looked for in a work like the present, it may prove neither unnecessary nor unprofitable to engage the attention of the reader for a while with a brief outline on this subject, premising, however, that the following observations are addressed to the sick,—for to the healthy I would give no laws, and offer no advice but such as common prudence will dictate and good sense obey.

All inflammations (except some few local ones of a scrofulous character) demand abstinence from solid nutriment, and were there no other guide, nature wisely in having constituted the stomach the centre of sympathy has pointed this out, by producing in such deviations from healthy action, a loathing and disgust of food, whilst cold and diluent and simple drinks are greedily and for the most part properly

taken to allay the uneasiness of a parched tongue and an excessive thirst. In such cases all azotised substances are contra-indicated, which, from their most nearly approximating in their nature, the elementary principles of the blood, would promote a too ready admission (provided digestion be not much impaired) within the vessels, and thus counteract the means best calculated to restore the balance of the circulation. Pain and giddiness of the head, with or without throbbing in the temples or ringing in the ears;—pain on taking in a deep breath, or cough with stitch in the side;—and pain in the abdomen increased by pressure, all alike, in addition to other remedial measures, require a rigid continuance in the same plan, while ripe fruit, vegetables and dry toast, if solid food at all be allowed, are least likely to fan the flame, and hence most suited to the occasion. In generalizing however, for reasons already assigned, we are not surprised, but prepared to meet with exceptions; thus we daily see severe head-ache relieved, nay removed, by taking stimulants within the stomach, and numberless instances there are of this kind, particularly among the poorer classes of people, where a cup of warm tea oft serves as a sovereign remedy,—as does a glass of *blue ruin* in the colic pains of the stomach, to which the same are so very liable.

The regimen, consisting of both animal and vegetable food, in common use, is decidedly most proper in this country for the healthy, and having pointed out the classes of complaints which are benefitted by *total* abstinence from animal diet, it now comes to be considered in what cases it serves as a remedial agent towards the cure of diseases, which will be found chiefly of a chronic nature, and often seated in bad habits of body; thus it is useful in preventing the develope-

ment and increase of scrofula and rickets,—in vermination, chlorosis, diabetes, and biliary and urinary calculous complaints; and in these it may not be unprofitable to mention, that the food should be almost wholly animal, provided it is not much opposed to the inclinations of the patient, in which case bread taken with it, will be found to agree better and prove more serviceable than potatoes or greens, the former of which, however, should be well baked and not eaten when new or soddened.

Fish, salted and seasoned meats, are in general unsuited to the recovery of health, and oftentimes highly pernicious. Roasted meat may be said to be more nutritious and more easily digested than boiled, but it should not be overdone; and finally, stewed food *á la mode francaise*, is wholesome, while it is not subject to the loss of alimentary matter which attends boiled meats.

Milk is admirably well suited to many states of the body, and holds an intermediate place, between animal and vegetable food;—with oatmeal or bread it forms a fit breakfast for children and delicate females, and when it disagrees with the stomach, this objection may often be obviated, by warming or adding a third part of hot water gruel or lime water to it. As a general diet, it is useful in pulmonary complaints, and in many diseased conditions of the liver.

I cannot believe tea made of the usual strength so injurious in the animal œconomy as is too often represented; it is true, that with some persons it acts as a stimulant, with others as narcotic; and, moreover, that it does not convey much nourishment of itself, but its accompaniments, the sugar and milk do so, and altogether it forms a most agreeable,

refreshing, and harmless compound, not to be rivalled by any known substance, and without a substitute. It may here be urged, that use has rendered it at length necessary to us, for we find it is not valued in other countries to anything like the same degree: however this may be, tea will be acknowledged to be a wholly indispensable article with the natives of this Island; and the millions of pounds annually consumed will add ample testimony in support of this statement. With regard to its alleged deleterious qualities, I may in refutation moreover remark, that in my conversations with many examples of extraordinary longevity, I have made it my duty to inquire if these persons relished or valued much their tea, and uniformly, with but one or two exceptions, they had been great tea-drinkers, and even some of them among the lower orders were then daily in the habit of taking tea at dinner-time, whether in these last it was from preference or not I cannot determine, and need not stop to enquire, since it would not affect the statement given, nor alter the position contended for. As will afterwards be mentioned, tea should not be taken when under a chalybeate course, and a strong infusion of it is objectionable in many cases of indigestion and hysteria; but in others, where nothing prohibits its use, dry toast with a little cold butter is to be preferred to muffin or roll.

In weak stomachs variety of dishes should be discarded as injurious, and by no means necessary to the completion of a good meal, which may likewise be made without the addition of pickles, anchovies, lard, spices, or sauces, which serve but as unnatural whets to effect an artificial appetite, as they assuredly induce a loaded stomach, and often generate flatulence and atony. Lamb, mutton, veal, pullets,

partridges, wood-fowl, ptarmigan, rabbits and grouse are, when plainly dressed, easy of digestion,—as also river and brook fish for the most part, with soles, smelts, dabbs, whitings, turbot, gurnet, crabs, and lobsters well masticated, and in many instances there can be no objection to the addition of a little cayenne pepper and salt with them.

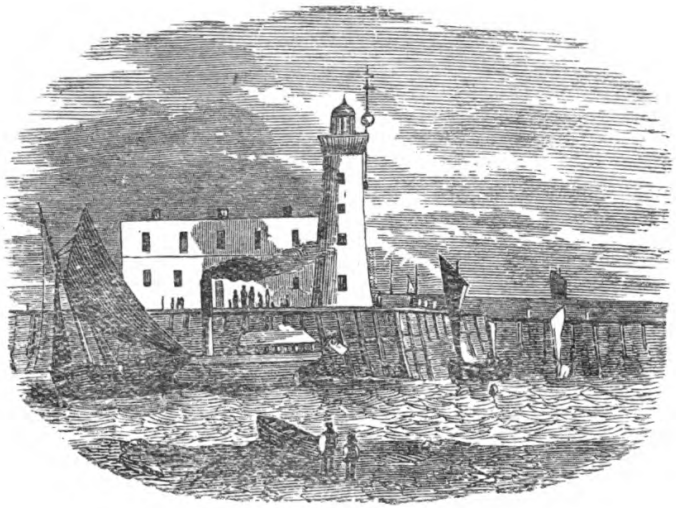
Pastry can seldom prudently be taken by those who are afflicted with weak digestive organs, and on the whole it is to be considered as unwholesome, and cheeses, (except cream cheese) may with equal propriety be dispensed with.

Ripe fruits, such as grapes, oranges, apples, pears, strawberries, raspberries, peaches, melons with ginger, and currants, may be taken freely, except in cases where there is relaxation of the bowels, and even then if accompanied with thirst and fever, provided the pulp be studiously thrown out, having expressed the juice. Fruits ought in general to be taken in the early part of the day.

Strong malt liquors are suited to none but such as lead an active life with considerable bodily exercise, and are decidedly pernicious to persons of sedentary habits, with bilious, asthmatic, and corpulent tendencies. Claret or Sherry wine and water may be affirmed in suitable quantities to be much less objectionable, and often useful in aiding digestion, and obviating languid states of the circulation in debilitated persons. Spirits may likewise *sometimes* harmlessly be taken, but the habitual use of them cannot sufficiently be reprobated, for independent of their inebriating property, their immediate action on the coats of the stomach, and their ultimate effects on the nervous system,

they are now proved to be absorbed by the veins soon after taking them, and therefore necessarily conveyed through the liver, the office of which would seem to prevent noxious substances taken within the stomach, getting into the general mass of blood, and there exerting baneful effects upon the heart and brain, and disturbing the functions of secretion ,— thus, as the primary action of ardent liquors, is the unnatural stimulation of the liver, (as displayed in its efforts to expel in the form of vitiated bile, such matters as would be offensive in their operation upon the vascular and nervous tissues generally,) their abuse leads, insensibly, first to functional, and ultimately, to organic disease, when the train of dropsical symptoms shortly supervene.

Finally, whilst a due value of wine and spirits is admitted and candidly acknowledged, it would be a deviation from a strict line of duty, were we not in strong terms to recommend great caution and temperance in their use; and urge rather, pure water for the daily beverage, as best calculated to prolong existence, retain vigour of both mind and body, and support the establishment of that due proportion between solid and fluid parts, upon which depends the healthy performance of all the phenomena that are exhibited in life. Much, however, must be left to the discretion and judgment of the invalid, in making his selection, not only as to the nature of his diet and drink, but likewise as to their *quantities*, always bearing in memory, that confirmed habits of many years standing, are not, with impunity, to be suddenly assailed or harshly dealt with ; but nevertheless, let us exhort him to persevere in the attempt to reform his irregular habits, and pursue a plan opposed to the now prevalent custom of noonday breakfasts, evening dinners, and midnight entertainments.



CHAPTER II.

GENERAL OBSERVATIONS ON BATHING.

Outline of the advantages afforded at Scarbro' as a Watering-Place. Division and arrangement of the subject. Value of ablution. The different kinds of bathing enumerated. Not to ascribe universal virtues to bathing or any other remedial agent, &c.

Prodest etiam interdum balneo, interdum aquis frigidis uti.—CORNELIUS CELSUS.

IT is not the object of this essay to draw invidious comparisons upon the rival claims and respective merits of the East, West, and South coasts, but I am not acquainted with any Spa better qualified than Scarbro' to promote the general objects in view in visiting a watering-place, for, independent of its invigorating sea-breezes, purity of air, sea-bathing, and mineral springs—saline and chalybeate, it promises the remaining requisites, viz., proximity to populous towns, and

ample convenience of accommodation. Thus favored, it is not surprising that Scarbro' should have attained a high pre-eminence in the list of English towns celebrated for their salubrity; and that it has arrived at the summit of a well-merited reputation so happily expressed by my late friend, Dr. Granville, among all classes. The steam-boat has rendered it but a step from London and Edinburgh, and the land-roads and railways are so universally good, that the invalid may by easy journeys, reach it from most of the northern counties, without encountering any of the difficulties formerly experienced, when intercourse was thus almost impossible, or at least rendered impracticable by distance, now no longer regarded even as a disadvantage.

It is true that Scarborough is not so gay as either Cheltenham or Bath used to be,—not so romantically situated as Matlock,—has not the richly wooded neighbourhood of Neider-Seltzer near Frankfort—does not possess the stimulant waters of Spa, nor the Thermal springs of Buxton,—neither are there the alterative sulphur springs of Moffat and Harrogate,—nor the thermal sulphur baths of Barèges and Aix-la-Chapelle; but we have waters resembling the chalybeate of Tunbridge, Hastings, and Thetford,—the chalybeate saline of Cheltenham, with the advantages of Brighton and other parts of the coast, where sea-water is at hand, which is the strongest in saline impregnation of all mineral waters used medicinally, and in salubrity of situation, and the possession of the general requisites to constitute it one of the most useful places of resort, Scarbro' yields the palm of superiority to none.

It is, perhaps, immaterial as to the division of the comprehensive subject before us: but nevertheless, as it is conve-

nient that some method be observed and plan laid down to be followed, it seems desirable, that the question as to the *propriety of bathing at all* should early be determined, for it is by no means advocated as a universal panacea, and therefore, the diseases in which *cold* bathing promises to be useful will be best first to be considered; added to which, a sketch of those in which it will prove either an inert remedy or an injurious agent. Having completed this important part of our scheme, *the manner* of bathing, including precautions necessary previous to immersion, regimen to be observed during a course of bathing, and hints as to the length of time to remain in the water, will then be dwelt on. Under the next head will come the best *time* and *season* for bathing, which will apply generally, whether we regard the bath as a recreation fitted for the preservation of health, or as a means of cure for disease. And finally, remarks and advice as to the *warm, vapour, and turkish baths* will conclude this department of my subject.

Ablution in all ages, from the time of the original lawgivers to the present, has been wisely perpetuated among nations; and it has often been observed, that where from the sloth and indolence (natural effects of hot climates) of particular sects, the natives might have neglected this salutary means, bathing has formed a part of their religious duties, furnishing another inducement for its adoption;—thus, on the supposition of offering to God, in reality serving themselves, by promoting their health, and in some measure preventing the occurrence of disease; for besides the removal of cutaneous sordes which obstruct the pores of the skin—limiting perspiration,—washing or sponging the body gives activity to the superficial vessels, influences greatly animal heat, and operates extensively on the nervous system

Bathing may be considered, relatively, either as general or partial; the former varies according to the degree of heat employed, or the nature of impregnations in the water used; thus there are cold, tepid, hot, warm, vapour, salt-water, medicated, and shower baths; and the latter or partial form comprehends the application to particular parts, as the hip and foot baths.

Daniel Le Clerk in his Histoire de la Medicine, traces cold bathing to an early period of the Grecian æra, since which time it has experienced similar vicissitudes in popular opinion, to those which have characterised the use of most other remedies, and to which it must be allowed they are all so much exposed; but at length, it is hoped, that we have arrived at a time when we can fairly judge, (from accumulated experience, and freed from bias—not drawing inferences from isolated cases,) and apportion such value to all the forms of bathing as they respectively deserve, and *no more:* for to ascribe great and almost universal virtues to particular agents is an error to which authors, in their anxiety to promote the interests of mankind and give support to their own opinions, are so very liable to be ensnared, and their judgment, in consequence perverted.

CHAPTER III.

THE COMPLAINTS IN WHICH COLD BATHING PROMISES TO BE SERVICEABLE.

To temperature and cleansing the skin some of the virtues of bathing referred. Used as a preservative against cold. Effects of cold affusion. Not adapted to early infancy or advanced age. Effects of cold bathing on the animal frame. Complaints in which it is found useful, &c.

Capiti nihil aeque prodest atque aqua frigida,
CELSUS.

Cold bathing may be performed either in river, spring, or sea-water, and in some cases the object will be equally attained in any of them, as not a few of the general effects are in all alike produced, for to their *temperature* and as cleansers of the skin, they owe many of their salutary operations upon the animal frame. The body may also be sponged either simply or with medicated waters, and persons who are in the daily habit of doing this, affirm, that by continuing

the practice throughout all seasons, (the extreme cold being taken off the water in winter,) they are wholly exempted from catching cold, and need to take little care as to clothing; we must, therefore, conclude the susceptibility to external impressions in such instances is thereby lessened, and in some measure, as far as regards variation of temperature, destroyed. If this means be adopted, it should be employed only by the strong, and rather as a preservative of health than a remedy in disease, except under suitable directions, when the temperature and medicated impregnation (if any?) will be fitted to the several different states of the constitution. Thus, the cold affusion has risen more and more into general estimation in fevers and topical inflammations, to reduce and carry off excess of heat, allay the burning sense of it, refresh the patient, and induce natural sleep, which latter in the previous excited state of the system had been denied. In these cases were there none other indications, the feelings of the patient would warrant its use, for he expresses himself often in the strongest language, that his sufferings are assuaged and his tormenting thirst quenched.

The cold bath, in its general acceptation, is not adapted to early infancy or advanced age, for in the latter condition of the body, the due balance of the circulation is liable to be overturned, and in the former state the *shock* or nervous impression, may prove too great to the powers of excitability, which at that tender period are excessive, and greater than at any other time of life; yet habit becomes second nature, and many children are indebted for their hardihood and strength, continued almost from birth, to a daily immersion in cold water previous to dressing. In India I found this plan was very generally pursued, but its universal application to Great Britain is questionable in individual cases.

By cold bathing is meant, the immersion of the body into water, at, or a little below the natural temperature of the surrounding atmosphere; thus, in August, in this country, the temperature of the sea ranges from 58 to 68 degrees F.; rivers and lakes are a little warmer still; and spring water much colder: at all events they are all upwards of 25 degrees below the heat of the human blood, and the sensation of cold is conveyed to the skin by their contact in consequence. This cold diminishes the calibre of the superficial vessels, and so effects a temporary impediment to the equal distribution of the blood. On emerging from the water, the heart being loaded, and hence stimulated to increased activity, propels its contents to the surface as before immersion, and thus congestion is succeeded by what is termed reaction, producing and constituting the "glow," so commonly experienced after bathing, which is in general indicative of *a good effect*, and merely signifies the restoration and increased action of the superficial circulation, by which a sense of warmth is diffused, and often, with the addition of gentle exercise, healthy perspiration induced.

