Practical observations on the medical powers of mineral waters, and of the various modes of bathing : particularly in scrofula, consumption, cutaneous affections, gout, rheumatism, palsy, disorders of the kidnies, indigestion, female diseases, general debility, nervous and liver complaints, &c.; &c.; : with remarks on exercise and diet, intended for the use of invalids / by Patrick Mackenzie.

MACKENZIE

ON

MINERAL WATERS,

&c. &c.

THE SECOND EDITION.

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PRACTICAL OBSERVATIONS

ON

THE MEDICAL POWERS

OF

MINERAL WATERS,

AND OF THE VARIOUS MODES OF

BATHING:

PARTICULARLY

SCROFULA — CONSUMPTION — CUTANEOUS AFFECTIONS — GOUT — RHEUMATISM — PALSY — DISORDERS OF THE KIDNIES — INDIGESTION — FEMALE DISEASES — GENERAL DEBILITY — NERVOUS AND LIVER COMPLAINTS, &c. &c.

WITH

REMARKS ON EXERCISE AND DIET.

INTENDED FOR THE USE OF INVALIDS.

BY

PATRICK MACKENZIE, M. D.

LICENTIATE OF THE ROYAL COLLEGE OF PHYSICIANS, LONDON; AND ASSISTANT PHYSICIAN TO THE FEVER INSTITUTION, &c, &c.

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TO THE

SECOND EDITION.

TIME in its ceaseless course is ever developing new matter for the advantage of man; so that the productions of to-day may be improved by the discoveries of to-morrow. With that diffidence, which this truth naturally gives to the mind, I offer this edition to the public; cherishing at the same time the hope, that the corrections and additions which it has received, may be found to be judicious, and to enlarge the sphere of its utility.

1, King Street, Holborn,
4th March, 1820.

TO

HIS EXCELLENCY LIEUTENANT GENERAL

SIR THOMAS HISLOP, BART.

COMMANDER IN CHIEF AT THE PRESIDENCY OF

MADRAS, IN THE EAST INDIES,

THIS VOLUME,

AS A MEMORIAL OF GRATITUDE,

IS MOST RESPECTFULLY INSCRIBED,

BY

THE AUTHOR.

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INTRODUCTION.

THE fashion which now obtains of paying annual visits to watering-places for the pupose of preserving health, or of recovering it, when impaired, by the use of some favourite fountain, or bath; and the frequent occasions which I have had of observing the injurious effects of the abuse of Mineral Waters, and of the various modes of bathing, have induced me to collect the opinions of the best writers on these subjects—to arrange

them with my own observations, and thus, as it were, to concentrate the scattered lights of knowledge to direct the invalid in search of the lost treasure.

In this attempt I have divided Mineral Waters according to their medical operations—I have avoided all scrupulous chemical enquiries and theoretical discussions, as incompatible with my object—and I have confined myself to a plain statement of medical facts only; the work being intended for the valetudinarian, and not for the critical eye of general science, nor of the medical profession. For the same reason I have

endeavoured to divest my language of all technical phraseology, and to compress, as much as possible, the subject, that I may be understood without fatigue to the attention. Should the result be successful, I shall not repent of my labours.

LONDON,
1st April, 1819.

PRELIMINARY

OBSERVATIONS.

MINERAL WATERS have been resorted to, from the earliest state of society, as remedies which operate powerfully on the human constitution.

Mankind, attracted by their mysterious properties, soon distinguished them from common water; but it was not until the latter end of the 17th Century that any attempt was made to ascertain their composition, and the sources of their medicinal virtues.

Since that period much has been done by the labours of chemists; and, within these few years, many important facts have been gained, which have shed considerable light on the properties of mineral waters.

Their foreign contents are not very numerous. They do not exceed forty. They associate in various proportions and combinations, but never more than eight or ten together in the same spring; each of which, considered separately, is of little value; but, taken collectively, is of importance in the cure of diseases. They are comprised in the following enumeration: air, and its component parts; oxygen and azotic gas; acids, alkalies, earths, and salts.*

Water, the only principle common among mineral wells, is the most va-

* Thomson's System of Chemistry, Vol. III.

luable of all their properties, and is the source of the efficacy of many springs containing but insignificant portions of foreign impregnations; for, besides the effect of the aqueous fluid upon the body, chemical agents, under great dilution, are rendered more diffusible over the system, and more efficient on the nerves, than grosser substances.

This virtue of the watery menstruum is exceedingly modified by temperature, which gives rise to a very important distinction among mineral waters, and shews the propriety of using them, whether internally or externally, at the fountain head. Those of a warm temperature are denominated thermal waters, in consequence of their usual application to the purposes of bathing. When drunk, they are stimulating for a short time, a glow of warmth being felt in the stomach, and sometimes a

slight giddiness in the head; but they are, notwithstanding, relaxing in their ultimate effects, when of a temperature above that of the human body; while those that are cold are tonic and bracing.

The utility of mineral waters established by the test of experience, has caused their situations, before unfrequented, to be converted into places of ease and convenience, and to be decorated with the embellishments of art, for the attraction of invalids of leisure and opulence. Thus some of the most beautiful and romantic spots of this island have been brought into public notice under the denomination of watering places, and have become celebrated for their baths, and fountains of health. They are, however, efficacious in the cure of diseases through other means also, acting in conjunction with their waters.

The absolute necessity of the atmosphere in the wonderful operation of life, establishes its influence in diseases as a natural inference, were the testimony of experience even wanting. When it is deteriorated, therefore, as it must be, in crowded cities, by the respiration of men and animals, and by an incalculable mass of exhalations of all kinds, the valetudinarian, in quitting the sphere of its baleful action, for the pure and uncontaminated atmosphere of a watering place, will find the mere change of air a great auxiliary to its mineral springs, for such is its importance, under every form of disease that there is often a necessity to remove patients to situations of a nature opposite to those in which their complaints originated—" from Land to Sea, from Sea to Land, from Mountains to Valleys, from Valleys to Mountains."

Exercise in the air, which should never

be neglected, is another of the advantages of these places of fashionable resort.

Walking is the most natural, and when the lungs are not in a condition to prohibit it, the most salutary exercise, particularly, on a moderate and gradual ascent, as it encreases respiration, promotes the pulmonary circulation, and renders the blood more completely oxyginated.

Riding on horse-back is extremely useful in many cases, especially in complaints of the stomach, lungs, and heart, for it strengthens the digestive organs, promotes expectoration, determines the blood to the skin, and gives energy and tone to the whole system, without disturbing the heart's action.

Carriage-exercise tranquillizes morbid excitement, and is well adapted to very debilitated and irritable states of the body.

Sailing is another mode of gestation highly conducive to health. Every kind of exercise should be taken by the invalid, during the morning, or forenoon, and, if convenient, in company with agreeable friends; for their conversation may tend to exhilirate the spirits, and to beguile the attention from the afflictions of the body. The mind has a powerful influence in the cure of diseases, and requires for the well-being of man in a state of health even, occasional relaxation from the cares of the world. Dancing and the other amusements at watering places, therefore, enjoyed with moderation and prudence, are beneficial. They should not, however, interfere with the strict observance of early hours, temperance in living, and the other regular habits of life, so essential to the re-establishment of health, the neglect of which, in the higher circles of society, is too frequently the cause of its loss.

The present fashion, then, of midnight entertainments, of noon-day breakfasts, and evening dinners, with their long list of high seasoned dishes, and stimulating drinks, should sedulously be avoided. The diet, instead, should consist of light and nutritious food, and some mild beverage. But should a stimulant drink be required, madeira diluted with water will be found both grateful and salutary.

The following hints may be instructive to the invalid, and may facilitate the formation of that regimen, best calculated to aid the operation of the water prescribed. Animal food yields more nutriment than vegetable aliment; but it is more stimulant and heating. On which account, although it imparts more immediate vigour, yet it exhausts the constitution so much the sooner. Accordingly, the most remarkable instances of longevity

occur among those people who live chiefly or wholly, as the Brahmins, upon vegetable substances. An animal diet is useful in various modifications of dyspepsia and asthma; in cachectic, chlorotic, and diabetic cases; in rickets and scrofula; in certain chronic disorders of the skin, and in many morbid conditions of the system, arising from the irritation of worms. It is injurious in active inflammations; in all affections of the head and lungs, connected with a fulness of their vessels, and in bilious and calculous complaints. Salted and highly seasoned meats are at all times unfavourable to the recovery of health. In regard to cooking, roast meat is more readily digested than boiled, many of the nutritious parts of the latter being dissolved in the water. Should too much heat be applied in the operation of roasting or boiling, the food, so over done, will be rendered less digestible and nutritious. In stewing there is no loss of alimentary matter, as the juices

extracted by the liquor employed in the process are retained and served up with the meat. On this account, beef-tea and other properly-prepared soups are wholesome. Vegetable aliment, although less nutritive, has some advantage, in being less stimulating than animal food. As it passes off more readily by the different outlets of the body, it is indicated in all inflammatory diseases, in cases of plethora and obesity; and in hepatic and other visceral obstructions. Being less putrescent than animal food, it is well adapted to the prevention and cure of the scurvy, typhus, and other malignant fevers. But being less easily assimilated, being apt to produce flatulency and acidity, and to pass off very quickly by stool and urine, it is consequently contra-indicated in dyspeptic disorders, and in all those maladies attendant on profuse evacuations, or exhaustion from other causes.—A mixed diet therefore, of vegetable and animal food, is best calcu-

lated for the inhabitants of this climate. Under every circumstance, the necessity of *moderation in quantity* cannot be too strongly urged, for *excessive eating* is a source of more diseases, than is generally suspected, and is as injurious, I am confident, as *excessive drinking*.

Milk holds an intermediate place between animal and vegetable food, and is peculiarly fitted to many states of the constitution. It is rendered heavy by boiling, and liable to induce costiveness. A third part however, of boiling water or some thin gruel added to it, will cause it to agree with most stomachs. This food, with a due proportion of bread, constitutes perhaps the best breakfast for children, and delicate persons.

Tea and coffee are in such estimation, that it would almost be impossible to introduce into general adoption any

substitute; but as the former affords no nutriment, and the latter is stimulating, they should be used with prudence.

Chocolate, not adulterated with aromatics and other stimulants, is extremely nutritious, and may be preferred.

Bread, when stale, and eaten in moderate quantities, is highly salutary; but when recently drawn from the oven, it is with difficulty digested. Cold butter sparingly employed is wholesome; but when melted it is less innocent. All descriptions of pastry and confectionary are inimical to weak digestive organs. Certain ripe fruits, as grapes, oranges, apples, pears, peaches, mulberries, raspberries, strawberries, and currants, are grateful, and beneficial in febrile commotions of the body, unattended with profuse alvine evacuations. But during a course of mineral waters, they are apt to disorder the bowels, and should therefore be avoided.

Well fermented malt liquors, provided they are not too strong, nor taken in improper quantities, will recruit and support the strength of those who lead a very active life; but they are improper for the sedentary, the bilious, the corpulent and asthmatic, and for those who are liable to giddiness, apoplexy, or other complaints of the head.

Wine in moderate quantities proves an agreeable stimulus, promoting digestion, giving tone to the system, and exhiliration to the mind. It is therefore useful in certain dyspeptic disorders, and in all debilitated conditions of the body from grief, or other distressing passions. But habitual excess in wine is productive of the worst consequences, and entails upon its votary, indigestion, gout and stone, emaciation, general debility, obstructions of the liver, and other viscera, apoplexy, palsy, dropsy, loss of memory, diminished energy in all the mental faculties, depression of spirits,

weariness of life, and insanity. All these melancholy effects, but in a more violent degree, follow the habitual use of ardent spirits as a common beverage. They should therefore be confined entirely to medicinal purposes.

Pure water is without doubt the best beverage for daily use. When cold it is refrigerant, tonic, and antiseptic. It is therefore, peculiarly proper, as well as grateful, during the warm months of the year, provided care be taken not to drink it while the body is overheated, or perspiring freely from violent exercise. Tepid water is preferable for the dyspeptic or bilious subject, being a better diluent, and more efficacious consequently in carrying off bile, or any other offending matter in the alimentary canal, and in promoting the urinary secretion. When of a temperature equal to that of the human body, it is considerably stimulant and well suited to gouty, paralytic, and chlorotic invalids.

Water is an essential agent in the economy of life. It assists the process of digestion, and maintains that due proportion of fluid to solid matter on which depends the healthy performance of all the vital functions. It should be made as pure as possible, by filtration, to improve its solvent quality, the source of its virtue. A filtering apparatus is therefore an useful domestic article, and should be formed of prepared charcoal, that substance being superior to any other in purifying properties.

Although much has been written on the aqueous regimen, yet sufficient attention is not paid to its importance. Were it more generally adopted, our catalogue of diseases would be curtailed, and instances of longevity more frequent.

"Water drinkers," says Dr. Saunders, "are in general, longer livers, are less subject to decay of the faculties, and less

acrid evacuations, than those who indulge in a more stimulating diluent for their common drink*."

The dominion which the mind has over the body, although the medium of its operation is little understood, is a fact firmly established by daily experience, and the phenomena of life.

"Spiritus intus alit totamque infusa per artus
"Mens agitat molem."—*Virgil.*

To it is to be referred the fatal effects of that melancholy which seizes the poor Swiss, when absent from his own land, on hearing his little native air called *le rans des vaches*. "Cet air si cheri des Suisses, qu'il fut defendu sous peine de mort de le

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* See a Treatise on the Chemical History and Medical Powers of some of the most celebrated Mineral Waters, with Practical Remarks on the Aqueous Regimen, by W. Saunders, M. D.

jouer dans leurs troupes, parce qu'il faisoit fondre en larmes, deserter, ou mourir ceux qui l'entendoient, tant il excitoit en eux l'ardent desir de revoir leur pays.*"

To it also is to be ascribed the now almost incredible effects recorded of amulets, incantations, and charms in the times of ignorance and superstition, and the real cures effected in our age, by the mummeries and impositions of the animal magnetism of Mesmer, and the metallic tractors of Perkins.

The confidence, then, in natural remedies to which the mind is prone, gives to these fountains and baths a medical character not to be attained by the imitations and substitutions of art, and renders them objects of general interest. "I am persuaded," writes the celebrated Lady Mary Wortley Montague, "mineral waters,

* Rousseau, Diction. de Musique.

which are provided by nature, are the best, perhaps the only real, remedies.*"

Although watering places may, under certain circumstances of disease, be visited at all times, yet the best seasons for repairing to their salutary wells are the summer and autumn, to combine the benefits of air and exercise, already mentioned, with those of the waters, which at these periods of the year are in the best possible state to remove those affections for which they are employed.

In travelling to them, the debilitated invalid should proceed by short stages, during the cool of the morning, and should carefully avoid fatigue, the mid-day heats, and evening dews, the too frequent causes of fever, and other destructive maladies.

On the termination of the journey, the

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* Letters during her last residence abroad, v. II. p. 9.

repose of a day or two, and the employment of some preparatory medicines in certain cases, may be adviseable, previously to commencing a course of the waters. Those which are to act on the alimentary organs only, should be drunk on an empty stomach; but those intended to operate on the general system, may be taken at all times of the day. The best time, therefore, for taking those of a purgative quality, is early in the morning. They should all be used in divided doses, of such quantities as to avoid the injurious effects of distension, and during such a period as the nature of chronic diseases requires. This last observation applies equally to the baths, which may, according to circumstances, be employed at different hours of the day.