Having prefaced these remarks as to the operation of cold water on the body, we are prepared to expect that its primary effects are stimulant; nor are we deceived in this matter, for although its sensible action may be said to exert but a temporary influence, yet nevertheless as it does quicken the circulation during immersion and increase the activity of the cutaneous vessels afterwards, it may safely be regarded as a stimulus, serving to equalize the circulation of the blood, and well calculated to overcome torpor or languor in its course:—thus, it promotes the healthy performance of many of the animal functions, gives tone to the muscular and nerv-

ous fibre, and renders active that essential requisite to the maintenance of health and good digestion, secretion.

The beneficial results of cold bathing may perhaps be much ascribed also to the water being a better conductor than air, abstracting rapidly the animal heat, and thus an effort of nature is demanded to supply what is lost: and the circumstance of the respiration requiring to be performed more frequently and fuller, (as respiration is the source of animal heat,) after immersion, would strengthen the position, although the loaded state of the vessels at the right side of the heart, would create a similar effect.

Attention to these several conclusions as to the operation of the cold bath will point out to us the complaints, in which this remedial means promises to prove a useful auxiliary and cure. It should be mentioned, however, that the following remarks refer more particularly to sea-bathing, as it is the custom to resort to the coast to bathe, rather than do so in the river or dam, and experience would certainly give preference to the former, though the effects of both, provided the temperatures are alike, must be much the same, except in cutaneous affections, and when the surface of the body is desired to be more stimulated by the brine; for if the saline impregnations of sea-water be not absorbed, there can, in reality, exist little differences between them. As its non-absorption, however, is perhaps not altogether determined, it is right to benefit by the doubt, and recommend sea-bathing rather than any other, and the more so since it is so often desirable to drink the water at the same time.

In reference to this subject, a contributor to the Cyclo-

pædia of Practical Medicine, in a late number of that monthly publication ably remarks,—"Although it is certain that the most important of the effects produced by baths depend on their temperature, and on other circumstances having no relation to their chemical constitution, it will not be doubted by any practitioner of experience, who has had sufficient opportunities of comparing the effects of the bath of simple water with those of mineral waters, or of the sea, that the chemical composition of the materials used in bathing, is a matter of considerable importance. Without at all entering here upon the question of the powers of absorption possessed by the skin, whether of water simply applied to it or of substances dissolved in water, experience has satisfactorily proved that the effects of immersion in pure water, and in water containing salt in solution, are different. Sea-water and mineral waters, particularly such as contain sea-salt or iron in solution, are more tonic, stimulant, and bracing, than simple water, and when used as a cold bath are productive of a greater re-action than the latter. When, therefore, the object is to produce re-action, and to brace the system, (and this is the object in a vast majority of the cases in which the cold bath is used,) sea-water is always to be preferred to fresh."

A convenient division has been made of diseases,—first, into those which often assume a violent character, producing much commotion, and running to a hasty termination; secondly, into those characterised by a lingering and less excited condition of the system. The former are designated acute, the latter chronic diseases; each may terminate in the other, and that the former or acute should end in the latter or chronic, is of very frequent occurence.

Chronic forms of complaint include a great variety of classes, and are those most commonly met with in practice, particularly among the higher orders of people; for the plebeian seldom appeals to medical skill in cases unaccompanied with pain or inflammation. It is in many maladies under this division, that sea-bathing is so successfully employed, whereas in acute attacks of illness it must be deemed to be forbidden.

In nervous states of the constitution, if not accompanied with great irritability, sea-bathing acts sometimes as a charm, by giving tone to the muscular fibre, in allaying morbid excitability, restoring appetite, and improving the strength. Its effects are often specific in re-establishing and confirming health in convalescents, when debility only is the remnant of protracted ailment, and also in those nervous tremors, attended by sweatings, elicited either with gentle or without exercise. In morbid and profuse perspirations of this kind it is highly serviceable, as it tends to brace the solids and render the relaxed and soft skin in such instances, of a harsh and often rough texture,—conditions unfavourable to the exit of the sensible and insensible perspirable fluid. It is proper in most of those states of defective energy, termed delicate and feeble constitutions, often arising from effeminate modes of living, confinement, and sedentary employments, or from hereditary taint. Of congenital weaknesses, scrofula is by far the most prevalent, though not so common as formerly, owing perhaps to an improved and more wholesome diet, better clothing, and the strict adherence to cleanliness required by police regulations in densely populated towns. In early youth this distressing malady presents itself in the form of swellings in the glands, oftentimes those of the neck,

which occasionally, if not checked by art, ulcerate and leave foul eschars, as evidences of their malignity. In early infancy, protuberance of the abdomen is the more frequent, and thousands are annually swept off by this inveterate form of the disease, which is marked by general emaciation of the limbs and chest, pale countenance, excessive appetite, and often fluctuation observable in the swollen belly, with evacuations of unchanged food. At the age of puberty, which is often precocious, such persons are subject to sore eyes and eruptions on the skin, the eye-lashes fall off, and the margins of the lids are red and thickned. They are likewise liable to caries of the bones, white swellings, and tubucular consumption.

To obviate so formidable a series of ills is often in vain, but scrofula is constantly prevented from displaying its fell character, by pursuing a strict line of undeviating and long continued domestic treatment, which consists in taking due exercise in a pure air, warm clothing, change of climate, animal and nourishing diet, and leaving the child unrestrained to follow his own amusements. On this subject a much esteemed author has likewise remarked: "from the number of instances of scrofulous tumours being dispersed, and scrofulous sores healed, even when the predisposition to the disease was hereditary, during a summer's residence at a well chosen situation on the sea-coast, that have fallen under my own personal observation, I can with truth aver, that to the scrofulous inhabitant of a large city, a change to the pure air of the sea combined with bathing, affords the best means of imparting to the constitution that degree of vigour required to overcome this species of morbid action of the lymphatic system."

Vermination with mucous and slimy dejections is often cured by bathing, the internal exhibition of sea water, and a change of diet to more animalized substances; by these combined means the nidus is removed and the worms expelled dead. For Rickets, St. Vitus's dance, Epilepsy depending on excessive irritability, and other species of narcotic disorders, as hysteria, blue devils, palpitation of the heart unattended with age or organic disease, and in some forms of indigestion accompanied with head-ache, sea bathing promises great alleviation.

It is an Aphorism of Celsus, that most acute of observers, "that he who is daily engaged in public or private matters, would do well to allot a portion of his time to the preservation of his health," and this applies equally to the man of letters, as to him whose whole time is given to sedentary and confining duties. In such avocations the digestion becomes impaired, and the long continued sitting position induces constipation, piles, and swelling of the legs. These inconveniences are relieved however, by exercise, bathing, and the internal administration of sea water.

Inordinate discharges unattended with fever, sexual weaknesses, and liability in the early months of pregnancy to abortion, are in almost all cases much benefited by the invigorating action of cold bathing, and I have never known any evil result from the practice.

In convalescence from hooping cough and scarlet fever, change of air and sea bathing will often be found to act as a charm in restoring the strength and improving the general health, as likewise they will prove very serviceable in all those

weaknesses arising from mercurialism, as well as those sexual ones which are the relics of excess in the gratification of the sensual appetites.

The manner and proper time for bathing will be given in their appropriate places, and the general rules therein expressed should be observed, except experience in particular instances should otherwise direct, for the very best remedies if inaptly or untimely applied become fruitless, and incur a stigma upon means which merited not reproach; and finally, the healthy may often do with impunity what might prove death to the afflicted; but even to those who have recourse to bathing for the improvement of their health and the prevention of disease,—as a salutary recreation, confirming hardihood, and destroying susceptibility to catarrhal affections,—it should be used with discretion, and if so employed, I am convinced it will not disappoint your warmest expectations.

The propriety of continuing to bathe when once rightly and suitably adopted, will by its *immediate effects* be determined, for if reaction do not succeed immersion, the body remains cold, and head-ache and shivering supervene. But even in such cases, if cold bathing be particularly indicated, the system may be brought to bear it by premising warm artificial baths, gradually reducing their temperatures to that of the sea; and to those who regard this latter with terror, an insulated bath of brine will answer in some cases equally well.

Acute inflammatory diseases confine the patient to bed as well as do many other morbid conditions of the body, it is

therefore needless to say, that sea bathing in all such states of the system is out of the question and wholly contra-indicated; and moreover, it would be found injurious in all organic lesions of the internal structure,—in disease of the lungs, heart, liver, and bowels,—in gout, jaundice, stone, erysipelas, and eruptive and ulcerated cutaneous affections.

Lastly, the cold bath is prejudicial in many of those cases, where accelerated circulation is an accompaniment of *local indisposition*, and where existing excitement forbids the application of stimulants, for in such cases, whether we regard cold bathing as a tonic or a stimulant, it is alike hurtful.

SCARBOROUGH FROM THE CASTLE HILL.

CHAPTER IV.

REMARKS AS TO THE MANNER OF BATHING.

Bad effects resulting from bathing referred to improper management. At no loss suitably to apply this means since its effects are understood. Rules laid down to be observed by bathers. Popular prejudices opposed, &c.

Lavatio corporis in frigida, bona ad longitudinem vitæ.—BACON.

A large majority of those recorded instances where sea-bathing in suitable cases, has been succeeded by unfavourable consequences, are wisely ascribed to an improper method in carrying into execution, a means otherwise well calculated to be productive of good. The bather, like the patient who swallows six doses of his medicine at once, cannot suppose that any other result than an injurious one can accrue from remaining six times longer in the water than he is directed. Yet the fluctuations in public opinion which the cold bath, as

a remedy, has experienced from time to time, may be referred to this cause, combined with false theories as to its more immediate effects upon the human body; but, happily, we now live in times when the dogma of empiricism and ipse dixit of any single individual, carry no weight when opposed to the laws of scientific and dispassionate investigation, where just and rational inferences are deduced from correct data and philosophical inquiry.

Aware that the cold medium in which the body is immersed, rapidly abstracts the animal heat, through a law of caloric to gain an equilibrium of temperature between bodies,—that the pulse during bathing is quickened to supply the loss thus sustained, in order to maintain a sufficiency of warmth for the necessities of life,—that a re-action from the temporary congestion of the blood succeeds immersion,—that the cutaneous vessels are stimulated to increased activity,—and that the saline particles by remaining on the surface in some degree serve to promote the latter purpose, we are at no loss suitably to apply this remedy to the various deviations from healthy action in the animal economy.

The rules recommended to be observed in bathing, are many of them such as common prudence would suggest; but lest any misapplication should occur, it is perhaps better that they should be expressly stated, since there are some popular prejudices to combat with, which, founded in error, tend to counteract the good effects, and throw discredit on so valuable an auxiliary in the treatment of chronic complaints.

Among the most frequent of these, is that groundless apprehension of plunging into the water before the body (if

exercise have previously been used) has cooled. It is true, that bathing should not be resorted to during profuse perspiration, nor when the body has been fatigued and strength exhausted, by long continued abstinence and exertion; but reason and experience have alike determined the safety and advantage of plunging into the cold bath when the body has attained the highest point of that warmth, which arises from previously taken moderate exercise. The transition of temperature is confessedly sudden and great, but we do not find the bad effects which *a priori*, on considering the subject abstractedly, we might possibly expect;—on the contrary, the system is roused to contribute to the surface a continuance of that animal heat, which the surrounding medium so rapidly absorbs; promoting, therefore, that salutary and most desirable effect of bathing—the succeeding "glow."

The natives of the frigid zones, attach much value to modes of bathing in which the transitions are a thousand times greater, and deem them most serviceable agents in the preservation of health, and productive of that hardihood which repels cold, and conduces greatly towards the vigorous performance of all the vital functions. But the people who inhabit those climes, well know that such extremes of heat and cold cannot be withstood after long fasting and fatigue; and instances assuredly there are, where the worst effects have followed bathing in such states of exhaustion, in which the body is rendered highly susceptible to external impressions.

The plan recommended here, is, that the bather having taken such exercise as is adequate to produce a general warmth, should select a dry machine, to be drawn a sufficient depth into the water to enable him, leisurely descending the steps, to crouch down so as easily to immerse the whole of

the body under water, after which the feeble and debilitated ought immediately to return within the machine, and be well rubbed with a close towel, hastily dressing, however, to favour by the warmth of clothing the conservative glow. He should then gently walk home, avoiding the sun's rays if powerful, or exercise such as would produce perspiration, and on his arrival, if he feel inclined, (which oftentimes happens) he may partake of a warm bowl of soup, or dish of tea or coffee, as may be preferred, already prepared in anticipation of his return; but if he experience nausea at the stomach, or a sense of coldness, a little warm sherry wine and water may perhaps more suitably be substituted.

The use of oiled-skin caps is to be condemned, but there are many cases among the fairer part of the creation, in which it would prove inconvenient to drench the hair with sea-water, and some of these might be admitted as exceptions to what otherwise is reprobated as a general rule, for it is such persons that can most safely use them; but on no occasion should caps be persisted in, where head-ache and languor succeed a temporary immersion.

In the healthy and robust few bad effects, from remaining long in the water, are observed to take place, particularly if occupied in that delightful recreation, swimming, which serves to supply by a continuance of muscular efforts, the necessary degree of heat, so as to prevent the surface of the body from becoming of the same temperature as that of the sea. Yet there are certain limits beyond which no man can safely venture, for when carried too far, the greatest prostration of strength supervenes, accompanied with headache, palpitation, quickened respiration, coldness, sickness, tremors, paleness and numbness of the extremities, and partial loss of

circulation. This assemblage of disasters is often found in those persons taken up when half-drowned, and the means used to restore them, consist in introducing hot brandy and water through a tube, if the power of swallowing be lost, into the stomach, placing the patient within thick blankets, using frictions and smelling bottles, and finally bags, bottles, or bladders, filled with hot sand or hot water, kept constantly applied to the limbs and pit of the stomach. The hot bath, if water sufficiently heated be at hand, is preferred in such cases by some; but whatever means are used, they must be persevered in most diligently, nor must we despair though these resuscitating measures should not answer in an hour's time, for instances are numerous, in which persons apparently dead to all around, have been restored at a lengthened period after the signs of life had ceased. In these latter cases, however, inflation of the lungs has generally been an auxiliary in the mode pursued, which by its promoting the circulation and propelling the blood forwards, is perhaps the means most to be relied on, in those almost hopeless examples of drowning.

Whilst this picture serves as a salutary check to the impetuosity of the fearless swimmer in setting bounds to his enjoyments, it points out what should be done in similar, though less aggravated cases, in which a few of the more simple and practicable remedies will alone be required to re-establish the wonted energies of life.

The cramp will sometimes, though rarely, seize the swimmer, warning him that he has been already too long engaged in his pastime, and he must hasten within footing, if out of his depth, when this spasmodic contraction will leave him, should jerking violently the limb outfail to do so. Sea water having a greater specific gravity from its saline

impregnation than fresh, will be found to support the head above water with greater facility, and render art in swimming less necessary.

It is a usual practice to plunge head-first into the water, and although it is desirable to sink the head immediately, yet a head-long dive is not necessary to effect this, and the succeeding head-ache which attends some cases may with justice be referred to this method of immersion.

Moderate exercise, after bathing, will be found greatly to aid its salutary operation; and the diet, during a course of it, need not, except in particular states of the constitution, vary from what is usual, provided the appetite is such as to take plainly dressed food with relish, for there are very few conditions of the body, if any, in which the stomach should be loaded contrary to the feelings and inclinations of the individual; and where such a procedure is persisted in, oppression and a sense of weight at the præcordia are inevitable consequences from the mal-practice, digestion becomes difficult, and the powers of the stomach are ultimately impaired. But a temporary residence at the sea-coast, procures oftentimes an appetite in persons who have long been without one, and to such a degree, that care is sometimes necessary to bridle it; and this effect may be much ascribed to breathing a pure and uncontaminated air, to the adoption of due exercise, to entertaining society, to change of scene and freedom from sedentary or studious occupations, to sea bathing, and to the aperient or tonic virtues of the saline and chalybeate waters. Thus, amidst so many auxiliaries, one scarcely knows how to apportion and affix the due value to each. But a return to appetite, in lingering chronic complaints, is one of the first symptoms of approaching convalescence,

which will often, by these combined means, be surprisingly brought about, accompanied with hilarity of spirits, increased vigour, and general improvement of health.

The frequency and most suitable time for bathing, will be considered under their appropriate heads in the next chapter; but, let it be impressed on the mind of the invalid here, that all the advantages accruing from sea bathing may be derived by a *single immersion* of the whole body, without incurring the risk of those shiverings and headache, which sometimes succeed a longer continuance in the water, than is sufficient for this purpose.

A course of sea bathing is occasionally noticed to produce swelling of the feet in delicate females, originating, probably, in defective absorption; it is however, in general, readily removed by two or three warm baths, or spontaneously on resuming the usual modes of life, and discontinuing to bathe.

Finally, there are two forms of headache resulting from cold bathing, and occurring in two very opposite classes of persons, which when severe, preclude its use altogether, or at least the shower bath substituted. The one kind affects those of a full habit of body, with florid complexion, and habitual determination to the head. As internal plethora is one of the immediate effects of sea bathing, and as the brain is calculated to receive about one sixth part of the circulating fluid, it is manifest that in the case of such subjects as above described, cold bathing cannot prudently be taken without previously depleting the blood vessels by salines and low diet, for apoplexy might still come on, although, even under other circumstances, it is by no means so common as might have been imagined, when we

consider the heedlessness with which bathing is resorted to by persons of all ages and habits of body ;—indeed, it is very rare, but I insert the caution, lest any of this temperament tempt and trespass on the laws of nature. The second variety of headache succeeding cold bathing, is experienced by those of a reverse state of the system, occurring in the feeble and debilitated, and is marked by pain situated at the hinder part of the head, with shivering. It arises from the water having been too cold, or having remained too long in it, and the absence of re-action, owing to defective vigour of the constitution. This latter may be removed by artificial warmth, with gentle stimulants taken within the stomach, and the shower bath tempered to 68 degrees of Fahrenheit's scale substituted for the sea.

This latter form of bath is suited for those persons who entertain a terror of the sea, or are subject to cramps when immersed in very cold water ; and lastly, a bath somewhat warmer than the sea would be found serviceable for very young children, who would be thus incited into a love for the water, if not rashly nor forcibly dragged into it, but too commonly practised, and often succeeded by an antipathy so strong as to last throughout life.

In regard to the shower bath, Dr. Forbes in an article inserted in the Cyclopedia of Medicine, ably remarks, " The immediate shock from the shower bath is, in general, felt to be greater than that from simple immersion ; more particularly if the quantity of water is great, its temperature low, and the fall considerable. On the other hand, owing to the absence of permanent compression of the surface by a dense medium, and perhaps also, owing to the access of air to the skin in the case of the shower bath, the anhelation and

præcordial distress are generally less in degree and certainly less permanent than in the plunge bath. From these and various other circumstances, individuals constantly present themselves to the practitioner who will bear the one form of bath and not the other, or who will be more benefitted by the one than the other."

In certain affections of the head, and in persons predisposed to such affections, the shower bath possesses a very decided advantage over the plunge bath, inasmuch as the shock and refrigeration are applied directly and in the first place to the head. And in these and many other cases also, it is a great advantage possessed by this bath, that the feet may be immersed in hot water during the process. This not only tends to prevent too great a repulsion of the fluids upon the internal organs, in cases where this is to be apprehended, but in feeble and sensitive persons it tends at once to lesson the shock and to increase the re-action.

It is an important advantage possessed by the shower bath, when properly constructed, that it can be increased or diminished in force, suspended, renewed, shortened, or prolonged, according to the feelings of the patient. The small quantity of water necessary to prepare a bath of this kind is another great advantage, as giving facility for having it at any degree of heat required."

CHAPTER V.

THE BEST TIME AND SEASON FOR COLD BATHING CONSIDERED.

The temperature of the sea during the autumnal months stated. Sea bathing in May and early part of June not suited to invalids. Hours of the day to be chosen for bathing. General conclusions, and rules defined, Hydropathic Palaces, &c.

Neque terrere autem ea res, (balneum,) si tempestiva est, debet; ante tempus nocet.—CELSUS.

In this country, autumn is the season usually selected for sea bathing, and not inaptly so, since the sea during the months of July and August has considerably increased its temperature, which will seldom be found lower than 60 degrees F., whilst the air in the shade is said to average about 66. If these calculations be correct, the transition from the medium in which we live is comparatively trifling, and the difference we experience on bathing, is in reality, that to our senses the water is cold, because we are immersed in a *denser*

medium than that which we inhabit, and therefore a better conductor, more rapidly abstracting the animal heat, and because we have not the protection of the raiment commonly worn when in the air ; otherwise, out of the influence of the sun's rays, did not these causes operate, we should feel to be as warm in, as out of the water, within six degrees according to the above estimate.

The westerly and south-westerly breezes too, which prevail at this season of the year, are favourable for bathing, provided they are unaccompanied with rain, and the place selected not so situated as to give rise to heavy sea or swell from them, which at some parts of the British coast much interfere with this salutary and agreeable ablution ; for the surf, in general, rises when the winds blow in upon the shore proportionally to their violence, and *vice versa.*

Some persons commence bathing in the open sea as early as May, but such a practice would be a dangerous experiment in weakly habits of body, or in those persons who are reduced by previous illness: the shock would be too great to promise any other than a feeble and imperfect re-action, on the vigour of which, much of the utility of the cold bath depends.

Cold bathing may be safely performed at any hour of the day, provided it do not interfere with digestion, nor had recourse to after profuse perspiration, nor when the body has arrived below the natural standard of its heat, through fatigue and long fasting. The early morning bath is convenient, as the toilet can be completed, if the time be husbanded, before breakfast ; but this hour is suited only to the robust and strong, for to the supperless invalid it cannot apply, since to

sally out thus early, exposed to the chilling influence of the morning air, and before the energies of life have been supported and strengthened to resist cold by a refreshing and invigorating meal, would be an act of folly and contradiction to common sense, which could not be suffered to pass with impunity. Neither after the previous night's debauch should this hour be chosen, for in proportion to yesterday's excess, will be this morning's depression, and such persons therefore must, like the valetudinarian, wait until the system has recovered its tone, and is recruited by the morning's meal, which, if taken at half-past eight o'clock, he may then bathe at eleven, decidedly the best time of the day for all invalids to take the cold bath.

It merits mention also, that the temperature of the sea sometimes varies with the state of the tide, particularly where it covers an extensive tract of sands, which become heated at low water by the sun's rays, and on the return of the tide, impart to the water additional warmth, as is observed on the banks of the River Dee, to the extent of sixteen degrees or more, and at Scarbro' to four or five Aware of this fact, advantage may be taken of it at places situated as above described, gradually to accustom the invalid to water of a lower temperature, if such should be desired. In this case, however, the time of bathing must be deferred until an hour after meridian, and a flowing or high-water tide selected to obtain this effect.

Finally, to recapitulate our subject:—having consulted that part of this work in which the complaints likely to be benefited by cold bathing are pointed out, and by comparison determined as to the propriety of it in his own case, the valetudinarian must next make it his study, in the safest and

best manner to carry his design into execution, knowing that much of the utility of remedies depends upon their proper and suitable application. Thus, if he have been suffering from protracted illness, or be convalescing from a more acute attack; if his strength be exhausted by profuse sweatings, or his muscular fibre wasted by mental anxiety; if the energies of life be impaired by inebriate habits, or his nerves shattered by excesses and continued irregularities in the pursuit of the pleasures of the sense, it behoves him in having recourse to the cold bath as a restorative, to take it two hours after breakfast,—to select a fine morning for its adoption,—to walk so as to diffuse a general warmth throughout the body, —to chose a *dry* machine, hastily undressing, immediately to immerse and quickly return,—then resort to gentle exercise again should the strength admit of it; after which, on arriving at home, a basin of soup or glass of warm wine and water may be taken with a view to promote the glow, which is no other than a free distribution of the blood tending towards the surface of the body. And, moreover, cold bathing in such debilitated states of the constitution ought not to be repeated more frequently than twice a week for the first fortnight.

The habitual bather, from early childhood, may affect to scoff at the minuteness of these directions, and count me as a "book-maker" for my pains; but let me remind him that I am not addressing him, for "nec medici nec curatoris egere æger," but a class labouring under an aberration from the robust strength and activity of organs which characterise, maintain, and constitute health; and if I err in too strenuously urging the necessity of caution, it is the more forcibly to impress the observance of my doctrines on the mind, for, should the hardy bathing veteran perchance not

have reason to lament at any time that he had observed no laws in the prosecution of his pastime, he will admit that bathing as he pursues it can have no salutary operation, but, on the other hand, head-ache and a sense of coldness are the results of his hour's amusement; which, if daily continued to this degree for any length of time, produces emaciation, and is followed by the very opposite effects to those which are desired.

Lastly, to those individual cases that may not be sufficiently far advanced in convalescence to bear the stimulus and shock of the cold bath, one of an *intermediate* temperature may better serve as an introduction to its use. And, moreover, there are some states of the body characterised by nocturnal febrile accessions, restlessness, languor, thirst, with hot and dry skin, which are very much relieved and mitigated by this tepid bath, or by merely sponging the surface with water. These symptoms may exist independently of the person being otherwise in bad health, and are frequently experienced during the sultry nights of the hotter months in this country, and in India very general; and those proceeding to tropical climates will do well to keep this in mind, for whilst it is perfectly safe in itself it allays uneasy sensations, and is the best means under such circumstances of obtaining refreshing sleep.

In conclusion, having duly weighed all these several observations taken collectively, and compared and applied them individually, something still is necessarily left to the discretion of the reader in isolated cases, and idiosyncracy of constitution, for which no general rules, however explicit, or however elaborately the subject is pursued, can apply to every condition of such exceptions, which although rare

when coupled with the multitude, are, nevertheless, sometimes to be met with. In acknowledging this defect, it is hoped, however, that enough has been said to render this little volume a useful companion and wholesome guide, in all ordinary instances.

We cannot close this branch of the Cold Water Treatment without a passing notice of those princely establishments now become so general throughout the country, which when legitimately conducted are to be commended in embracing early hours, great moderation in diet, and the internal and external use of cold water, and it was deplored that Priestnitz, the peasant of Gräfenburg, the great apostle of Hydropathy should not survive beyond middle life to be a living witness of the efficacy of his system.

CHAPTER VI.

ON THE WARM BATH, ETC.

Effects of hot and vapour baths. The commonly confounded terms of tonic, relaxant, stimulant, and debilitant, as applied to bathing, reconciled. The Warm bath as a restorative to fatigue, as a remedy in disease, and as a means of cleanliness, considered. Medicated baths. The Turkish and Russian baths, &c.

Calida lavatio et pueris et senibus apta est.—CELSUS.

Whilst the use of warm and vapour baths is strongly advocated, as a means well calculated to fulfil many very salutary purposes, it should be added, that discretion is necessary as to their temperature and the duration of immerson, independently of what ought to form the principal object to be first considered—the propriety of bathing at all; which must much depend upon the condition of the body, either when healthy or diseased,—upon the season of the

year,—upon the state of digestion,—and upon the selection of the hour best fitted for the occasion; for if we avow that bathing often possesses great remedial powers, we are constrained to admit, that when imprudently adopted, it is likewise capable of doing mischief; otherwise the bath might be likened to those quack remedies, the effects of which, are universal and all-powerful, whilst in themselves they possess no deleterious or noxious ingredients.!

The human body being so admirably constituted as to provide against the immediate evils resulting from extreme heat and cold, we are at no loss to reconcile the discrepancies existing in public opinion of the tonic and debilitating effects of the water, either of which may, in general, be obtained by temperature and the continuance of the application of the stimulus. Thus, the hot and vapour baths at a high temperature possess most powerful stimulant and relaxant effects, and accordingly advantage is taken of them in the practice of medicine as auxiliaries in the cold stage of ague, spasmodic cholera, and congestive fever, in chronic rheumatism, in retrocedent gout, measles, and scarlet fever, and though perhaps they are to be regarded chiefly as therapeutical agents, wherever profuse cutaneous discharge is desired, which is otherwise by nature designed to enable the system to resist excess of heat by the refrigerating process of evaporation. The *warm* bath again excites, though in a way very different to the former both in degree and kind; for whilst the force and frequency of the heart's action are greatly augmented during immersion in the hot and vapour baths, the warm bath excites the capillary vessels of the skin, so as to induce a free and more equable distribution of the blood, the pulse becomes fuller and slower, the surface of the

body is softened and (following a general law of caloric,) enlarged, the nervous system is soothed and internal organs relieved; by lessening pain and alleviating irritation, it acts as a sedative; by its power of relaxing and soothing, it is antispasmodic; by equalizing the circulation of the blood, it becomes a tonic; and by its promoting perspiration and removing cutaneous sordes, it is directly diaphoretic. The *cold* bath on the other hand is recommended by physicians, to allay the burning heat of fever, and aid in the restoration of that strength which is exhausted or impaired by previous acute or protracted illness. It will not, therefore, surprise us, that so many misconceptions have arisen with regard to bathing, if we consider the variety and oftentimes opposite objects in view in the adoption and execution of its different forms, to procure the respective states we desire; or that the terms of tonic, stimulant, relaxant, and debilitant, should have been confounded, indiscriminately, together, now that we know, that any one of these effects may singly be secured, by the proper and suitable application of the means.

The temperature of the *warm* bath may be said to range between 85° and 98° F. Its use when the body is fatigued by a tedious and harassing journey, is attended by the most refreshing effects,— for it relaxes the rigidity consequent to long continued walking or riding, and induces a pleasing state of repose. But the warm bath besides being hygeiènic, is a remedy well calculated to alleviate a large class of those morbid conditions of the body, termed chronic, and those attacks of catarrh resulting from suppressed perspiration, of so frequent occurrence in our changeable climate. It is efficacious in removing deep seated pains in the limbs and joints, as also for those persons who habitually suffer from cold extremeties, and languid circulation; it is useful in the case

of females arrived at the age of puberty, and those who labour from difficult and painful periodical illness; it is much valued in acute rheumatism after free depletion, and in some forms of palsy unaccompanied by cerebro-spinal derangement, associated with the galvanic current. It is very beneficial as an auxiliary in convulsions from teething, and in many of the eruptive and some of the inflammatory diseases of children; and, finally, it will be found salutary to those who have long resided in hot climates,—in genito-urinary irritations,—and some species of gout. The complaints included under the head of genito-urinary, in which the warm bath is serviceable, are very numerous, and in some of them the suffering is intense, as for example, in spasmodic stricture of the urethra, nephralgia, and stone. Its use is happily extended to many other affections seated in a similar tissue, viz:—the gastro-enteritic, among which may be cited the passage of gall stones, colic, dysentery, and fistula. When the warm bath is used to relieve the distress and fatigue occasioned by long continued exercise, or in the case of muscular rigidity, friction, champooing, and flexion or extension, should be adopted contemporaneously with it. At Bath, the bather can use locomotion at will during immersion, which in some cases might prove an advantage; for ordinary purposes, however, the common Slipper bath, in which the person is laid in a reclining posture, will answer equally well, whilst the Hip-bath is more convenient, and often better suited to genito-urinary complaints.

The little excitement attendant on first going into the bath, is observed gradually to subside,—the pulse will then be found slower and fuller,—the respiration to be rendered more free and less frequently performed,—the skin softened, and the blood derived from the internal organs more equally

distributed, indueing a state opposed to local determination and irregular irritability of action. It is desirable the bather should enter the water in a tranquil state of mind—not immediately after exercise, such as to have violently heated him; and that he should keep up the temperature during his stay in the bath, by making occasional additions of hot water to it. It is perhaps unnecessary to add, that on his return to dress, warm towels should be in readiness lest the body be chilled.

Ths warm bath may be judiciously used by healthy persons for the purposes of cleanliness, and the skin well rubbed with a flesh brush, with a view to remove detached dead cuticle or condensed oily matter, obstructing the free passage through the pores of the skin, and for mental exhilaration. With the same intent the *temperate* or *tepid* baths might be employed, but the period of immersion would require to be shorter, and the sensations experienced would prove by no means so grateful to the feelings of the individual.

A simple division of baths has been made into warm and cold, and 85° appointed as the line of demarkation, which although arbitary, serves well enough in general, for practical purposes. This arrangement will give the warm bath, properly so called, a range of 11 degrees, as a sub-division again constitutes all baths at the temperature of 98 and upwards, *hot*; and as our feelings do not furnish any criterion to enable us accurately to judge of the temperature of the water, a thermometer should always be at hand that we may not deceive ourselves, for if the heat of the bath be greater than the blood, a different effect is obtained to that we desired in prescribing the *warm* bath and our object frustrated, as a necessary consequence. It is, therefore, of great importance that 86° is known to be the *minimum* and 97° the *maximum*

temperature of the *warm bath.*

The intermediate degrees of temperature, from 91 to 97, are those most generally to be recommended in the use of the warm bath. For chronic pains in the limbs, 95° will suit well, as likewise to relax rigidity of muscular fibre, and refreshing the body under exhaustion, fatigue, and long continued exposure to boisterous weather, or exercise taken within the influence of a scorching sun. In these latter cases there is generally a sense of chilliness, sometimes amounting to rigors,—conditions by no means unfavourable to the use of the warm bath. For cutaneous affections, the temperature should be at the maximum, or 97°, in which the water may be impregnated with substances adapted to the particular nature of the case, and immersion continued, (if no untoward symptom present itself,) for an unlimited period.