Mineral waters have usually been divided according to their chemical properties. As none of them, however, possesses a sim-

ple character, but they all have to each other certain relations arising from the quantity and quality of their ingredients, I have preferred another arrangement, founded on their medical effects, as more important to the purposes of health than any scrupulous classification of their mere contents.

DILUENT & REFRIGERANT WATERS

ARE those which contain the smallest possible quantity of foreign impregnation, and are of a low temperature.

MALVERN WATER.

SUCH is the character of the spring at Malvern, a village situated about half way between Ledbury and the city of Worcester.

The fancied sanctity of its water, from its long established efficacy in the cure of many chronic diseases, gave it, in former times, the name of the holy well, which it still retains.

Its medical powers are to be referred to its remarkable purity, whereby its diluent property is considerably encreased; and also to its low temperature.

When first drawn it appears quite clear and pellucid, and does not become sensibly turbid on standing. It resembles, in every respect, pure good soft water.

A wine gallon of it contains about five grains of the carbonat of soda, with a very minute quantity of the carbonat of iron. Its foreign matter, therefore, is less than that of any water in common use.

Notwithstanding this purity, it is said not to keep well, but to acquire a fetid odour by standing in open vessels. This circumstance Dr. Wall imputes to the ready solubility in it, of the impurities of tubs and other vessels.

Malvern water is principally employed

as an external remedy. It has been found eminently serviceable in painful and deep-seated ulcerations, occurring in a scrofulous habit of body, attended with local irritation and fever, in inflammations of the eye and eye-lids, and in those eruptions accompanied with intolerable itching, where there is great irritation, and where the skin is apt to break into painful fissures that ooze out a watery acrid lymph. On its first application to an inflamed surface, it will often increase for a time the pain and irritation, which, however, go off in a few days.

The great benefit arising from its external use has led to its employment in some internal affections, and often with success; as the following: painful disorders of the kidneys and bladder, attended with a discharge of bloody, purulent, or fetid urine; in hectic fever, the consequence of scrofulous ulcerations of the lungs, or irritating sores on the surface of the body; and in old fistulas.

In these complaints it should be used at all times of the day, constituting a common or diet drink, for

"Nothing like simple element dilutes
"The food, or gives the chyle so soon to flow."
ARMSTRONG.

Its effects on the bowels are by no means constant. Sometimes it purges briskly for a few days, but occasionally it constipates, particularly those who are addicted to the use of malt liquors.* In all cases it increases the secretion of urine, and if it agree with the invalid, it will improve his appetite, spirits, and general health. In some instances it produces slight nausea, drowsiness, giddiness, and head ache; but these symptoms soon disappear, or yield to a gentle purgative. These occurrences Dr. Wall ingeniously enough refers to a temporary plethora, or fulness of the ves-

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* See a Treatise on Malvern Holy Well, by the late Dr. John Wall, of Worcester.

sels of the head, produced by the rapidity and ease with which this pure liquid enters the absorbent system.

The duration of a course of this water must be regulated according to the nature and inveteracy of the disease.

The local disorders should be kept constantly wet with it by means of linen dipped in the water, and renewed when dried.

The bowels should be kept regular by occasional doses of aloes, rhubarb, or Epsom salts; and the diet should be bland and nutritive.

The rich and beautiful scenery of this watering place, the salubrity of its atmosphere, its delightful walks and rides, tempting the invalid to active exercise, and its exhilirating influence on the animal spirits, arising from these circumstances, consti-

tute important auxiliaries in the cure of diseases, and powerful attractions to its fountain of health.

The village of Ilkley in Yorkshire, about 16 miles west from Thorp-Arch, possesses, in its vicinity, a spring similar in purity to the Malvern. It is consequently appropriate to the same diseases.

DILUENT & DIAPHORETIC WATERS.

These are thermal waters, and possess various degrees of heat.

Although not so pure as the cold diluent waters, yet they contain so little foreign matter that their effects must be ascribed to the fluid operating by its warmth, and by its power of dilution. They are generally appropriated to baths, although in some cases they are drunk with benefit.

MATLOCK WATER.

The village of Matlock, romantically situated in a hilly part of Derbyshire, presents to the eye of taste one of the most striking spots of picturesque scenery.

It possesses several cool springs, the waters of which are conveyed into baths for medical purposes. The temperature, according to Dr. Percival, is usually at 66 degrees.* The Matlock Water is, therefore, the lowest in temperature of the English thermal waters.

It is remarkably clear, has no particular taste, and mixes well with milk.†

Its specific gravity is but a very few grains greater than that of distilled water. Its foreign contents (probably the muriat of soda and the carbonat of lime) are therefore so trifling, that the medical virtues of this water, may be safely ascribed to its purity and temperature.

It is principally employed as a bath,

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* See Percival's Essays, vol. II.

† See Saunders on Mineral Waters, p. 128.

and is beneficial in all cases of debility occurring in delicate constitutions, that cannot support the shock of the ordinary cold bath. It forms, on this account, a good intermediate bath between Bath or Buxton and the sea; and may be employed to prepare the invalid for the latter.

As an internal remedy it may be used in all cases where a mere diluent, having a tendency to the skin, is required.

BRISTOL HOT-WELL*

This celebrated spring is situated at the bottom of a lofty cliff, called St. Vincent's rock, on the banks of the Avon, and about

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* See Dr. Nott's Treatise of the Hot-well near Bristol, and Dr. Carrick's Dissertation on the Medical and Chemical Properties of the Bristol Hot-well.

a mile distant from the city of Bristol. The air is genial and salubrious from its agreeable southern exposure, being sheltered by high ridges of dry limestone cliffs from the bleak north and east winds, and likewise from the boisterous west. It is, therefore, well calculated, in every respect, to renovate the health and spirits of the invalid; and, from its mild atmosphere, to be a winter residence.

The Hot-well water is extremely clear and sparkling, and separates numerous air bubbles, when poured into a glass. It has no decided taste or smell, although rather agreeable than otherwise to the palate.

Its average temperature is pretty steadily at 74° Fahr. during winter, and summer. Its specific gravity is only 1,000,77, which approaches so nearly to that of distilled water, that this circumstance alone sufficiently proves its purity.

Among the numerous chemical investigations of this water, the analysis by Dr. Carrick is, perhaps, the most accurate. It gives the following contents in a wine gallon:*

	Grains.
Muriat of Magnesia	7,25
Muriat of Soda	4,00
Sulphat of Soda	11,25
Sulphat of Lime	11,75
Carbonat of Lime	13,50
	47,75

	Cubic Inches.
Carbonic Acid Gas	30
Atmospheric Air	3
	33

This water is entirely an internal remedy. Its sensible effects, when warm and

* See Dr. Carrick's "Dissertation on the Medical and Chemical Properties of the Bristol Hot-well, 1797."

fresh from the spring, are generally a gentle sensation of warmth in the stomach, and sometimes a slight degree of head-ache, and giddiness; but these symptoms are only transient, and may speedily be removed by a gentle aperient. It increases, in most cases, the flow of urine, and the perspirable state of the skin; but it has a tendency to constipate the bowels, which effect should be obviated by the requisite remedy.

Its operation is highly salutary in several disorders of the alimentary canal, in those dyspeptic symptoms with which Europeans who have long resided in hot climates are commonly afflicted, in chronic, bilious diarrhœas, and mild dysenteries. It has afforded relief in diabetes, by rendering the system more sensible to the impressions of the appropriate medicines; but the high reputation which it has acquired is above all, in alleviating some of

the most distressing symptoms of pulmonary consumption, as the harrassing thirst, the dry burning heat of the hands and feet, the partial night sweats, and all those symptoms which are peculiarly hectical. From the relief which it thus affords, even in the advanced periods of this formidable disease, it may materially contribute, in the early stages of it, to a re-establishment of health. The season for the Hot-well is, from the middle of May to October, to combine the advantages of air and exercise.

The following is the usual mode of taking the water: two glasses should be taken as early in the morning as the invalid's time of rising will permit, with half an hour spent in gentle exercise interposed between them; and this quantity should be repeated in the same manner, midway, between breakfast and dinner. The size of the glass should be from a quarter to

half a pint, which last may be considered a full dose. At no time should it be taken in such a quantity as to cause any oppression, or sense of weight in the stomach.

As the effects of this water is extremely gradual, the duration of a course of it must necessarily be for a long time, to experience the full benefit arising from its use.

Another spring, resembling the Hot-well, is at Clifton, called Sion Spring,—equally noted for cures in similar diseases.

BUXTON WATER.

Buxton, so celebrated for its medical springs, is a considerable village, situated in the north-western side of the county of

Derby, on the borders of Cheshire, from which it is separated by a chain of lofty hills, intersected by deep ravines. The summits of these hills are bare, and their sides but thinly covered with verdure; giving to the face of the surrounding country a bleak and barren character, notwithstanding the fertility and beauty of the vallies.

The climate is ungenial—the winter being severe, the spring tardy, and the summer uncommonly rainy. With all these imperfections, Buxton still possesses some advantages for the invalid, from the excellence of its accommodations and roads; from the dryness of its soil, composed principally of limestone, which allows exercise immediately after rain; and from the turbulence even of its atmosphere, which prevents every mischief arising from stagnation of air.

It has been long noted for its warm springs; and from the remains of Roman antiquity which have been discovered near it, it was probably in repute among the Romans.

These springs issue to the day through small fissures in a hard, calcareous free-stone. They are numerous, and supply a sufficiency of water for the large consumption occasioned by the numerous baths, and the other purposes for which it is employed. The original fountain is St. Ann's well, which is enclosed in an elegant stone building. The other springs are precisely similar in quality, and are received into a number of beautiful and convenient baths, both public and private.

By evaporation to dryness, Dr. Pearson found in a gallon of Buxton Water only $14\frac{3}{4}$ grains of residuum, of which he estimates $1\frac{3}{4}$ grain to be muriat of soda, $2\frac{1}{2}$

grains to be sulphat of lime, and $10\frac{1}{2}$ grains to be carbonat of lime.

It had often been observed that in this spring, a quantity of elastic fluid was discharged with the water, and that a portion escaped from the water itself on exposure. This was supposed to be carbonic acid; but Dr. Pearson ascertained it to be nitrogen gas, or azote, mixed with a little atmospheric air, the volume of air amounting to about $\frac{1}{64}$ of the water.

Buxton Water is thus remarkably pure, and differs from common spring water only in its temperature and the small quantity of azotic gas, which it holds in solution.

In sensible properties, it cannot be distinguished from common spring water, heated to the same temperature. It is quite clear and colourless,—does not become turbid on exposure to the air,—

leaves no deposit,— and is entirely devoid of smell or taste. Its temperature in the gentlemen's bath is invariably 82 degrees. As this heat is several degrees below that of the human body, there is a slight shock of cold felt on the first immersion into the Buxton bath; but it is succeeded almost immediately by a pleasurable and soothing glow. On account of the slightness of this shock, this bath is well adapted to renovate the strength of delicate habits, and to prepare them for the more powerful remedy of sea-bathing. For this purpose it should be used two hours before dinner,and gentle exercise in the open air should be taken after it.

Buxton water is employed largely, both in external and internal use. As an internal remedy, it has afforded considerable relief in defective digestion, and derangement of the alimentary organs, consequent upon a life of high indulgence and intem-

perance; and in painful affections of the kidnies and bladder, connected with the formation of calculus. It appears to produce various effects on the bowels—not unfrequently a diarrhœa or looseness* succeeds, for a few days, its use; but more commonly constipation follows. The former is a salutary symptom, and must not be checked. The latter is injurious, and must be removed by aperient medicines, especially in those habits where the action of the alimentary canal is naturally sluggish. Two glasses of about a third of a pint each, before breakfast, with a little gentle exercise interposed between, and the same quantity repeated between breakfast and dinner, form a proper course of Buxton water, which must be continued according to the duration of the disease.†

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* This effect of the Buxton water depends entirely on the nature of the contents of the stomach and bowels.

† See Observations on the Effects of Buxton Water, by Joseph Denman, M. D.

DIURETIC WATERS.

These waters, along with a portion of saline and alkaline matter, have a large impregnation of carbonic acid, which communicates certain sensible qualities, and increases their medical powers.

SELTZER WATER.

Such is the character of this water, which is imported to this country in stone bottles, closely corked and sealed, from the spring of Seltzer, in the village of Neider-Seltzer, situated in a fine woody country, about ten miles from Frankfort.

This water, when fresh, or well preserved, is perfectly clear and transparent,

and sparkles much on being poured into a glass. To the taste it is pungent, gently saline, and alkaline; but this pungency it loses on exposure to the air, from the escape of the carbonic acid gas.

Its contents, given by Bergman, and brought to the proportion of an English wine pint, are,

	Grains.
Carbonat of Lime, about.....	3
Carbonat of Magnesia.....	5
Carbonat of Soda.....	4
Muriat of Soda.....	17,5
	29,5

The quantity of gas evolved is extremely copious, being 60 cubic inches to the 100 of water; or upwards of 17 cubic inches to the wine pint. It is almost entirely pure carbonic acid gas. This quantity being more than is sufficient to saturate the alkali and earths, gives to the water, therefore, its acidulous taste, and freshness.

The operation of this water in moderate doses is to raise the spirits, improve the appetite, and increase the urinary discharge.

It is particularly serviceable in alleviating some of the symptoms indicating a morbid condition of the lungs, as in checking the profuse night sweats and constant cough, and in diminishing the fetid purulent expectoration, and frequent flushings attendant on slow hectic fever.

From its excellent property of allaying irritation, it forms a useful remedy in those eruptions of the skin dependent on a disordered state of the stomach, and in various derangements of that organ, and of those viscera connected with it, as indigestion, acidity, heart-burn, bilious vomiting, spasmodic pains in the bowels, and bloody or highly offensive stools. It has been found beneficial in gonorrhœa,

leucorrhœa, hypocondriacal complaints, and particularly, in painful affections of the kidnies and bladder, marked by purulent discharge, and difficult micturition. It mixes well with milk; and will not soon coagulate it. This mixture is strongly recommended by the illustrious Hoffman in cases of hectic fever, with expectoration. The usual dose of Seltzer water is from half a pint to a pint; and the only precaution necessary during its use, is to preserve a regular state of the bowels.*

See Hoffman, "De Elementis, et Viribus Fontis Selterani," in vol. v. of his Works; and a Treatise on Mineral Waters, by W. Saunders, M. D.

STIMULANT WATERS.

These waters contain carbonic acid, with portions of saline and metallic matter, chiefly carbonates of lime, magnesia, and iron: but the carbonic acid in excess still communicates the same sensible qualities, modified, however, with regard to medicinal powers, by these impregnations. They are highly grateful to weak stomachs, and act powerfully on the nervous and vascular system.

SPA WATER.

The spring which supplies this water is called Pouhon, and is in the centre of the village of Spa, in the principality of Liege.