The remarks of Dr. Forbes, already introduced elsewhere to the notice of the reader, are so judicious as to the influence of saline impregnation, in modifying the effects of the warm bath, that I am induced to insert them. He observes, "This subject is, perhaps less regarded in this country than it ought to be. Many persons seem to consider only the temperature, deeming it a matter of indifference, whether the water is that in common use for domestic purposes, or is that of the sea, or of mineral springs. Two or three trials on delicate and relaxed subjects, will suffice to convince any one that the two kinds of baths are productive of very different effects. In general it may be stated that water containing mineral and saline substances in solution, is less relaxing, and consequently more tonic, than pure water. Such compound baths can be borne for a longer period, and are followed by less exhaustion than baths of hot water. In cutaneous diseases, sometimes one kind of bath will be pre-

ferable, sometimes another, according to the nature of the case. It would be both unphilosophical and unjust to consider the chemical composition of the water, as a matter of indifference, provided the same degree of stimulus were communicated to it by the skin. Without pausing to examine the question as to the absorbing powers of the skin, and the actual transferrence of the materials of the bath into the blood, through this medium, it is a matter of simple observation and fact, that the effects of bathing vary with the nature of the chemical composition of the fluid. The warm baths attached to the mineral springs of Bath, Buxton, Cheltenham or Leamington, Harrogate, Matlock, and Tunbridge Wells, have each peculiar effects. The warm sea bath differs from all these: and, although the difference may not often be appreciable, there is no doubt a difference even in the action of river, rain, spring, and hard and soft pump water, respectively. When used as a measure of hygeiéne, the saline bath is in almost all cases to be preferred."

The first Emperor Napoleon was in the habit, at one time, of using an artificial sulphur bath, composed of the following ingredients, which may answer in some cases as a substitute for Harrogate water: to every gallon of water, take of alum, carbonate of lime, and castile soap, of each four grains; of common table salt eight grains; of carbonate soda, thirty grains; and of the sulphuret of potass, twenty-four grains; these materials being rubbed together, and dissolved in a small quantity of the water over a fire, are then to be added to the remainder, previously heated to the proper temperature for bathing.

On Wellington's return from India, when suffering from a liver complaint, the nitro-muriatic acid bath, just then introduced by Dr. Scott, was recommended to him and used

with advantage, since which period it has been enumerated among the medicated baths, and although now no longer *the rage*, yet as its use is often followed by effects similar to those of mercury, it is well worth a trial in suitable cases, which is easily accomplished by mixing equal parts of the nitric and muriatic acids together, and adding the compound to the water as before. Half an ounce of each will serve for six gallons of water heated to 95°, and immersion continued for half an hour if the strength be not much impaired, and the bath repeated three times a week.

It is desirable, that weakly and debilitated persons who purpose bathing in the sea, should initiate themselves gradually to its temperature, by taking at first a bath at 86°, and with two days interval, a second at 78°, remaining in each case five minutes in the water, when the sea may be safely entered under the directions already given

Should the warm bath, composed either of fresh or sea water, be designed to renovate the system, it may be taken daily, or on every alternate day, a couple of hours before dinner at 95°, and immersion continued for a quarter of an hour ; but, if it be intended to elicit perspiration, it should be used towards bedtime, if possible in the house where the person resides, and having remained half an hour in the water, immediately get into a bed, previously aired, and drink freely of hot tea, coffee, or water gruel. The latter effect may be obtained in a still greater degree by the vapour and hot-air baths at a *corresponding* temperature, viz., about 106° ; and greater, again if heated to 120 or 130 degrees, as in the Russian and Caldarium of the Turkish Baths which are equivalent to the hot water bath at 110° ; but cases of ill health to which such high temperatures can usefully be applied, are

comparatively limited, and are suited chiefly to those persons who are under the immediate superintendence of a skilled attendant or their medical adviser. In acute attacks of Sciatica and obstinate Lumbago I have reaped much advantage from the adoption of the Caldarium of the Turkish Bath. It should not be forgotten, however, that the vapour bath at a *corresponding* temperature with that of the warm bath, whilst its soothing properties are similar, possesses a higher claim and obtains a preference in those cases in which perspiration without excitement is desired, an effect supposed to arise in consequence of the body being enclosed in a rarer medium.

From what has been already written, as to the various modes of bathing, if their respective effects be borne in mind, but little difficulty will arise in their appropriate application to the several healthy conditions, and morbid states, of the system. Thus, where a stimulus is desired, the vapour or hot water bath is proper, provided the case admits of the present excitement and resulting depression; if a sedative, the warm bath; and if a tonic effect be wished, the cold sea bath will be suitably used. Yet there are circumstances to be considered, which preclude any perfect accuracy of classification, and prevent any considerable condensation of the subject before us, so as to form invariable rules, establish fixed maxims, or even reduce to elementary principles; for the baths may fruitlessly be had recourse to, *when indicated*, if in their adoption, measures be not prudently taken to secure their otherwise good effects; and there is not anything more illustrative of the practical utility of a work such as the present one, than this simple fact, which in addition amply reconciles the conflicting testimony as to the value or alleged worthlessness of bathing altogether, for alike with all other remedies, when improperly carried into

execution, the discredit is too liable to be referred to the means, rather than the manner of using them.

The error of supposing the warm bath to possess relaxant or debilitating powers, continues to operate upon the minds of many persons, and would seem to be derived from authors of very old date, who wielded their pens in censure of the enervating customs prevalent in those ages of *vapour* and *hot-air* bathing, used as Pliny informs us, to promote digestion and excite appetite. Juvenal and Seneca are still more severe in condemning the practice, and Celsus regards these high temperatures as suited only for medical purposes, whilst to those in health, who desire to elicit perspiration, he recommends exercise to be taken in the influence of the sun's rays. The lengths to which the Roman people at the decline of the republic, carried their luxurious modes of living, doubtless tended greatly towards and hastened, by confirming effeminate habits, their final downfall, and the baths, as they allured to other species of sensual gratification, by exciting artificial appetites and lusts inconsistent with the infirmities of the human body, contributed and made subservient to the indulgence of the passions, when well might the moralist exclaim,

"Balnea, vina, venus corrumpunt corpora nostra."

On the whole, whilst we regard the cold baths as suited chiefly for youth and middle age, the warm may be used by all, but more particularly by aged persons and very young children, either as salutary luxuries or a means of personal ablution; though I much doubt the truth of that statement, which invests the warm bath with the power of repelling the advancing finger of time upon the features and complexion except it be allowed to operate indirectly in improving the health.

Finally, the warm bath may be taken at any hour, without any particular care or uncommon precaution being necessary as to taking cold from it afterwards, as its sensible effects are simply to accumulate heat at the surface of the body, and by equalizing the distribution of the blood, enlarging the calibre of the cutaneous vessels. But as this state of the system is not favourabe to the process of digestion, which to be healthily performed, requires a temporary determination to the stomach,—two or three hours after a meal is the most suitable time for its use, and eleven o'clock in the forenoon for the most part will be found to answer best. For those, however, who dine at six or seven o'clock in the evening, a couple of hours after luncheon, if that time better serve their convenience, will answer equally well, and the bath succeeded by gentle exercise alike in both cases. The remarks made as to the propriety of taking a dish of soup, glass of porter, or sherry and water, after the use of the cold bath, apply equally here and need not be repeated.

In conclusion, it may be briefly observed, that the warm bath, "the solace of toil," is to be considered often more suited to weakly persons than the cold, whilst the latter is preferred as contributing greatly to the vigour and growth of youth, and as establishing permanent health and activity of all the wheels of life in manhood, for it appears to steel the frame against the sudden changes of weather which mark our climate, and is highly serviceable in those numberless cases of debility familiarly known by the term, nervous and general weakness.

END OF PART I.

ENTRANCE TO THE CLIFF BRIDGE & SPA GROUNDS, SCARBOROUGH.

PART II.

ANALYSES

OF THE

MINERAL SPRINGS

AND THEIR

MEDICINAL PROPERTIES.

CHAPTER I.

Prefatory Observations.

The relation which the sea and mineral waters generally, as internal remedies, bear to the subject of the foregoing volume. Early use of mineral springs, and the confidence reposed in natural remedies in all ages. New view, &c.

Scire potestates Aquarum, usumque bibendi.
VIRG.

The value of Mineral Springs must have been for ages acknowledged, since all researches undertaken to discover their first application as curative means, to the infirmities of the flesh, have proved fruitless, and usually dissipated in the endless mists of time. Their existence is doubtless coeval with animal life itself; and the confidence reposed in *natural* remedies at every known period of the world, has formed a remarkable and almost universal epoch in the history of all

nations, and confers upon mineral fountains a medical reputation, which neither the substitutions of art nor the scepticisms of the day, can entirely efface. All Spring Waters may be regarded as mineralized, but the common acceptation of the word would limit its signification to those possessed of such powers as entitle them to be employed for medicinal purposes, and it is highly probable that man early discovered their properties as distinct from the effects of common water, and attracted by their mysterious qualities, became the patron and advocate of their use, destined to be more fully established by the concurring testimony and accumulated experience of succeeding generations.

The usefulness, indeed, of mineral waters does not rest exclusively on the authority of antiquity, although confirmed by Holy Writ, and attested by the Father of medicine, for we may appeal to the stately palaces erected within the last half century, on sites not otherwise possessed of qualities beyond their claim as places of salubrity, sometimes natural beauty of country, but oftener for their springs and baths, as evidences of their present estimation among mankind, and the sense and taste displayed in annually resorting to them; —nay, in this country we may refer to Gloucester's modern Cheltenham, with its Well-walks, and other beauties, designed to attract and minister to the health and entertainment of the visitor,—to Somerset's Roman city, Bath, of Bladud notoriety, favoured by nature in picturesque effect, ornamented by public buildings, and enlivened by its Vauxhall Gardens, exquisitely laid out in lawns, vistas, groves, winding paths, shaded bowers, waterfalls, grottos, alcoves, and labyrinths, bounded by the meandering waters of the Avon,—to Sussex's seat of fashion, Brighton, of mushroom origin as a watering-place, though possessed of a chalybeate,

and the advantages of the coast, defended from the north-east winter's blasts by the hills in its rear, and favoured by the presence of Royalty. These and some other places of general resort, might be adduced as examples of the acknowledged benefits derivable from a visit to such scenes of pleasure and stores of health, for that crescents and squares of noble buildings should be raised, and grounds devoted to sequestered haunts far distant from the busy hum of trade and other occupations of life that commonly assemble in numbers men together, strongly imply, that Watering Places are very generally admitted to have a conspicuous hold on public confidence. Thus it is, that situations formerly remote and unfrequented have risen to eminence, been converted into places of ease and opulence, decorated by the embellishments of art, and finally become the residence of princes.

The efficacy of the waters and the salubrity of the air are undoubtedly not the only causes which operate in inducing the patrician public to visit these famous and favoured fountains, some of which owe their celebrity as much to the patronage of fashion as to the virtue of their springs, for,

> "Fashion in everything bears solemn sway,
> And words, and haunts, have each their day."

The waters, however, have in general first attracted attention, but the real utility of such places in all cases depends upon a multiplicity of combined causes, tending to promote tranquility and entertainment of the mind, alternate repose and exercise of the body, and the necessary regularity of the animal, vital, and organic functions, which constitutes life, and maintains in all its integrity, the health. It is to the

aggregate change effected in the system, that the benefit derived from a trip to the Spaws is properly to be referred, rather than singly to the value of the baths or the purity of the springs; and this change is wrought through the operation of all those influences, which create, often by in-appreciable means, almost a revolution of nature. If the indisposition that has led the invalid to quit the comforts of his home, be *Indigestion*, the release from sedentary or mental occupations, will greatly favour and promote the salutary effects of a gently stimulating chalybeate, as a tonic, which together with exercise and amusement, will secure digestion, and restore appetite. If he have laboured under inflammation, or been consumed by the quenchless fire of fever;—if the summer heat shall have relaxed the system, or a protracted bowel complaint have well nigh exhausted the strength;—if his nerves have become shattered by irregularities, or his intellectual faculties impaired by excessive study, application to confining duties, or deficiency of sleep,—the sea breeze will prove a restorative of no mean value, and the chalybeate a cordial to heal and brace the languid frame.

Previously to the close of the eighteenth century, the number of votaries at the shrine of spawism was comparatively greater to the population than at the present day, when by lacking faith in the omnipotence of the wells, one of the qualities attendant on their use is lost, and one too, to which some of their virtues may be fairly attributed. It was not until this period that the composition and nature of mineral waters were understood or at all accurately examined, since which time, their alleged marvellous effects have alternately formed the subject of praise, astonishment, and ridicule, and in proportion to their former credit in public estimation, in the same ratio, with many people, has been their insolvency

in later times. The fact is, as may be well expressed in the language of the immortal Horace,

> "Est modus in rebus; sunt certi denique fines,
> Quos ultra citraque nequit consistere rectum."

They are entitled to a *certain degree* of confidence in *suitable cases*, and although possessed of but a small quantity of saline matter, may now be safely advocated on scientific principles, as important remedies, distinct from their admitted properties as tonic, aperient, and diuretic.

I allude to the recently demonstrated effects of saline matters when largely diluted in a watery menstruum *on the blood*, or in other words, to the doctrines of Stevens, as first applied to the yellow fever in the West Indies, and subsequently extended to the cholera, as it occurred in this country. To chemical analysis we are indebted for the knowledge that in some, and probably in many, morbid conditions of the body, there is an excess or deficiency of certain constituent principles above or below those assigned to healthy blood, as the standard of comparison. It would be foreign in a popular work to enter at large on this subject, but if the scientific inquirer will bear these circumstances in mind, together with the physiological fact of venous absorption within the human stomach, he will be able to make deductions that will necessarily invest mineral waters with powers and effects on the animal economy, which, although they may have been experienced, have, I believe, never hitherto on the same grounds been explained. I predict, indeed, that the solution of that problem, which places the alleged effects of spaw waters at variance and inconsistent with their known nature and chemical composition, will on this principle ultimately be established.

If the theory Hahnemann were admitted, or by future investigations proved to possess some merit and accord with experience, it would greatly confirm any view founded on the virtues of medicinal substances when administered in *extremely divisible doses*, and although no disciple of his school, yet I am convinced that mineral waters owe very much of their value to this property, effected by the watery menstruum. The extreme tenuity of the fluid and its bulk being exposed to an extended surface within the stomach, are most likely the causes which favour its absorption, and having arrived within the vessels, it so acts upon the blood as to provide a healthy serum, by dilution of it promote secretion, and by reddening the clot, foster that close and necessary union of action and dependence on each other, that subsists between the nerves and blood vessels.

On this principle therefore, the most plausible ground which has been urged as an objection to mineral springs, viz, their *paucity of saline contents*, is deemed to be that on which their virtues much depend, and if considered as established, will remove the only argument which seemed *a priori* to be entitled to any weight.

The effects of mineral waters as well as of many classes of medicines, are not always obvious to the senses, but it by no means follows, that they are not executing some good purpose, any more than that the heart is not beating or our food digesting, because they do so imperceptibly. But among the salts possessed of sensible effects, one familiar example will be furnished, in evidence that saline matters when largely dissolved in water have their properties *greatly augmented* by dilution, and if this fact be admitted in one, two, or three salts, and it is indisputable, why not extend the principle to

all, although in lacking perhaps sensible qualities in many cases it cannot be made manifest. By analogy however, it must be inferred; and will be found in accordance with their acknowledged absorption and action on the blood, as already explained. If one ounce of Epsom salts be dissolved in one ounce and a half of water, and swallowed, it will commonly be succeeded in due time by certain appreciable effects. Should half the quantity of the same salt, however, be dissolved in a pint of water, and in like manner taken, an equal, at least, but usually a greater effect will be produced, displaying the augmentation of property by *dilution*.