In cold dry weather it appears colourless and clear; but in moist weather the surface of the well becomes turbid, and on the approach of rain, a humming noise is heard, which the country people call the music of the spring.

This water, when fresh taken out of the well, scarcely sparkles; but in a few minutes it separates small air-bubbles, which adhere to the inside of the glass, and increase very copiously when the water is shaken or poured from one glass into another.

It has a bright appearance, and an agreeable acidulous taste, with a strong chalybeate impression; but it loses these sensible qualities on exposure to the air. When kept in bottles well corked, and covered with cement, it will preserve for a long time its original state, nearly unaltered.

The contents of a wine pint of Spa water, as ascertained by Bergman, and reduced to English measure, are the following

	Grains
Oxide of Iron	,56
Carbonat of Lime	1,47
Carbonat of Magnesia	4,46
Carbonat of Soda	1,47
Muriat of Soda	,172
	8,132

The gas given out is entirely carbonic acid, and amounts to about 45 per cent. of the bulk of the water, making 12,79 cubic inches, or about six ounces and a half in every wine pint.

Spa water is therefore, a chalybeate, and a very strongly acidulous water. The quantity of alkaline matter which it contains is, notwithstanding, sufficient to make it mix very uniformly with milk, and to give it ant-acid properties, after the car-

bonic acid has been expelled by the heat of the stomach.

The sensible operation of this water is decidedly stimulant. When taken in a full draught, particularly in hot weather, or upon an empty stomach, it strikes the nose with a pungent vapour, and occasions a swimming in the head, and a degree of intoxication, which sometimes continues for half an hour; but does not debilitate.

Although, by its general stimulant quality, it promotes every secretion, its most regular determination is to the kidnies and the skin.

It is particularly well calculated to afford relief in acrid discharges from the urinary passages; in all disorders in females, arising from derangement in the menstrual evacuation, and especially in removing

sterility, when the consequence of fluor albus, or relaxation of the uterine system; and in the male sex in preventing involuntary discharge of semen, and the weakness induced by gonorrhœa.

In disorders of the alimentary canal, as bilious vomiting, diarrhœa, and dysentary, it proves an excellent auxiliary remedy, particularly in restoring the tone and healthy action of the stomach and bowels.

Its diffusive stimulant character renders it improper in all inflammatory complaints.

During its use, the regular action of the bowels should be maintained by occasional doses of some apperient medicines.

The dose of this water is usually about half a pint, three or four times a day, increased gradually until some effect is pro-

duced on the secretions. After this no further increase is necessary. The course must be continued so long as there are signs of its salutary operation on the disease, and of ultimate success.

Some invalids on the spot are in the habit of diluting, with this water, the wine which forms their common drink. This beverage is found pleasant and salutary.*

PYRMONT WATER.

This celebrated chalybeate spring at Pyrmont, in the province of Westphalia, possesses the same medical properties as the Pouhon at Spa; but it is thought to

* See Dr. Saunders's Treatise on Mineral Waters.

be considerably rougher, and more active in its operation.

It is indicated in the same diseases; and it requires similar precautions in its use.

Bergman's analysis presents the following constituent parts in a wine pint:

	Grains.
Oxide of Iron	,56
Carbonat of Lime	4,46
Carbonat of Magnesia	10,03
Sulphat of Lime	8,68
Sulphat of Magnesia	5,57
Muriat of Soda	1,56
	30,86

The quantity of gas which this water contains, exceeds that of any mineral spring with which we are acquainted. Bergman estimates it at 90 per cent. of the bulk of the water, or about 26 cubic inches in the pint. It is almost entirely carbonic acid gas.

STIMULANT, DIAPHORETIC, AND DIURETIC WATERS.

THE warm temperature of these waters encreases their general stimulant properties, and particularly their determination to the skin and urinary organs.

BATH WATER.

THE beautiful city of Bath, composed of a noble assemblage of splendid buildings, decorated with a profusion of elegant architectural ornaments, is situated in a deep narrow valley, on the banks of the Avon, in the county of Somerset, with a surrounding landscape, diversified by mode-

rate hills and vales, highly fertile, and well cultivated. The climate is mild and genial, and well adapted to renovate impaired constitutions.

This city is of considerable antiquity, being noticed by the earliest of our own historians.

From the many interesting Roman remains which have been discovered, particularly a set of baths with all the apparatus for warm and vapour bathing, it is probable, that its thermal springs were in repute with the Romans, when in this island.

These are numerous,—are of a higher temperature than any other in this kingdom,—and are eminently accommodated to the use of invalids, by the erection of elegant baths, and of other buildings, for their convenience and amusement.

The principal springs of the Bath waters are three, and arise within a short distance of each other, near the river Avon. The King's and Queen's Baths are supplied by the same spring; but the Hot Bath and the Cross Bath by separate springs.

"The temperature of the King's Bath water, as drawn at the pump, is 114° Fahr. that of the Hot Bath in Hetling Court is 116°, and that of the water of the Cross Bath pump is 107°." These high temperatures they, however, lose in flowing into their spacious baths. Thus "the water at the edge of the King's Bath is about 98 degrees; over the spring it is above 100 degrees; and as the King's and Queen's Baths are a continuation of the same water, part of the Queen's Bath is about 98 degrees, lessening in its temperature as it recedes from the spring. The temperature of the Hot Bath is above 100

degrees; and of the Cross Bath from 92 to 96 degrees."*

The specific gravity of the King's and Hot Baths is 1,0020° and the Cross Bath 1,0018°.†

The waters in the three baths differ slightly in chemical composition. Dr. Falconer has estimated that "the solid residuum from a gallon of each water, is in the proportion of 71 grains in that of the King's Bath, 78 grains in that of the Hot Bath, and 86 grains in the Cross Bath. Of 80 grains of each residuum, the saline part, soluble in water, was 31 grains in the first, 29 in the second, and only 11 in the third. This latter, therefore, contains

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* See a Treatise on the Bath Waters, Part First, Second Edit. by G. S. Gibbes, M. D. F. R. S.

† See Falconer's Dissertation on the Bath Waters, 1790.

much more insoluble matter; and as this residuum does not effervesce very strongly with nitrous acid, it is probable chiefly sulphat of lime. The depth of the colour produced with tincture of galls was the greatest in the first mentioned water, less in the second, and least of all in the third. The degree of precipitation, with lime-water, followed the same order. Hence we may conclude, that the King's Bath water is the strongest chalybeate, that it contains the most carbonic acid, and active neutral salts, and the least of the selenite and other earthy residuum. The Hot Bath water is a very little weaker as a chalybeate, as well as in gaseous and saline contents, but yields more earthy residuum. The Cross Bath water is still less gaseous, chalybeate, and saline; but much more earthy."

These waters have been the subject of various other chemical investigations, at different times.

From the analysis, by Mr. Phillips, it appears that the gaseous fluid that arises with the waters, and is separated in bubbles over the spring, consists of

	Grains.
Carbonic Acid Gas	5
Nitrogen Gas	95
	100

Dr. Gibbes suspects that oxygen gas forms a small part of the composition, from some diminution of bulk in the fluids, and the evident discolouration which takes place on the addition of nitrous gas. One quart of the water, Mr. Phillips says, contains

	Cubic Inches.
Carbonic acid	2,4
	Grains.
Sulphat of Lime	18,
Muriat of Soda	6,6
Sulphat of Soda	3,0
Carbonat of Lime	1,6
Silica	,4
Oxide of Iron	,00394
	29,60394
Loss	,39606
	30,

The result of the experiments of Dr. Wilkinson on the Bath waters is, that in 400 grains of the gross residuum from the water of the Kingston Bath,* there exist

Sulphat of Lime	231
Muriat of Soda	84
Sulphat of Soda	45
Cabonat of Lime	22
Oxy-Carbonat of Iron	5.6
Silex	5
Variable quantity, Vegetable Extract	2,5
	3,95,1
Loss	4,9
	400

And that in the same quantity of solid contents of the other springs, called the Hot Bath, the King's Bath, and the Cross Bath, the two former evinced the same proportions with the Kingston water, but that the Cross Bath water afforded a much larger proportion of a calcareous salt than of the alkaline salts.