Since mineral waters are thus affirmed to possess a claim on public confidence, a question arises as to whether their artificial preparation will supply a *substitute* to those invalids who from the nature of their complaints, from a desire to continue under the care of their ordinary medical adviser, or from other imperious circumstances, are prevented from resorting to the natural wells. It may be answered in the negative; for setting aside the advantages of change of air, habits, and occupation, attendant on a visit to the spaws, the waters cannot be used in all the perfection of their original composition, as notwithstanding the labours of hydro-analysts, the march of chemistry, and the elaborate skill and accuracy bestowed upon their preparation, yet they have not always proved identical in their chemical composition and medical efficacy with the natural springs. In some cases it is probable that the whole of the ingredients that enter into their formation are not yet discovered, for some of which we possibly know not appropriate tests,—how much less likely is it, therefore, that we can succeed in making an exact imitation of the waters as they exist in nature, or effect those hidden combinations and associations, which however seem uniformly to be performed

on the laws of definite proportions and elective attraction. The Ems-water, as prepared by the celebrated Struve, of Dresden, differs both in taste and operation from the natural springs, and the Scarborough and Harrogate waters, as artificially made in my own laboratory, deposited flocci by the third day of their preparation, the former of a yellow and the latter of a paler colour. The hand of nature, indeed is the only true method by which we can obtain the virtues of mineral waters in all their power and purity. The strongest of the chalybeate springs do not contain more than five grains of the carbonate of iron in a gallon of the water, the real quantity of this tonic received at a single dose into the stomach, or contained in a pint, is therefore extremely small, but, nevertheless, it will exert a more salutary influence upon the system, according to Dr. Saunders and others, than ten times the dose of the artificial carbonate in our ordinary prescriptions. Moreover, the effects of the waters differ from, and are often altogether disproportionate to the results which we should expect to find from their known chemical analysis.

It has been my great object, throughout this book, to attach just as much importance to the various subjects contained in it as they respectively deserve, *and not more*, and while I am willing to admit that the application of mineral waters for the alleviation and cure of human infirmities is properly limited to certain classes of complaints, and even of those only when in particular stages, yet I shall always be found ready to make a determined stand against those vain aspersions of charlatanry and empiricism, which the philosophy of the day, with plausible ingenuity, has sometimes endeavoured to envelope the results of that patient, scientific, and comprehensive enquiry, which has led to an elaborate examination of some very valuable auxiliary therapeutical agents, and has

declared mineral waters to be those "perrennial springs, which, issuing, from the bowels of the earth, are charged with principles to which reason and experience alike award medical virtues." We must not regard them as confined to the results of the chemists, for the salts obtained through analysis, by means of evaporation, or any other process, may have been *produced* during the operation, but as the results of the synthesis or combination of nature; and I have shewn the futility of the attempts of art in their imitation, and that their acknowledged effects are oftentimes at variance with their known composition, and saline impregnation, which if duly considered, will go far to reconcile the discrepancy of opinion that has existed upon the subject; while to those who would affect to dismiss the matter after the fashion of the times, I would apply the quotation used by a friend and fellow graduate, in his Inaugural Dissertatio de Homœopathia,

"Quanto plures cachinnare aliquid, quam intelligere possunt."

The bountiful hand of Providence with great profusion has scattered abroad waters, which experience and science have shewn to exert considerable influence upon the functions of animal life. But it is a very limited view of the subject, when we confine our observations to the details of the analyses and medicinal effects of mineral springs; for, together with the phenomena presented by volcanoes, they form a link in that chain of investigation, that is properly destined to disclose to us the internal constitution of the globe itself. Their relation to this great physical problem, and to other departments of science and art, demonstrates their importance as subjects of inquiry to the naturalist, the chemist, the mineralogist, and the physician. How deeply do hot springs excite the meditations of the geologist, from their connexion with the general question of the temperature of the earth,

and with the local development of volcanic agency!! How striking is the contrast between the icy crystal streams that rise from the glaciers of Switzerland and the boiling geysers of Heckla, Stormboli, Etna, and Vesuvius! and how varied are their relations to the general cosmical system, when regarded in a comprehensive and philosophic point of view!

The theories advanced relative to the *origin* of the water of mineral springs, and the causes which influence their temperatures and composition, although deeply interesting, will not be expected to be discussed in the pages of this volume, for to do them and the subject adequate justice, the limits of it would prove altogether insufficient for the purpose, and my reader is probably more desirous to view me in my medical character than as a speculative inductive philosopher. Much, however, has been done in elucidation of this department of inquiry, by the united efforts of the chemist, the geologist, and the mathematician, who have applied the resources of their respective branches of science to the explanation of volcanic phenomena, and the constitution and origin of mineral waters generally.

The water of springs, of whatever description, must be derived from one or more of these sources, viz., from the waters of the atmosphere, which after sinking to a certain depth re-appear on the surface of the earth, emerging through the soil or rock,—from the focus of present or past volcanic activity,—from the great mass of the ocean,—or from large subterranean reservoirs of this fluid. It is more than probable that those mineral waters which vary in their quantity, impregnation, and temperature, either periodically with the seasons, or after the lapse of a number of years, and those temporary streams observed at the foot of hills, derive their

origin directly from atmospheric moisture, percolating the rents and fissures of the rocky strata, and destined to appear again below; but the impenetrable beds of clay, massive granite, compact kneiss, and mica slate strata of the earth's crust, would oppose its passage to any great depth within its bosom, while assuredly the water of boiling springs, which emerge on the verge of perpetual snows at an altitude of 13,000 feet above the level of the sea as at the Himalayah mountains, cannot be derived from the atmosphere, not to mention the peculiar relations of the Icelandic geysers, and the volcanic eruption of the Andes, which consist of torrents of mud and boiling water.

Thermal springs are seldom found in extensive plains, remote from mountain ridges, but are abundant enough, and possess the highest temperatures when in the vicinity of active volcanoes, whose localities are for the most part islands rising out amidst the ocean, or if situated on the great continent, will be found at no great distance from the coast. These facts seem to lead to two natural inferences, first, that hot springs very often owe their temperature to subterranean fire; and secondly, that proximity to the sea is one of the necessary conditions for the production of volcanic energy. The immense quantity of water ejected at the mouths of their craters can only be derived from two sources, first, either from reservoirs existing in the centre or crust of the planet we inhabit, and secondly from direct communication with the sea, effected by filtration through the pores and fissures of the earth, and absorbed, contrary to gravity, by capillary attraction, or forced up by atmospheric pressure, and the weight of the superincumbent waters. The former supposition is rendered improbable for several reasons, among which may be mentioned, the fact that pits

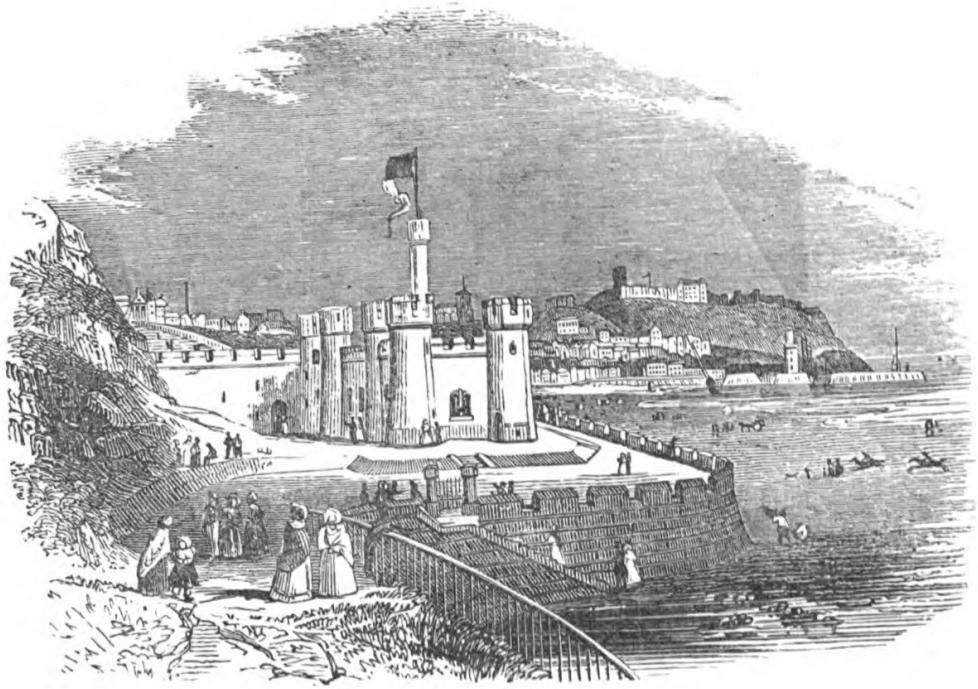
and mines become drier the deeper they go, and that according to the researches and experiments of Cavendish and others, the globe is 4.9 or we say five times heavier than its own bulk of water.

Thermal waters undoubtedly arise in places where it would be difficult to demonstrate their connection and dependence on volcanism, and which unquestionably owe their heat to other causes. And there is an important point of late revealed relative to the temperature of the earth at different depths from its surface, which is pertinent alike to hot and cold springs, and may lead to a more intimate knowledge of their true origin, and disclose how far their saline impregnation is dependent on the solution of the rocky strata through which they pass. It has been long known that the heat of the earth increases with the distance downwards from the surface, but it remained to be ascertained whether that increase of temperature was progressive or could be found to observe any certain definite ratio appreciable in numbers. By a series of close, accurate, and unobjectionable experiments, this object is apparently accomplished, and the mean rate of increase of terrestrial temperature with the depth, is declared to be 43.9, or about 44 feet for every degree indicated by Fahrenheit's thermometer. In some ranges of mountains we find both thermal and cold springs to occur on the same range, but their respective elevations in such instances always differ,—the thermal uniformly occupying the lower part or foot of the mount. The inference to be drawn from this fact in relation to the earth's temperature is obvious.

The mean temperature of the earth in all northern and southern habitable countries as we approach the poles, is fortunately higher than that of the air there, or animal and

vegetable life must have long since ceased to exist, for how could colonization and culture take place on a soil whose average temperature was 5° below the freezing point of water? we might have looked in vain for the flourishing towns and profitable harvests now existing in situations possessed of no higher atmospheric temperature.

I have thus endeavoured to prove that the earth is possessed of *innate heat*, wholly independent of solar and atmospheric influence, and now come to the conclusion, that mineral waters, principally if not entirely, owe their temperatures to it. And had it formed a part of my plan in this essay, to treat of thermal springs, no difficulty would have arisen in establishing a scale of distinct and oftentimes augmented effects upon the body, according to their relative temperatures.



CHAPTER II

THE SCARBOROUGH SPAW.

Discovery of the Spaw Water. Dr. Wittie first recorded the history of the Spaw and analysed the Springs. Subsequent researches. The opinion entertained by the celebrated Drs. Mead and Belcombe as to the value of these waters. Results of the analysis of the springs. The value of analyses in judging of the real effects and virtues of a spring. Saline and gaseous contents of the waters individually considered, &c.,

---

Tales præcipue sunt aquæ, qualis terra per quam fluunt.—PLINY.

It is stated in Hinderwell's History, that the mineral springs of this spaw were accidentally discovered to possess medicinal properties so early as the year 1620, and subsequently became the ordinary physic of the inhabitants of the town. Their reputation rapidly extended, and has now been maintained with unusually trifling variation for upwards of two centuries.

An anecdote is related of one of the governors of the spaw who lived far from temperately, but had, nevertheless, arrived at the advanced age of 103 years, and in the full possession of his faculties, and with few bodily infirmities. "Whenever he was questioned respecting his regimen, he usually replied that he had always lived well, and when sick the spaw water was his sovereign remedy."

It would prove tedious to the reader, and answer but little purpose, to inquire at any length into the works which have been written on the subject of this celebrated spaw, or to detail the acrimony with which the earlier authors supported their respective controversial views, and as chemistry and medicine have since those periods assumed new features, we can readily dispense with the twaddle and gross personality, that for the most part characterized these splenetic effusions of rivalry at the dawn of science. Dr. Wittie, however, has the merit of having, in 1660, recorded the early history of the spaw, and given the first analysis of the springs. Dr. W. Simpson, in 1669, published a criticism on the Treatise entitled "Scarborough Spaw," of Dr. Wittie, in which he calls into question this gentleman's chemical knowledge, and desiring no adventitious aid to favour his opinions in the dispute or to patronize his work, rests his claim to public confidence in these words; "prævalet ipsa veritas! imo in æternum prævalebit"! Dr. Tunstal in the same year, committed to print the results of his researches. Dr. Simpson's work recalled Dr. Wittie to the field in a rejoinder. Dr. Short succeeded them in 1734, and found that a gallon of the chalybeate yielded, by evaporation, 220 grains of solid residiuum. About the same time, Dr. Lucas discovered the purging water to contain 320 grains in the same quantity, though Dr. P. Shaw in the same year got only 240, but Dr. Rutty afterwards obtained 284 grains.

Dr. Shaw's "Inquiry into the contents, virtues, and uses of the Scarborough Spaw," is properly considered as a great effort of genius for the time at which it was written. He entertained a high opinion of the usefulness of the wells, and in his dedication to the celebrated Dr. Mead, of London, points out one of the causes that tended to establish Scarborough as a fashionable watering place, in these words; "These waters, fraught with virtues known to few, and healing chiefly the sick of inferior rank, are at length, by your experience, and subsequent just and generous recommendation of them, introduced into better company, and now cheer the spirits and brace the nerves of peers as well as commoners."

In the interval of 1734, when Dr. Shaw wrote, and 1763 the year of the land-slip of the cliff, these mineral springs were submitted to analysis by Sir George Baker, Dr. Heberden, and Mr. John Travis, and in 1798 by Dr. Belcombe, who was then the latest author on the subject. The only matter, however, so far as I know, which he has furnished, besides the analyses to be found in Hinderwell's history, is a fragment, (for which I am indebted to a respected member of the Doctor's family,) relating to the late effects and uses of the springs, which is truly valuable, in so far as it affords the results of ten years' experience in their employment, and I shall, therefore, extract some passages from it, when engaged in the consideration of that part of my subject.

According to the experiments I have instituted, the results of the analyses differ in some measure from all antecedent ones, not so much in the salts themselves, as their quantities, and the gases with which the waters are imbued. The direct and indirect modes were severally applied, and since they each furnished different results, for reasons that will shortly be explained, we can only hope for an approximation

to the *exact* constitution of the waters, and must rest satisfied with constructing our non-crystallized analysis on the knowledge of the quantity of acid and base contained, and speculate as to their affinities and actual state of union in the natural and undisturbed springs.

NORTH WELL.

Temperature 46° F. Specific Gravity 1003.323.

IN EACH GALLON.

Carbonic Acid Gas.....	128	Cubic inches.
Iron Protoxide.....	1.25	grains.
Magnesium Sulphate	90.00	,,
,, Chloride	8.00	,,
Sodium Sulphate.....	2.50	,,
,, Chloride	3.25	,,
Calcium Carbonate.....	30.00	,,
,, Sulphate	44.00	,,
,, Chloride	12.00	,,
	191.00	,,

SOUTH WELL.

Temperature 46° F. Specific Gravity 1003.806

IN EACH GALLON.

Carbonic Acid Gas.....	120	Cubic inches.
Iron Protoxide.....	1.5	grains.
Magnesium Sulphate	100.0	,,
,, Chloride	20.0	,,
Sodium Sulphate	7.0	,,
,, Chloride	5.0	,,
Calcium Carbonate.....	24.0	,,
,, Sulphate	14.0	,,
,, Chloride	9.0	,,
	180.5	,,

* See Appendix.

Although the improved chemical analysis of the present day enables us to determine with sufficient accuracy, the quantities and essential constituents of mineral springs, yet it supplies only for them what anatomy is for the human body, —it constitutes the basis of our acquaintance with their composition ; and when regarding them as medicinal agents, it should not be forgotten, that analysis dissolves the bond of connection between the different substances, as they are associated in the secret laboratories of nature, distinct from the imperfect, and often hypothetical combinations of the chemist. A knowledge of the proportion of acids and bases contained in mineral water, enables the physician to form a *general estimate* of its medicinal virtues, from its synthetical resemblance to one, with the *exact effects* of which he is already well acquainted, and it is, therefore, through this means, that he would found a rational theory of its operation. But, nevertheless, experience should go hand in hand with the chemist, in judging of the real effects of every spring

It is probable that mineral waters owe their saline and gaseous impregnation, generally to the process of solution, sublimation, and lixiviation existing in the earth's interior, aided by hidden but omnipotent influences. There is no where, however, in nature, a chemically pure water, for it is the great, the universal solvent, and is constantly exposed to the influence of light, heat, air, and matter,—all agents incessantly at work changing its original purity.

There is scarcely a subject more worthy of profound meditation, or better calculated to excite a lively interest in the mind than the origin of those inexhaustible springs, which for a long succession of ages have poured forth such enormous

quantities of saline and gaseous matters, without any sensible diminution of their quantity, temperature, or degree of mineral impregnation. Nor need we dive far into the interior of the earth to learn the effects and operation of those hidden causes of heat, mass, time, and pressure, which are probably instrumental in the production of those varied features which mineral waters present. The enquiry is a difficult one, and not fitted for these pages, but though the true secret should never be revealed, it is important to demonstrate in what manner they might be formed, by the creative energies exercised within the bowels of the earth.

Did we find the solid ingredients with which mineral waters are charged already prepared in masses, and forming strata in the solid crust of the earth, it would be an easy matter to ascertain their composition, and trace their origin from such sources; but such is not often the case, and it is necessary, therefore, to enquire for other probable causes in the discovery of their formation. But it is a remarkable fact, that in a large proportion of mineral waters, the ingredients, are identical with those discharged from the interior of the earth by volcanic eruptions, or found in fissures of the crater and lava masses, in the form of sublimations. The origin of the ingredients of all such might be ascribed to a general case, while a second class, which are found to vary with the temperature, dryness, or moisture of the seasons, may be regarded as the local products of certain strata, permeated by atmospheric moisture, dissolving the substances with which it comes in contact in its subterranean channels.

If Davy's hypothesis, which regarded the crust of the earth as the result of a grand process of oxidation and its interior as composed of the bases of the earths which enter

most abundantly into its composition could be substantiated, all difficulty in the investigation as to the sources from whence the solid and gaseous impregnation of mineral waters were derived would cease to exist, and the phenomena attending volcanoes and the production of hot and cold springs and their ingredients readily explained. The experiments and calculations of Maskelyne and Cavendish assign to our globe, a specific gravity, of no less than five times that of water, being fully one third more than the mean density of its rocky crust. If this point be deemed established, it would tend to support Davy's view of the metallic nature of the interior of our planet.

The waters of the Scarborough spaw issue at the foot of a diluvial cliff, on the south side of the town, at a very trifling elevation from the level of the sea. It does not however necessarily follow as in the case of those waters which emerge from granite, or some point of the crust of the earth inferior to it, that they are originally derived from this formation, as they may have traversed many, but nevertheless a certain uniformity is commonly discovered in the nature of the neighbouring rocks and the composition of the springs which flow from them. There are two classes of mineral waters, however, whose geological relations are frequently obvious, viz., those thermal springs which rise in the vicinity of, or directly from, active volcanoes; and those brine-springs, whose *matrices*, or parent formations, are clearly seen to be rock salt deposits.

The foreign ingredients of ordinary springs, or those used for domestic purposes, are derived immediately from the soil out of which they issue, and when they exude from a sandy or silicious matrix are very pure, and have a greater specific

gravity than other terrestrial waters, with the exception of the sea.

The mere altitude in the position of mineral waters seems to exert no influence in the temperature and composition of them, beyond the facts already stated, that where there are two sets of springs, hot and cold, in the same hilly range, the former of these occupy the lower elevation.

The alkaline and earthy salts constitute the great proportion of the solid matters contained in the Scarborough waters. The bases of these salts are magnesia, soda, and lime, all of which enter largely into the composition of the solid crust of the globe. The acids found in union with these bases, are the sulphuric, muriatic, and carbonic. These principles, together with the oxide of iron, in various combinations and proportions, form the purging, and salinely carbonated chalybeate, which the well server now, August 1881, calls the "Magnesia water."

My experiments furnish no nitrogen or azote in the Scarborough waters, but such as I consider to be neutralized by oxygen in those proportions which constitute atmospheric air. It is indeed of rare occurrence in cold springs, whilst atmospheric air is universal, and pervades, in certain proportions, all exposed within its influence, and the idea of its existence in these waters has probably arisen from this circumstance, that having obtained carbonic acid gas within the jar, intermixed however with the common air contained in the water, the means used to decompose the former, have taken away also the oxygen of the latter, leaving the nitrogen marked by its negative qualities to itself. That oxygen, distinct from carbonic acid, is contained in the jar, is clear from the fact of a lighted taper continuing to burn in it for a short

time. In thermal springs, however, azote or nitrogen is much more abundant. In the Buxton water it is almost the sole gaseous constituent, and forms 95 per cent of the gas which bubbles up in the Bath waters.

The other gaseous fluid contained in the Scarborough waters is carbonic acid or fixed air, which is diffused throughout and plays an important part alike in the composition and medical effects of the springs, as it holds the iron in a state of solution, and enables the stomach to bear a quantity of the cold liquid without oppression. It does not, however, appear to be in so great a quantity, as when the waters were submitted to the analysis of Doctors Higgins, Belcombe and Phillips. But its fugitiveness is striking, as is seen best in highly acidulated chalybeates, such as are found at Tunbridge, Hartfell, and Cheltenham, and may be observed likewise at Scarborough, by the ochreous deposit found in the bed of the water or adhering to the pipe, separated by the gentle agitation which it undergoes in its descent. Other circumstances may also account for the discrepancy in the results of our analysis, such as the distance the waters were taken, and the time allowed to expire, prior to submitting them to examination in each case, independently of the circumstance already alluded to, that what they regarded as azote I conceive to be atmospheric air, whose oxygen appears to have been viewed as a part of the combined carbonic acid. This supposition would go far to reconcile the difference between us, but it is probable from the statements of early hydro-analysts, that the waters have undergone some change, or we should not have discovered so great a difference as the following table exhibits, in the solid residuum of a gallon of the water as it flows into the South Well, whatever varieties in the temperature employed in its evaporation.

NAME.	QUANTITY SALINE MATTER.	
Lucas	320 grains.	
Shaw	240 ,,	
Rutty	284 ,,	
Belcombe	237 ,,	
Alexander	180 ,,	non-crystalized.
Phillips	405 ,,	crystalized.

The origin of carbonic acid as it emerges from the bowels of the earth, has engaged much of the attention of philosophers, but amid the various opinions that have been advanced upon this difficult subject, that is daily gaining ground which regards it as the result of terrestrial heat causing calcination of the carbonate of lime or common limestone, which is known to exist in so great abundance, (second indeed in quantity to silica itself,) in the solid crust of the earth, so far as it has yet been explored by man. This view of its origin is strengthened by the impossibility of its being evolved from the combustion of coal, or formed by the direct union of its elements, and the facts that among the numerous examples of disrupted strata discharged from volcanoes, there are none so common as fragments of limestone. It might be disengaged by the action of sulphuric acid upon limestone, but sulphur is necessary to the formation of this acid, and this element exists, so far as is known, only partially, being chiefly the product of volcanic energy, and could scarcely therefore supply the enormous volumes of this gas, which, impregnating so generally all waters, issue in all quarters from the surface of the earth. It is true that limestone is a bad conductor of caloric or heat, and were it not that the intense heat to which it is thus exposed caused rents and fissures, there would be a limit to the evolution of this gas, which however, is enabled by this means, to make its exit and find the caustic lime in a favour-

able state for solution, hence the general prevalence of carbonate of lime in mineral springs, and its frequently extraordinary quantity.

The next great acid I have to allude to, as existing in combination with the bases of the Scarborough waters, is the sulphuric, which may be formed either as a product of the union of its elements or as an educt from some sulphuret. It is very probable that iron-pyrites is the source of the sulphuric acid contained in many chalybeate springs, but more particularly the alumino-sulphate of iron waters, such as Horley Green, near Halifax, and those found in the Isle of Wight. When the sulphates predominate in a mineral water, it generally contains muriates and carbonates, but with only a small quantity of *free* carbonic acid. And this law accords with my analysis of the Scarborough Spaw, in which the sulphate of magnesia predominates, and I have, therefore, called the south well "the Purging Water," though subordinate ingredient in a chemical sense, may play the most important part in the medical effects of a water, as the iron for instance in the north well, which is probably derived from the iron-stone nodules found in the cliff. The sulphate of magnesia is generally associated with the sulphates of soda and lime in most waters, but particularly those possessing iron, and the sulphate of soda will appear by my analyses as an ingredient of the Scarborough waters for the first time. It is, however, in subordinate proportion. The springs of Cheltenham contain 81.04 parts (in 10,000) of this salt. The springs of Seidlitz, in Bohemia, contain a large quantity of the sulphate of magnesia. The sulphate of lime is largely diffused in mineral waters, always in the vicinity of gypsum deposits, but never associated with the carbonate of soda. The carbonate of lime is generally associated with the

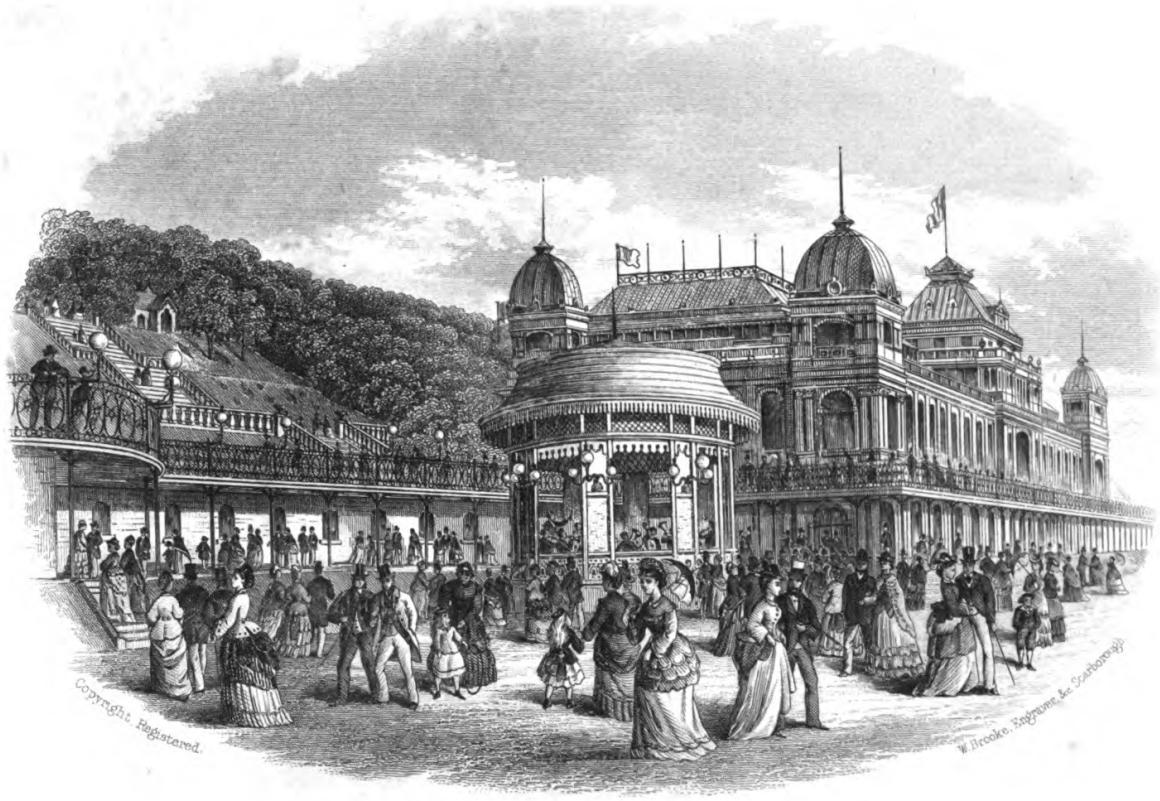
sulphate, and in some thermal waters where its solubility is aided by a high temperature and an excess of carbonic acid it exercises considerable formative changes upon the physiognomy of the earth's surface, as for example, in the enormous calcareous vault which forms the receptacle of the boiling Sprudel in Bohemia.

Muriatic or hydrochloric acid in all probability exists as a muriate in the bowels of the earth, and is not formed by the union of its elements, but may be separated from its combinations there, by sulphuric acid, or by sulphur aided by heat. The muriate of soda is the most frequent of these combinations, and may either be derived from immense masses of rock-salt, in primitive rocks, or from sea water, when in the vicinity of volcanoes. In 1822, the crater of Vesuvius discharged so large a quantity of muriate of soda, or common salt, as to supply the inhabitants of the neighbouring villages with it for culinary purposes for several days. But in the language of an esteemed author and fellow graduate, "volcanic rocks and mineral springs do not stand to one another in the relation of cause and effect, but are the effects of one common cause, the vast central igneous focus; and so long as the gaseous products are retained by the pressure of the superincumbent rocky strata, their elastic force progressively increases till it becomes capable of rending asunder the solid crust of the globe, and of clearing for itself a passage into outer space. Should they, however, find a ready ascent through fissures already existing, such an accumulation of elastic force cannot take place, volcanic eruption will not occur, and there will be substituted for them the permanent and peaceful ascent of mineral springs."

The muriates of magnesia and soda are admitted to be

present in the Scarboro' waters, and I have introduced for the first time, another salt, viz., the muriate of lime, as it is generally found associated with the former in mineral springs according to Dr. Murray's view of their constitution, and secondly, because I think were there so much carbonate and sulphate as Dr. Belcombe's analyses indicate, a portion would be deposited in the earlier stages of the operation of their evaporation by heat, or when otherwise deprived of bulk of menstruum and free carbonic acid. But it must be confessed that we are still in a great measure ignorant of the real state in which substances exist in mineral waters, being often forced after the separation of the constituents into their simplest proximate elements, to re-construct a system of combinations upon entirely hypothetical and arbitrary suppositions.

Magnesia, lime, and iron, are very extensively distributed in the solid crust of the globe, and their origin as constituents of mineral waters in combination with the acids, whose probable sources have already been explained, will now be obvious, nor will the reader be surprised to learn, that they are to be found in various combinations in mineral springs. Scarcely any cold spring is entirely destitute of iron, and it is the quantity of this metal contained, and its being medicinally the predominant ingredient of the water, that constitute a chalybeate. The North Spring at Scarborough, is strictly a chalybeate-saline, but may be considered as chalybeate. It occurs here as the carbonate of the prot-oxide, and is deposited in the form of an oxide, as the water comes in contact with the air, owing to the escape of the carbonic acid. Iron is always a *chemically* subordinate ingredient in the constitution of mineral waters, never exceeding 5 grains in a gallon.



THE PROMENADE & SPA SALOON, SCARBOROUGH.

CHAPTER III.

MEDICINAL AND PHYSICAL EFFECTS OF THE SCARBOROUGH WATERS.

Effects of mineral waters founded on experience and the known therapeutical qualities of their saline contents. Berthollet's view of the association of the salts in a natural water. Particular properties of the Scarboro' waters. The North Well. The South Well, &c.

Siquidem Deus Omnipotens summas et longè præstantissimas in aquis recondidit soterias vires, quarum tanta est excellentia, tantaque utilitas, ut longè multumque omnibus aliis remediorum generibus sint superiores.—HOFFMAN.

On entering into the consideration of the effects of mineral waters upon the organism and function of the human body, two points of difficulty in arriving at sound conclusions are presented,—the one which would regard them solely on their specific characters as the result of a series of well

directed experiments, or in other words, by experience,—the other in explaining their operation, as is applicable to other remedies, upon general principles of therapeutical agency. Neither of these views, singly, will suffice to elucidate the various phenomena observed in relation to them. Water is the only property common to mineral springs, upon which much of their efficacy depends, its action being clearly diuretic and diaphoretic, independent of saline impregnation, which, however, through its influence, under great dilution, is rendered more diffusible over the system, penetrating the secretory organs, resolving obstruction, and exercising, possibly unknown effects upon the great circulating fluid. Hence it is necessary in estimating the medicinal effects of a water, to ascertain what is to be referred to the mere water, and what to the foreign ingredients contained, and so on; but it is still more important to consider its several relations as *a whole*, and not to suppose certain virtues as necessarily accompanying a certain chemical composition, but to ascribe due agency to the several combined causes attendant on its use, such as the moral influence of the mind, the extreme divisibility of the salts and the tenuiny of their menstruum, the salts themselves and their quantity, the water as a diluent, the exercise taken to aid its operation, its temperature, and the aggregate results of many trials of it.