* The spring which supplies this bath, and the springs which supply the other baths, Dr. Wilkinson thinks, are ramifications from one general source.

From the numerous chemical investigations, therefore, of these waters that have been made, the following general conclusion may be formed of their composition: that they hold in solution but little neutral salts with an alkaline base, and therefore are scarcely saline; that they are, in a very slight degree, impregnated with carbonic acid; in a still slighter degree with iron, and as it should seem only when hot from the spring; and that they contain a good deal of calcareous salts, and a little silicious earth,* which render them hard, and unfit for domestic purposes. Notwithstanding they possess very great medical powers, to whatever cause attributable.

When drunk fresh from the springs, they have in most persons the effect of

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* For this Discovery Chemistry is indebted to Dr. Gibbes.

raising and rather accelerating the pulse, increasing the heat, and exciting the secretions. These symptoms take place in a few minutes after drinking them, and in certain habits, will continue for a considerable time. "They are thus a stimulant of a diffusible nature, acting more immediately on the nervous system, and particularly on the skin and kidnies."

Their effects on the bowels, like that of all waters which contain but a minute quantity of any purgative salt, are uncertain; in general, however, they induce a costive habit of body, which should be obviated by occasional doses of some mild aperient medicine.

The diseases for which they are resorted to are very numerous. In most of them the bath is employed along with the internal use of the water.

They are indicated in all those cases where a gentle, gradual, and permanent stimulus is required; and where there is no circumstance to occasion danger from the sudden heat and increase of pulse which so often attend their exhibition.

Their heating quality points out the necessity of much caution in their employment, which might often do considerable injury in various cases of active inflammation, especially in irritable habits, where there exists a strong tendency to hectic fever; in diseased and suppurating viscera, and wherever a dry tongue and quick pulse indicate a degree of general fever. The disorders, therefore, to which they are suited, are of the chronic kind, and are the following: chlorosis and menstrual obstructions; affections which bear the preparations of iron well, and are at all times relieved by their administration. In these cases the bath will eminently assist

to remove that languor of circulation, and obstruction of the natural evacuations, which characterize these frequent and distressing maladies of the female sex. Hypochrondriasis; dyspeptic disorders; spasms of the stomach and bowels; jaundice, arising from simple obstruction of the gall ducts, in consequence of debility; and those morbid conditions of the system brought on by a long residence in a hot climate, or by intemperance in a cold one, and marked by derangement in the biliary secretion, lassitude and general weakness.

By their power of exciting the motion of the vessels when languid, they are likewise efficacious in inertia of the nervous system, as paralytic affections. When these are seated in the extremities the waters are usually pumped* upon the part,

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* This pumping is strangely denominated *dry pumping*.

and this partial application is considered equally beneficial as the hot-bath, and less stimulating to the general constitution. It is consequently much employed.

Bath is greatly frequented by individuals afflicted with rheumatism and gout. The waters are, however, useful only when the inflammatory stage of these diseases is over, and when there remain only signs of weakness of the organs of digestion, such as nausea, eructations, flatulence, and want of appetite.

The quantity of water taken daily by adults, during a full course, is recommended by Dr. Falconer not to exceed a pint and a half, or two pints; and in chlorosis, with irritable habits, not more than one pint; and this allowance should be divided into three portions, of which two should be taken before breakfast, at different times, and one afterwards.

The morning is the time generally chosen for the bath, which is usually employed two or three times a week. The duration of the immersion should be regulated by the sensations of the invalid, and may be from ten minutes to half an hour, should no degree of lassitude or faintness occur.

The choice of the baths is a matter of importance, from the great difference in their respective temperatures; the Cross Bath being about 94 degrees, while that of the King's Bath is at least eight degrees higher. The former is consequently a tepid bath, although it feels warm to the skin, and may be used for the common purposes of health; but the latter is a hot bath, and should be confined to those cases requiring the most stimulating application, as rheumatic and paralytic affections of the joints.

The more temperate seasons of the year

are generally recommended for the use of the Bath waters, which should always be aided by moderate and regular exercise.

The course should be continued for a considerable time, to make a fair trial of their efficacy, their operation being very gradual.

The regimen should be suited to the nature of the disease; and the habits of life regular.*

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* See Dr. Falconer's Dissertation on the Bath Waters, and Dr. Charlton's Three Tracts on the same subject.

TONIC WATERS.

THE contents of these waters are the oxide of iron, held in solution by carbonic acid; a small quantity of azotic gas and atmospherical air; and a little saline and earthy matter. But their leading distinction is the chalybeate impregnation to which all their medical properties are to be referred.

TUNBRIDGE WATER.

TUNBRIDGE WELLS, a populous village in the county of Kent, about thirty-six miles South of London, contains many chalybeate springs, resembling each other in chemical composition. Two are chiefly

appropriated to medical use; and they afford an abundant supply of water for the numerous invalids who yearly resort to this watering place.

The sensible properties of this water, when first taken up at the reservoir, are the following: it is colourless, clear and bright, and has no perceptible smell. It does not sparkle in the glass, but it slowly separates a few air bubbles, which adhere to the sides of the vessel. It has, in a slight degree, a ferruginous taste, without any saline or acidulous impression.

If exposed to the air for some hours, the disengagement of minute air-bubbles increases, the liquid grows turbid, a yellowish iridescent pellicle encrusts the surface, and in twenty-four hours, the water has entirely lost its chalybeate impregnation. This effect takes place more speedily when the water is heated.

The contents of a wine gallon of Tunbridge water, according to Dr. Scudamore's analysis, are the following;*

	Grains.
Muriat of Soda	1,25
Sulphat of Soda	1,47
Muriat of Lime	1,54
Muriat of Magnesia	,29
Carbonat of Lime	,27
Oxide of Iron	2,29
Traces of Manganese, insoluble matter	,44
Loss, &c.	,13
	7,68
	Cubic Inches.
Carbonic Acid Gas	8,05
Azote	2,75
Atmospherical Air	2,50
	13,30

The analysis of the Tunbridge springs shews it to be a simple carbonated chalybeate water. It is, therefore, purely a tonic.

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* See "An Anaylsis of the Mineral Waters of Tunbridge Wells, &c." by C. Scudamore, M. D.

All waters of this description are more invigorating, in proportion to the iron they hold in solution, than any artificial preparation of this metal, particularly in a solid form. This advantage arises, in all probability, from the diluting principle of the water, whereby the chalybeate is rendered more diffusible, and, on that account, more efficient on the system.

Soon after taking a moderate dose, the strength of the pulse is increased, and a certain degree of warmth is felt, occasioned by the accelerated circulation; and by persevering in the use of the water, the appetite and spirits are improved. These effects are most obvious in irritable and sanguine habits.

On commencing a course of this water, it is not uncommon for the invalid to experience nausea, vomiting, and pain about the heart; or else a heaviness in

the head, slight giddiness, and a sense of fulness over the whole body, which symptoms, however, soon disappear; but should they continue, the use of the water must then be abandoned.

Its general operation is to increase, in a gradual manner, the tone of the secretory system, and by the permanency of its tonic power, to augment the strength, nervous energy, and vigour of all the functions of the body. It is, therefore, in those chronic diseases that arise from slow beginnings, and are attended with great laxity and debility of the solids, that this water is particularly indicated. It is eminently efficacious in fluor albus, or in profuse menstruation, and in removing barrenness, or a tendency to abortion, arising from weakness in the uterine system. Chlorosis, which is intimately connected with this derangement, and its attendant disposition to a cachectic state of the body, and

to general dropsy, is much benefited by the Tunbridge water, notwithstanding the feverish irritation which always subsists, the head ache and difficult breathing might seem to forbid its use.

In impaired appetite, irregular digestion, flatulent distension of the abdomen, from debility of the assimilating organs, and in all cases of general weakness, unconnected with visceral obstructions, or inflammatory symptoms, it affords an excellent remedy.

To persons of a weak and irritable habit, the fresh drawn water is apt to prove too cold, and to cause sickness. This inconvenience is easily prevented, by giving to the water a tepid warmth; and to do this, it is the best method to put it into a bottle, closely corked, and to immerse the whole into hot water; for, by this means, but

little of the carbonic acid escapes, upon which so much of its virtue depends.

In chlorosis and other disorders of debility it is frequently of service, to conjoin the employment of the warm bath with the internal use of the water.

The daily allowance should be taken at two or three intervals, commencing about eight o'clock in the morning, and finishing about noon. The dose at each time varies from one quarter to three quarters of a pint, according to the age, sex, constitution of the invalid, and duration of the course; for all ferruginous waters lose much of their effect by long habit.

The requisite period for a course may be computed to be, from one month to two months; preparatory to which, and during its continuance, some aperient medicines should be taken to cleanse the bowels,

and to keep them regular; for this water has a tendency to constipate.*

Exercise in the air should daily be taken; the diet should be mild and nutritive; and the general habits of life regular.

The sea-port town of HASTINGS, on the Sussex coast, possesses a similar chalybeate spring, applicable to the same diseases, and has an advantage from its situation of affording the means of sea-bathing, which is frequently a powerful auxiliary in the cure of some of the disorders for which this mineral, tonic water, is prescribed; it is, therefore, worthy of the attention of the invalid.

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* To prevent alarm, it is necessary to observe, that all chalybeate waters tinge the fæces black.

THETFORD WATER.

THE town of Thetford, situated partly in the hundred of Shropham, and county of Norfolk, and partly in the hundred of Lackford, in the county of Suffolk; distant thirty miles S.W. from Norwich, and eighty miles N. N. E. from London, possesses also a chalybeate spring. Its composition is as follows.*

	Contents in a gallon, Grains.
Carbonat of Iron.....	2,75
Muriat of Magnesia.....	3,25
Muriat of Lime.....	2,25
Sulphat of Magnesia..... ...	1,25
Muriat of Soda.....	2,125
Sulphat of Lime.....	3,
	14,625

* See "Guide to the Chalybeate Spring of Thetford," by F. Accum.

	Cubic Inches.
Carbonic Acid Gas.....	12,07
Oxigen Gas	1,21
Atmospheric Air.....	3,04
	16,32

This water thus appears to be one of the strongest chalybeates with which we are acquainted. It exerts on the human constitution an influence equally active as the Tunbridge water. It requires the same precautions in its use. And it is applicable to the same diseases. The Thetford spring will, therefore, be found well worthy the attention of the invalid.

APERIENT AND TONIC WATERS.

THESE waters, in addition to iron and carbonic acid, hold in solution a quantity of some purgative salt, which is sufficient to give them, when taken in a moderate dose, a decided determination to the bowels; but which is rendered so gentle by the salutary operation of the chalybeate and carbonic acid impregnation, as not to occasion any griping or faintness after their use.

CHELTENHAM WATER.

THE chalybeate saline spring, to which the town of Cheltenham in Gloucestershire

owes its celebrity, is called the original, or old Spa, from its being the first well there, discovered about a century ago.

Its temperature in the morning is generally above 53 or 54°, and at noon in the hottest season 6 or 7° higher. When fresh drawn, its water appears tolerably clear, but not perfectly transparent. To the taste it is saline, bitter, and chalybeate; but not brisk nor pungent.

Its solid contents, in a wine gallon, are the following:*

	Grains.
Sulphat of Soda and Magnesia (Glauber and Epsom Salts)	480
Oxide of Iron	5
Muriat of Soda (Sea Salt)	5
Sulphat of Lime	40
Carbonat and Muriat of Magnesia	25
	555

* See Dr. Jameson's Treatise on the Cheltenham Waters.

	Cubic Inches.
Carbonic Acid Gas.....	30,36
Azotic and Hepatic Gases.....	15,18
	45,54

This analysis was made by Dr. Fothergill in the year 1788.

Although the water of this well had generally a strong flavour of sulphuretted hydrogen gas, twenty years ago, yet it has not discovered any indication of it, for several years past. Its medical virtues depend entirely on the purgative salts and iron which it contains, aided by the diluting principle of the water. The iron strengthens the stomach, while the salts operate on the bowels.

Cheltenham possesses numerous other wells of various characters.* Some differ

* See Dr. Jameson's Treatise on Cheltenham Waters.

widely in properties* from the old Spa, while others resemble it. The best exam-

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* These are the carbonated steel, and the sulphuretted saline wells.

The following is the analysis by Mr. Accum, of the carbonated steel well near Higeia House.

	In a Gallon. Grains.	In a Pint. Grains.
Carbonat of Lime.....	4,7	0,5875
Carbonat of Iron.....	5,3	0,6625
Muriat of Soda.....	6,25	0,78125
Muriat of Lime.....	3,125....	0,390625
Sulphat of Lime.....	2,125....	0,265625
	21,5	2,6875
	Cubic Inches	
Carbonic Acid Gas.....	14,7....	1,8375
Atmospheric Air.....	3,9....	0,4875
	18,6	2,3250

This water is perfectly transparent, and sparkles rather more than common spring water. It has a decided chalybeate taste. Exposed to the air for six hours, it separates numerous air-bubbles, which ad-

ple of this is the chalybeate, strong saline well in the Long Pump Room, situated in Montpellier Ground. The water of this pump, when first drawn, is perfectly transparent; is without smell, and has a strong refractive power. To the taste it is chalybeate, distinctly saline, and slightly bitter.—Its temperature was 53 at 29,5 barometrical pressure, the temperature of the air being 65° Fahr.—Its specific gravity was, as 2,039 to 2,036.

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here to the inner surface of the vessel. In twelve hours it loses its ferruginous taste. The same effect is produced by its being made to boil, which renders the water turbid, and causes a brown granular precipitate. It is a tonic water.—For an account of the diseases in which it is indicated, and the mode of its administration, see Tunbridge Water.

The sulphuretted strong saline well in the long pump room contains, according to the experiment of the same chemist,

On pouring the water, fresh from the pump, from one tumbler into another, and leaving it exposed to the air, it separates a number of exceedingly minute air bubbles,

	In a Gallon. Grains.	In a Pint Grains.
Muriat of Soda, or common Salt	183,25	29,90625
Sulphat of Magnesia Epsom Salt	48,125	6,01562
Sulphat of Soda Glauber's Salt.	53,	6,625
Hydro Sulphuret of Lime.	32,75	4,09375
Muriat of Magnesia	29,	8,3125
Sulphat of Lime	66,5	3,625
Muriat of Lime	24,125	3,015625
Carbonat of Lime	18,	
Carbonat of Magnesia	5,75	,71875
	460,5	57,5625
		Cubic Inches.
Carbonic Acid Gas	7,9	0,9875
Sulphuretted Hydrogen Gas	11,	1,375
	18,9	2,3625

This water has a very fetid odour, resembling that of rotten eggs, and a saline taste. It is colourless and

which adhere to the inner surface of the glass. Exposed to the open atmosphere for eight days, it suffered no material change.