With respect to the salts obtained from a mineral water, the decomposition of the chemist furnishes but an indifferent and imperfect view of them, as they are associated by the hand of nature, since, as we have noticed already, some of them are, in all probability, produced by the process employed in reducing them to their simplest proximate elements; the exact state, indeed, in which the salts exist in mineral waters cannot be discovered, but the doctrines of Bertholét regarding

the influence of mass in modifying the force of affinities, would lead us to suppose, "that when several salts are dissolved in the same solution, (even those which do not decompose each other,) a certain reaction ensues, each acid combining with a portion of each base, and there arise a series of compounds resulting from the reciprocal union of all the elements; the number of which is equal to the product of the sum of all the acids into the sum of all the bases." Dr. Murray found that sulphate of soda and muriate of lime could co-exist in a very dilute solution without decomposition, but by concentration a new arrangement took place, and hence inferred the errors committed by the results of the ordinary evaporation in the analyses of mineral waters. And it is a curious fact, that, according to all analyses, when they can be supposed to have been executed with any precision, where the sulphate of lime exists, the muriate of soda is always present. Brande also found that the carbonate of soda and sulphate of magnesia do not decompose each other when each is dissolved in 60 parts of water, nor the carbonate of soda and muriate of lime when in 6000 waters. The only correct method, therefore, in forming a rationale of their effects, is to regard them in their original combined state, and as *acting as a single compound*, of the operation of which, experience alone is to be most relied on. And, moreover, any single salt which might be selected as characterising a spring, from its predominance in quantity, or superior activity, may be found so modified by the presence of other subordinate ones, that its qualities are wholly disguised and its operation materially altered. Thus, *conbination* of different substances, possessing similar effects, augments their *common* properties, and this fact applies to vegetable as well as mineral compounds, and is well understood by physicians, and practised by cooks in their spiced meats, if we can credit Dr. Kitchener.

The sulphate of magnesia, or Epsom salts, is doubtless the predominant salt in the purging water at Scarborough, but its operation is greatly aided by its conjunction with other salts, and in a ratio beyond that which could be explained by quantity or similarity of property— it is indeed the union that augments their common effects, and gives to each, under such combination, increased power.

The temperature of the Scarborough waters being usually about 45° F. enables them to hold in solution a quantity of carbonic acid, and therefore to take up a larger dose of the insoluble earths, such as the sulphate and carbonate of lime, and the oxide of iron, than is met with in ordinary springs, and the temperature and iron may, together with the carbonic acid, be regarded as immediately tonic to the system, and as obviating the otherwise debilitating effects, in their daily use, of their aperient properties. All variable springs in this country are coldest at the end of spring, and warmest in autumn, reaching their highest temperature about September. But at Scarborough the mineral waters will seldom be found at any season, when examined as they emerge from the cliff, to be higher than 47° or lower than 45° F.

The presence of fixed air or carbonic acid gas in a mineral spring performs an important part in its effects in many cases of delicate health, particularly those marked by gastric irritability. And it is important to know, that the larger the proportion of gaseous matters, and the smaller that of the fixed, the more easily is the spring borne by the stomach, for should there be a large quantity of salts contained in it, oppression and nausea will be the common effects resulting from a dose in weak states of the digestive organs, particularly when unaided by the stimulus of presiding gas.

The mineral waters of Scarborough with but little interruption, have enjoyed more or less celebrity during the last two centuries, founded on the experience of every recurring season. The Spa consists of two Wells, the Chalybeate and the Saline.

Dr. Granville notices the great discrepancies which have been observed in the Chemical Analyses of these Springs undertaken from time to time, due no doubt partly to the land-slips of the South Cliff, from whence they take their rise; "but he adds that for medicinal purposes, the approximating analyses of the probable ingredients at present received may be deemed sufficient, especially when we add the taste, temperature, specific gravity, and the physical impression made by the waters on the organs of digestion."

The North Well. I regard the mineral waters of Scarborough, as well as most others of the same description, as physiologically and therapeutically stimulant in their effects, and am confirmed in this opinion by the drowsiness, giddiness, sense of heat and prickling of the skin, and general fulness, often experienced on first taking them. This stimulant power may be directed to different organs in different degrees, and may not be appreciable to the individual as in the foregoing uneasy sensations, but may exercise its influence in exciting the capillary circulation, promoting the alvine and urinary secretions, and digestive functions, and operate indirectly on the nerves generally, and through them extensively on the locomotive organs.

In the North Well, besides the latent fixed air and iron, there are sundry saline matters which modify its medicinal character as a pure carbonated chalybeate, but will not materially detract from the general effects and known tonic proper-

ties of such springs, is not liable to the disadvantage arising from their constipating quality, and may be employed in a more plethoric condition of the body than that in which their use is generally advisable. The iron exists in it as a bi-carbonate of the protoxide, and from the minute division of its particles by dilution, is presented over a large surface, to the sentient and capillary mouths of the absorbent vessels, and most likely directly absorbed into the circulating mass, in a manner that with the grosser carbonate in common use, is not found to take place. The exhilaration of the animal spirits accompanying its use, is most probably attributable to nervous stimulation, and primarily caused by the carbonic acid which enables it likewise to sit easy on the stomach.

Although the iron is the ingredient that characterises the North Well water, and constitutes it a chalybeate, yet the magnesia and lime are by no means destitute of medicinal power, whether we regard them as associated with the sulphuric, the carbonic, or the muriatic acid. For the reasons already assigned, it is probable that the lime exists naturally in the water as a muriate, although my analysis describes it chiefly as a carbonate and sulphate, being the products probably, rather than the educts, afforded by the usual chemical manipulation.

This spring holds an intermediate character with the waters of Cheltenham and Leamington, of Tunbridge, Hastings, and Thetford, and Spa and Pyrmont. It possesses more iron than the first, but is not so purely chalybeate as the second, nor so acidulous as the third variety here mentioned. It has little aperient property, braces the solids, gives tone and vigour to the system, and passes off by the kidneys.

The South Well, or "Purging Water." The Epsom salts and muriate of magnesia contained in this water, so predominate as to justify me in regarding it as belonging to the class of purgative springs, but in moderate doses its operation on the bowels is so gentle as not to occasion any griping or other uneasiness, which property is most likely referrible to the presence and modifying power of iron and fixed air.

This well, with its admixture of purging salts, fixed air, and ferruginous ingredient, has been termed an aperient chalybeate, and is more particularly distinguished as the "Scarborough Water." Its primary effects are relaxation of the bowels and an increased flow of urine; hence it is refrigerant and antiphlogistic, but these effects are seldom accompanied with those debilitating consequences which attend the continuance for a much shorter period, of an equal dose of artificial salts in our ordinary prescriptions, or even what are called factitious mineral waters.

Dr. Belcombe observes, in the fragment already alluded to, that the general effect of this water "when drank in a sufficient quantity, is to act gently on the bowels and kidneys, and sometimes on both, but without harassing or fatiguing, on the contrary, it strengthens and exhilarates." He then enters upon a long catalogue of complaints in which it proves very serviceable, many of which are of opposite descriptions and very different in their nature one from another. Now, however inconsistent *prima facie* this sort of arrangement may appear, it is founded on reason and supported by experience, and admits of some explanation by the circumstance of the water being impregnated with a variety of saline compounds, some one of which may be deemed appropriate for the particular case, although it is associated with other ingredients.

Thus for example in one instance, the purgative quality of a mineral spring may be desired, and this to be effected with the smallest possible functional disturbance; in another case, the diuretic effect; in a third, its indirectly tonic power, or its depleting agency, or with a view to use it as a refrigerative remedy, a febrifuge, an emenagogue, &c., all of which indications, it may, logically speaking, be calculated to fulfil, to the *extent of its known impregnation* of particular saline substances and *ascertained effects*, but not further. The combination of several qualities in one water proves a great obstacle to the construction of a complete theory of its action independent altogether of empirical views, but it is this property of mineral springs that gained for them the appellation of "universal medicine," at a time when their mysterious origin was a good and sufficient plea for referring to them a thousand occult qualities, characteristic of the dawn of an enlightened philosophy, and when cures were effected in cases that had not yielded to other remedies led men's minds to regard their effects as miraculous, or as instances of God's peculiar goodness to his creatures, so prone is erring human nature to attribute to the partial interposition of the Deity the effect of general laws which its finite reason cannot comprehend.

The South Well water may be said to hold an intermediate place in its nature and effects with the Cheltenham, Melksham, and Thorparch, the Seidlitz, Epsom and Leamington, and the Hastings and Pyrmont waters.

All the preparations of iron are noticed to cause the fæces to be of a black colour from the formation of the sulphuret of iron, of which persons taking chalybeate waters should be apprized, lest the circumstance occasion alarm.

CHAPTER IV.

PRACTICAL DIRECTIONS.

The season of the year in which the waters are principally taken. Climate of Scarborough, and its claim as a place well calculated for the recovery of health and strength. The complaints for which the North Well Water is to be used, with directions as to the quantity, time of day, &c. The South Well, or "Purging Water." Complaints in which it is proper. Rules for drinking, &c.

Foret perutile quinimmo summopere necessarium, ut ii qui custodes sanitatis audiunt, et morbis mederi student, aquarum salutarium passim scaturientium genuinas et proprias vires imprimis probe et curate explorarent, quo ægrorum incommodis recte consulere possent.—HOFFMAN.

The season during which mineral waters are employed medicinally, usually extends from the month of June to that of October inclusive. The summer and autumn are

generally selected so as to combine the benefits of air, exercise, greater constancy and mildness in the weather, and the general exhilarating effects of this period of the year when all nature is smiling and full of animation. This arrangement however is conventional, there being nothing so peremptory in it as to prohibit its use at any other period, provided the local peculiarities of the watering place suit the strength of the invalid, and are appropriate for the nature of the disorder. In travelling to them the *enfeebled* patient should proceed slowly, and by short stages carefully avoiding fatigue, midday heats, and evening dews,—the frequent causes of feverishness,—if not of renewed attacks of illness. At the end of the journey in such cases, the repose of a day or two is necessary, and may be employed in taking some preparatory medicines should such be deemed advisable, previously to commencing a course of the waters.

But since the great bulk of visitors frequent Scarborough for pleasure, the advantage of the sea baths, and invigorating sea breezes, as well as for the benefit of the springs, it will not be out of place if I devote a few lines to a brief exposition of the climate of the place and its claim as productive of health, and this may be accomplished with least tedium to the general reader, by condensing the information furnished by Doctor Belcombe to Hinderwell's own edition of the History of Scarborough, the introduction of a few passages from Mr. Brearey's very useful Guide, and the researches of my late friend Mr. Dunn on the vital statistics of this marine resort, which are found to be such as would establish a far greater salubrity and comparative exemption from diseases of the respiratory organs,—the great scourge of the country,—than is found to exist elsewhere, in the proportion

of one-fifth only to one-third of recorded mortality as occurring in the kingdom at large.

The effect of climate upon health and longevity is a very curious and deeply interesting topic, and has only of late years engaged the attention of philosophers and physicians. Its effects, however, are with difficulty appreciated, being combined with many other circumstances. But if we doubt as to the effects of climate, we can have no hesitation in pronouncing upon the healthfulness of particular situations, however great or small the population. Neither can we dispute the singular effect of change of place and air, although the distance be very small, and the aspect, elevation, &c., of the locality nearly the same.

With respect to longevity, it is stated that in January, 1796, six persons were interred whose united ages amounted to 481 years, out of a population of 7,000; and that the average mortality between the years 1801 and 1811, was one in forty-seven per annum, which, at a time when vaccination was not so extensively adopted, and medicine not so successfully practiced as at present, is remarkably small. Mr. Brearey's later statistics furnish still more favourable results.

"The town owes its salubrity in a great measure to its situation upon the acclivity of a hill, lying exposed to the sun, well brushed by southerly and south-westerly winds, and ventilated by the current of air which accompanies every flowing tide. The spring months, March, April, and May, as is the case all over this island, are commonly the least agreeable of the year. The vernal monsoon from the east, generally sets in with violence, and often continues to blow with little intermission, for six or more weeks, sometimes enveloping us with sea fogs, suddenly changing the temperature 8 or 10 degrees. I have freqeuntly observed these fogs to rise from the

sea like a little cloud, which spreading itself on the horizon, drives upon the shore, and in an instant obscures the brightest day. They seldom extend far from the coast, often not more than a mile, and rarely farther than the neighbouring hills. Coming into a sea-fog, from the sunshine of a clear day, resembles entering an ice-house in summer. The north-east Winds are very keen at this season."

"Spring reluctantly yields to summer, which at this place is delightful. Although we boast of few shaded woods, our atmosphere is generally temperate and cool, resembling the winters of the southern parts of Europe. The oppressive heats to which inland watering places and others on the southern coast of England are subjected are seldom experienced here. Like islands within the tropics, we have our diurnal sea breeze, commonly setting in about noon, and continuing until evening, wafting health and refreshment all around. The sands are enchantingly cool, and the ride close to the edge of the sea is sought with avidity, while the Cliff and Spaw Terrace are crowded with beauty and fashion. At this season, few places can boast a climate so agreeable or salutary to valetudinarians. Sea bathing at this season of the year is a great luxury, and when succeeded by the enjoyment of the sea breeze, excites the most agreeable sensations. Summer here encroaches a full month upon autumn."

"In autumn the air is serene and bracing, and the atmosphere for the most part clear, and may be considered, perhaps, the most agreeable time of the year in most parts of England. The monsoon now begins to blow from the south-west, and it is generally repressed by violent but transient gales from the north-east. The intervals are usually fine and "healthful, often continuing for many weeks, and thence called a Michælmas summer." No period of the year is more favourable for

sea bathing, which may be often pursued with signal advantage to the middle of December. The temperature of the sea is now gradually decreasing and the bracing effects are consequently greater. Exercise too may be more freely taken, and the habit fortified for the winter. Sometimes the equinoctial gusts scare from our cliffs the affrighted stranger, who in idea, beholds the stiffening hand of winter already at our door. Let him but wait a few days, the storm which lifts the billow to his dwelling subsides, and a succession of clear open weather prevails, often protracted to Christmas."

"Our winters are milder than places in the same parallel of latitude, whose situation is more inland. We have in general less rain than our neighbours; the wolds on the south, and the high moors on the north, drawing away many showers to the right and left. It is universally observed that frost is less severe near the sea, and that snow seldom lies there long. During winter we have oftentimes many beautiful days, which resemble those of a more southern climate."

With respect to temperature, a comparison of the register-tables kept at the four different places of London, York, Penzance and Scarborough, show that the mean average of the month of January was 5½ degrees higher than at York, 4 degrees higher than in London, and only 1½ lower than Penzance, and that for many years back the mean temperature of the autumnal quarter has ranged between 44 and 49, and for the year as high as 52 degrees.

In the foregoing chapter I entered into a recital of the effects of the mineral waters of Scarborough, as deduced from experience, and on those general principles of therapeutical agency, commonly resorted to in the explanation of the *modus operandi* of other remedies; but it is by no means

affirmed that these reservoirs of healing efficacy are to be generally regarded as substitutes, still less as equivalent, in active disease for other remedies and lest I may be supposed to overrate their qualities, it is necessary here, distinctly to state, that I look upon them as oftentimes substitutes, but still more frequently as valuable auxiliaries in the cure of chronic complaints, in that class and form, which embrace by far the greatest number to which flesh is heir. Nor, on the other hand, would I undervalue the aid afforded during a course of them by the local advantages of climate, the exercise with which they are usually taken, the change of air, scene, and occupation, and the hundred other concomitants presented to the observation of the invalid visiting a watering place. They must not be relied on in maladies occurring in plethoric habits of body, which assume an inflammatory or febrile type; neither are they suitable in disordered states of the stomach and bowels, particularly if dependent on biliary derangements, till these are rectified by more appropriate remedies. When their taste and temperature are extremely repugnant to the feelings of the drinker, they will seldom prove beneficial, but these qualities may often be obviated by adding a teaspoonful of brandy or of some aromatic tincture to them.

The North Well, or Chalybeate, is found in an excavation of the Spaw-Terrace, at the foot of the bridge and south cliff, on descending those steps near the lodge or hut appropriated to the waterservers, formerley called "the Bear's Pit." The water is perfectly clear, of a blueish hue and sub-astringent or inky taste, and sparkles a little when poured from one glass into another, owing to the escape of some of the fixed air or gas, with which it is charged, and hence, to reap any material benefit, it should be drank at the fountain, as agitation in

conveyance deprives it of this property, together with a portion of the iron which is, indeed, held in solution by it.

When this water *agrees*, it will not cause nausea or oppression of the stomach; a moderate dose is shortly followed by an increase in the strength and frequency of the pulse, and a sense of warmth is experienced. Its ultimate operation, when continued for a length of time, is marked by a gradual improvement in the tone of the secretory system, and by the permanency of its tonic power, augments the strength and nervous energy, and promotes the vigorous performance of those functions essential to life and health. Hence it promises to be efficacious in complaints characterised by inertia of the nervous system, and torpor of the digestive organs. It will prove useful too in allaying that irritability and morbid excitement which is dependent upon debility and relaxation of the body, from whatever cause it springs.

It affords a good remedy in impaired and capricious appetite, irregular digestion, flatulent distension of the stomach, arising fnom debility of the assimilating organs, in chlorosis, when conjoined with the employment of the warm sea bath, and in all cases of weaknesses unconnected with inflammatory symptoms or visceral obstructions.

Doctor Belcombe observes "the North Well water has little or no opening quality. In all cases of general weakness and relaxation its virtues are acknowledged. And I observe that the water-servers generally recommend it to the delicate of their own sex, and I believe with good success. It is peculiarly useful in a variety of nervous cases; particularly those consequent to confinement, dissipation, and a town life, where the bowels require no assistance; it is likewise serviceable in those very numerous cases, which occur to females

at that time of life, when the growth seems disproportionate to the strength. This complaint is mostly distinguished by a pale complexion, depraved appetite, weariness and pain in the limbs, palpitations, &c."

Few complaints could be named in which this and similar waters, are not said to have worked wonders, but we may dispense with such traditional and extravagant commendations and admit that in the graver forms of disease they are not to be trusted, except at most as auxiliaries. In my own very limited experience, I am in the habit chiefly of recommending this spring to those who are suffering from the relics of previous illness, and the resulting debility consequent on severe and acute forms of complaint. Its application, therefore, with me is not very extended. In atonic Indigestion, however, it oftentimes exerts a very beneficial influence, probably owing to the stimulus excited by the fixed air and the iron upon the nervous papillæ of the stomach, together with the regular exercise usually accompanying a course of it. In a case of Epilepsy, unconnected with organic lesion, I used this spring with the effect of procuring a longer interval between the fits. My late eminent brother, Dr. Alexander, of Manchester, who wrote on Pulmonary Consumption, recommended carbonated chalybeates when the premonitary symptoms of that complaint have been subdued by his treatment, which consisted in general, of daily emetics, and perpetual blisters on the chest. In Tic-Doloreux, unconnected with affection of the brain, a course of this water may be very salutary,

RULES FOR DRINKING THE NORTH WELL WATER.

Some persons experience much uneasiness from the quantity of cold water recommended to be taken upon the stomach. Delicate invalids, and those to whom simple water

in any form is an uncommon beverage, suffer most from this cause, but to obviate this, the doses should be small, and repeated at longer intervals, and peppermint lozenges taken afterward, or a teaspoonful of tincture of lavender or cardamom mixed with the water.

In biliary derangements this water ought not to be commenced with, until preparatory means have been used, and these, in general, should coincide as nearly as can be with the intention of the water and object in the removal of the complaint. In many cases in which an aperient is deemed necessary, the ordinary family pill, or the Pil. Rhei Co. will suffice for this purpose.

When the intention of this water is to strengthen the body, and act simply as a tonic, a tumbler glassful may be taken any time of the day, but when a course of it is desired, it should be taken in the morning before breakfast likewise in such cases, as it acts with most effect upon the constitution when fasting, between seven and ten o'clock. In general it should be taken early in the morning, and may be carried to three or four well glassfuls, at intervals of a quarter of an hour, occupied in exercise.

A full course may be said to extend to six weeks, but it will be known to have a beneficial effect if after a shorter time, the strength is improving, the appetite good, food relished, and digestion easily performed; and to obtain the full effect of a course, it is necessary that exercise in the open air should be daily taken, that the diet should be mild and nutritive, and the general hours and habits of life regular.

The South Well, or Purging Water, is situated within a few feet of the one already described. Its sensible properties

are not dissimilar, though the taste is perhaps rather more saline and bitter, and less ferruginous. Its supply at the fountain head is so limited that the well-woman tells me (August 1881,) that to meet the demand it is turned off at night during the season.

The effects of this spring, when first taken are irregular, sometimes producing drowsiness and headache, symptoms however which speedily disappear. When taken in too small a quantity to act upon the bowels, it generally determines to the kidneys and skin. In larger doses it has a more speedy operation on the intestinal canal, and effects this object without griping or leaving any langour or debility. Its tendency to preserve the bowels in a solutive state, renders it a convenient remedy for habitual costiveness, and for its frequent accompaniment, the piles. It will indeed prove serviceable in many cases requiring a continued, though gentle action upon the alimentary canal. Thus, some affections of the head, commonly marked by depression of the spirits, and dark coloured alvine-evacuations, will be benefited by a course of it. Worms also will be expelled, being first deprived of vitality by the ferruginous ingredient, which to many tribes of them is poisonous. It will be found useful in subduing stomach complaints, by diminishing the pernicious effects of acrid matters lodging in the intestines, and by removing the load of undigested food from the debilitated stomach, without at all weakening the digestive organs.

Artificial remedies, possessing any power, in general excite an action which the system is unable long to sustain, particularly when undermined by the treacherous advances of a disease, the early symptoms of which too often steal upon and lurk unobserved by its unwary victim, until at length he becomes sensible of the serious injury he has received. Such is one

form of chronic disease, as it often presents itself to the observation of the physician; and it is that in which mineral waters are much recommended, so as to stay the morbid action without loss but augmentation of strength, and if possible resolve, penetrate, and remove those obstructions of the different organs, which sedentary, studious, or irregular modes of life, or other particular causes, have gradually induced. In such cases, therefore, it must be obvious, that it is a matter of some moment to select such remedies, as while they gradually subdue the complaint, rather add to, than impair the strength. Acute maladies, too, have chronic stages, particularly if they are not treated early, and opposed by active means. It is evident then that chronic forms of complaint constitute a large class of those to which we are exposed, and that natural waters have an extended application to them, when judiciously administered.

This water has been much esteemed in certain cutaneous complaints, which in popular language are termed scurvies, and is useful in many affections marked by depraved habit. And from its aperient property, and the known importance of the regular performance of the functions of the stomach and bowels in the establishment and maintenance of health, it is applicable to a number of other miscellaneous forms of illness, as will now be expressed in the language of Doctor Belcombe, who had ten years' experience in its use. "The South Well water is serviceable in *debility and relaxations of the stomach, in nervous disorders, scurvy, struma, or swelled glands, chlorisis, and particular weaknesses.* I have found it very useful in a variety of *chronic complaints*, attended by *habitual costiveness.* These complaints are often accompanied by some degree of *jaundice*, or are frequently sequent to it; to a *sedentary life*, to *long continued* and *painful affections of the mind*, to long and

tedious illness, to *agues*, to residents in *hot climes*, and sometimes to *intemperance*. In such cases, I have known a glass of this water repeated every day for some time, produce the most desired and permanent effects, even when very powerful medicines have not been found to answer, or only to afford temporary relief. Most commonly, however, two, three, or even four half-pints, taken at proper intervals, and repeated daily, are required, although no very great constipation may have preceeded. It sometimes affords relief in the *grável*, as well as in several pains of the *loins*, whose seat seems to be in the kidneys, although they are called Rheumatic. Diseases commonly comprehended under the appellation of scurvy, as *pimples, red face, eruptions* in various parts of the body; *roughness of the skin, or scurf, &c.*, are often cured by a long continued use of the South Well water. Some remarkable instances of this kind have come to my knowledge, both in the inhabitants of the town and in strangers. In these disorders so much water should be drank daily at proper intervals, as will produce some sensible effect upon the bowels."

From the mildness of its operation compared with many of our artificial remedies, I see no well-founded objection in its use to obviate the torpid state of the stomach, so troublesome during pregnancy. Generally speaking, a course of these waters is not well adapted for very old persons, and still less for young children under *ten years of age*.

Waters similar to this issue from various points of the Cliff, and these are used chiefly as external applications to sore eyes, and to strengthen the union of bone after fracture. They owe their virtue in such cases probably to temperature.

RULES FOR DRINKING THE CHELTENHAM, OR SOUTH WELL WATER.

An advantage attends this water in common with many others possessing purgative properties, that it may in general be used at once without any preparatory, artificial, or resolvent remedies. But there are some plethoric states of the body in which this water will distress the head, and disturb the functions of the stomach, unless the bowels have previously been excited to action by suitable aperients. In such cases, however, a family pill may be taken at bedtime, and succeeded by a teaspoonful of Scarborough salts, or a Seidlitz powder thrown into a glassful of the water the following morning, with very good effect. In other instances unattended with full habit, it may be had recourse to at once, and should a sense of coldness, oppression, nausea, or flatulence, occur at first from its use, it will be alleviated by taking peppermint lozenges, or a teaspoonful of some aromatic tincture mixed with it, as already recommended in the case of the North Well water. Dr. Granville himself took this spring with benefit, and both he and Mr. Brearey have accepted Phillip's analysis, the former having tabulated its ingredients into pint-doses.

The waters ought not to be warmed, as in their cold natural state they better brace the stomach and cool the body, and, moreover, they lose a part of the medicinal power of the ingredients by being heated.

It is of more importance that this water should be taken in the early part of the morning than the other, and with exercise in the intervals of drinking. The dose of this water must depend much on the age, sex, constitution, and object in view in taking it. A robust individual may take twelve ounces or a well-pint at a time, and repeat it at intervals of a

quarter of an hour, to the extent of three or four glassfuls, according to the effect desired. One glassful, at two doses, may be sufficient for a young person or delicate invalid.

Those who both bathe in the sea and take the waters, should do so on alternate days, but the warm sea-bath, or the douche, may accompany the internal use of these waters on the same day, and will often prove valuable auxiliaries to them. The tepid affusion or douche of brine will indeed be found an admirable means, together with small doses of the chalybeate, in restoring health and re-establishing the strength in those who have become much reduced and wasted by previous illness. The efficacy of the douche may be increased by friction with the hand, either naked or armed with a flannel.

This water in general should be taken early in the morning before breakfast, as it acts with greatest advantage on an empty stomach, but when the strength forbids early rising or exposure to the chilly morning air, it may be taken three hours after the first daily meal. Exercise, and by this is here meant walking, or a gallop on the strand and regular habits of life are necessary, and should be observed by all invalids resorting to a mineral spring. Late hours, depressing affections of the mind, and midnight mental exertion are carefully to be avoided.

The diet must depend much upon the nature of the ailment and the previous habits of the invalid. Tea and Coffee are objectionable as forming the breakfast, if taken *soon after the waters*. Milk and bread, or cocoa, or chocolate, are nutritious, and generally recommended for those drinking chalybeate waters. When these do not suit the irritable and enfeebled stomach, a dish of *water gruel* with *dry toast* are most

suitable. During the rest of the day the diet should be light and wholesome, avoiding flatulent food, malt liquors, and the pulp of unripe or decayed fruits, which are liable to disorder the stomach.

For further details in respect to the Topography, Vital Statistics, and equability of temperature—its coolness in summer and mildness in winter—this romantic "Brighton of the North" and "Queen of Watering Places," I must refer the reader to the researches of Messrs. Granville and Breary.

CHAPTER V.

EFFECTS OF SEA WATER.

The ocean the receptacle of all waters. The composition of the sea, with the recently discovered active ingredients. Brine Springs. Effects of Sea Water taken internally. Efficacy of Sea Water in the complaints of Children. Doses, &c.,

Sea salt is a material peculiarly agreeable to the taste of mankind, as well as to many other animals; perhaps it is necessary to the support of their existence. —BUCHAN, *on Sea Water.*

Since the sea is the common receptacle for all the waters which traverse the surface of the earth, it might be supposed to contain a portion of all the soluble matters of which the crust of our globe is composed; but such an opinion is unsupported by chemical analyses and opposed to reason, when it is considered the small proportion which river and spring water bear to the great ocean, and that the water of the sea, already saturated with saline matters, is not in a favourable

state for further solution. Potash, Iodine, and Bromine, in addition to other known substances, have however of late years been detected in it, and moreover, it is a very heterogeneous compound near the shore, and at the mouths of great rivers, where, besides the suspension of muddy particles, it contains various animal and vegetable matters, which render it impure and unfit for preservation. In extent of saline impregnation it exceeds all other waters and according to the results of chemists, varies in different seas, being stronger in brine within the tropics, in the Mediterranean, the Dead sea, and in the Baltic, than other parts hitherto examined. A curious fact, too, is stated by Dr. Marcet, with respect to the temperature in the arctic and tropical seas, that in the former it increases, and in the latter it decreases with the depth. This singular, though perhaps not altogether unaccountable circumstance, was first discovered by my friend Dr. Scoresby, and is confirmed by later observers.

In giving the composition of sea water, the analyses of Lavoisier, Bergman, Higgins, Vogel, and Legrange, are usually referred to, but as the results differ as well in quantity of saline matter, as in the combination of the acids and bases, it will be unnecessary to enter into any exposition of its constitution, but confine ourselves to the consideration of its medicinal properties, which are found much to depend on its aperient qualities when taken in large doses, and the effects of the muriates of lime, soda, and magnesia, when in small ones. Doctor Murray, indeed, demonstrated that the ingredients found, as well as their relative proportions, may be varied at pleasure, according to the process employed in the investigation. Analysis must not be regarded as an *experimentum crucis*. The lime probably exists in the water naturally as a muriate, but the chemist, as was stated to be the case

with mineral waters generally, finds it as a sulphate, most likely owing to the reaction of the sulphate of soda and magnesia upon the muriate of lime during the evaporation. The muriates of soda and magnesia may be deemed the fixed and chief ingredients, but Bromine and Iodine are substances of great power, and although they exist in sea-water in almost inappreciable quantity, yet they may exert some effect, and be entitled to some share in its well known virtues. The brine spring of Ashby-de-la-Zouch, in Leicestershire, and others of the same class, which most nearly resemble sea-water, and serve as connecting links between the modern and those remnants of the ancient ocean, which forms immense rocky masses in the bowels of the earth, have been long celebrated in scrofulous disorders, and are found to contain Bromine, which appears from its highly poisonous qualities to be anything but an inert agent even in very small doses, exemplifying the well known maxim in therapeutics, that a remedy must be capable of much harm to be enabled to do much good. Doctor Daubeney found this active principle in this country to occur in largest quantity in the brine springs of Middlewich in Cheshire, amounting to 1.337 in 10,000 parts, in combination as an hydro-bromate of magnesia. Bromine and Iodine were first detected in the Mediterranean, by Balard, and subsequently found in the Baltic, German Ocean, and Dead Sea, and most likely exist universally in sea-water.

When pure, sea-water is clear, colourless, destitute of smell, and has a saline, bitter, and to some a nauseous taste. When taken to the extent of half a pint and upwards, it is stimulant to the stomach, usually excites a little thirst, particularly in warm weather, and sometimes occasions, at first, disorder in the digestive organs in persons of an irritable or

bilious habit. If taken in that quantity upon an empty stomach, it commonly proves purgative.

Sea-water seems to exert a peculiar and happy effect distinct from its aperient properties, in *glandular affections* of a scrofulous character, acting, it is presumed, as a stimulant to the absorbent system, and exciting the dormant energies of the constitution.

It is in many cases a remedy of infinitely greater power and efficacy than the spaw waters, and is admirably suited to *children, for the promotion of health and growing vigour, for the expulsion of worms infesting the bowels, and for the removal of mesenteric glandular obstruction*, marked by pale countenance, emaciated limbs, distended stomach, and capricious, though generally voracious appetite. Infants of all ages are liable to this often fatal complaint, but I have seen the best results follow the use of sea-water, in small quantity, mixed in their milk, together with a gentle mecurial (Hyd. c. Creta) course, and washing the body every morning with brine.

For children between two and six years old, a *wineglassful* twice a day in such cases is sufficient. For expelling worms the water should be taken *before breakfast*, in a quantity sufficient to affect the bowels, and repeated every alternate morning. For purposes of general health in children as well as in adults, *once a week* may be often enough, as it produces an increased action of the bowels, which continues to last some days.

I am in the habit of recommending it as a tonic and alterative for adults; in cases of *debility*, arising from previous illness, attended by *torpor* of the functions of the stomach and bowels. In *Leucorrhœa*, unaccompanied by febrile symptoms,

in *chlorosis*, some *visceral obstructions*, *chorea* occurring in children, and in some cases of *indigestion*. In all these instances the dose usually is a *wine glassful or two according to age*, *every night* at bed-time, which neither operates as a purgative nor creates thirst, but preserves the bowels regular, amends the appetite, promotes digestion, and improves the general health.

FINIS.

J. WALSH, PRINTER, HALIFAX.