The abundance of this spring is such, that it yields upwards of 800 gallons of water in 24 hours, at every season of the year.

Its constituent parts are the following :*

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transparent. Its temperature was 51,7 at 29° barometrical pressure, the temperature of the room being 64° Fahr. The specific gravity is as 279,7 to 277. It tarnishes all metallic substances.

For its medicinal operation on the morbid conditions of the human frame, its dose, and the precautions necessary to be observed during a course of it, read Harrogate water.

* See Analysis of the Mineral Waters lately discovered at Cheltenham, by Frederick Accum, 2nd. edition.

	Contents in a Gal. Grains.	In a Pint. Grains.
Muriat of Soda	219,75	27,46875
Sulphat of Magnesia	98,25	12,28125
Sulphat of Soda	80,01	10,00125
Muriat of Magnesia	40,00	5,
Muriat of Lime	36,00	4,5
Carbonat of Iron	7,15	,89375
Sulphat of Lime	85,01	10,62525
	566,17	70,77125
	Cubic Inches.	Cubic Inches
Carbonic Acid Gas	12,07	1,50875
Oxigen Gas	4,03	,50375
Atmospheric Air	1,21	,15125
	17,31	2,16375

This analysis shews that it holds in solution, several of the most active ingredients of mineral waters, and approximates nearly in composition to that of the old Spa. Its medical character is similar in every respect, for it has a speedy operation on the alimentary canal, and produces evacuations without griping, or leaving any languor or debility. It is probably on this account, and from the salutary

influence of the chalybeate, that it may be employed uninterruptedly for a considerable length of time, and that, during its use, the digestive organs will be strengthened, the appetite improved, and the constitution envigorated.

The sensible effects sometimes produced by this water, on first taking it, are a degree of drowsiness and head-ache; but these symptoms soon go off spontaneously, even previously to the operation of the bowels. When taken in too small a quantity to affect the intestinal canal, it will generally determine pretty powerfully to the kidnies. There is an advantage attending this water in common with all purgative waters, that it may be used in most cases at once, without any preparation of the body. There are, however, some conditions of the system, in which the water will distress the stomach and head, unless the bowels have previously been

excited to action by preparatory medicines. Invalids in the habit of using calomel may take two or three grains of it at bed time, and a dose of the water at the well next morning to work it off. Three doses of calomel thus taken, to act as purgatives, with an interval of several days between each, will commonly be sufficient to prepare the body for a course of this water.

The season for drinking it, is during the whole of the summer months, and the time of the day, found by experience to be the best, is early in the morning, when the water contains most iron, and the stomach is empty. Notwithstanding some valetudinarians drink it at bed time for the purpose of its remaining all night in the bowels, that it may more completely cleanse them in the morning after exercise. The dose ought always to be moderate on first using it, and the quantity encreased according to the effects produced on the

body. It will consequently depend very much on the age, sex, constitution, and disease of the invalid; and, whether it is intended gently to augment the natural evacuations, or to act as a brisk cathartic. A small tumbler, containing about six ounces of the water, will, in general, be a sufficient dose at the commencement of the course. This quantity may, however, be repeated, if required, after walking a quarter of an hour, or twenty minutes; and may in two or three days be augmented to two glasses, holding twelve ounces each, called well pints. When the water disturbs the stomach, instead of passing off freely, Cheltenham salts should be added to one of the glasses. These salts are kept in a state of solution at all the wells, for the purpose of strengthening the water, when it is not sufficiently active of itself.

The symptoms of nausea, flatulence, and vomiting, which sometimes occur

from its use, will be relieved by peppermint drops, ether, or a tea-spoonful of the simple tincture of cardamoms, taken with the water, or after it. When it continues to cause head-ache, or giddiness, the water should be warmed, or exposed to the atmosphere for a few minutes, before it is drunk, to dissipate the aerial principle; and after drinking it, the invalid should walk about in the open air.

The temperature of the water is of some importance. In its cold state it braces the stomach, and cools the body; while in its warm, it relaxes. Invalids should, therefore, endeavour to habituate themselves to the use of it in the coldest state, except in those cases where warmth is required, then some of the water, which is kept on purpose by the pumper, heated, should be added to each dose.

The duration of the course necessarily

varies with the nature of the disease, and the effects of the water on the constitution.

The diet should be light and nutritive. Flatulent food, malt liquors, and acid fruits, which are apt to disorder the stomach and bowels, and to occasion griping and habitual purging, should be carefully avoided.

Daily exercise in the morning, and regular habits of life, are indispensibly necessary. From the medicinal powers of this water, and the known importance of the due performance of the functions of the alimentary canal in the establishment of health, it is obvious that it is applicable to a vast number of miscellaneous diseases of a chronic kind, and many of which are highly difficult of cure.

It has been found of essential service in subduing stomach complaints, the effects

of gout, or rheumatism, and other causes, by diminishing the effects of acrimonious matters in the intestines; by removing the load of undigested food from the debilitated organs; and by bringing the body to a regular solutive state, without weakening the digestive powers. It is highly useful in suppressed menstruation, in removing glandular obstructions, especially of those affecting the liver, and the other organs connected with it; in leucorrœa, in nervous and hypochondriacal diseases, and in checking the progress of incipient dropsies, which so often proceed from them.

Persons who, from a long residence in a hot climate, or from indulgence in the luxuries of the table, are suffering under derangement of the hepatic system, marked either by excess, or deficiency of bile, and a morbid condition of this secretion, will derive much benefit from a course of this water, judiciously administered. It has

relieved a variety of scrofulous disorders in different parts; inflammations of the eye and eye-lids; and from the sympathy existing between the bowels and skin, it has been equally salutary in old ulcers and discharges of the legs, and in several cutaneous diseases, which, in popular language, are called scurvies. Various parts of the human body, particularly the intestines, are infested with worms, which, by means of their living principle, resist the powerful solvents of that cavity: this water will be found advantageous in expelling them, not only by its purgative quality, but, also, by its ferruginous impregnation, which is to them poisonous.

Its tendency to keep the body in a solutive state, renders it a convenient remedy for habitual costiveness, and for its general consequence, the piles. In short, it is indicated in all cases requiring a continued and moderate alvine evacuation.

SCARBOROUGH WATER.

THE town of Scarborough is situated on the declivity of a very high cliff, on the Yorkshire coast, overlooking a spacious semicircular bay, terminated by lofty rocks. The mineral springs issue from the bottom of a cliff, about half a mile south of the town. They are in number two, and arise contiguously to each other. Notwithstanding this proximity, they differ in their composition. One is a chalybeate tonic water, like the Tunbridge;* and the other, which is particularly distinguished as the Scarborough water, is an aperient chalybeate, having an admixture of purging salts with its ferruginous ingredient. It is thus similar in composition to the Cheltenham water, and is applicable to the same diseases.

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* See Tunbridge water for the requisite information relative to the dose of this chalybeate, the rules for its use, and the diseases in which it may be employed with advantage.

This town has an advantage of situation which Cheltenham has not, that of affording an opportunity for sea-bathing, the use of which will, in many cases, assist in the cure of the diseases for which the mineral water is employed.

MELKSHAM WATER.

Melksham is a pleasant town on the great road between London and Bath. It is distant about 97 miles from the former, and 11 miles from the latter place. The scenery around is extremely interesting, and the air highly favourable to the recovery of the valetudinarian. Although the town does not at present possess the splendid edifices of long established watering places, yet by its baths, for hot, tepid, and cold bathing,—its beautiful and newly erected lodging houses near the

Spa, and other encreasing accommodations, it gives every promise that it will, in a few years, rival them in all desirable conveniences. Melksham possesses, besides a chalybeate spring,* two wells, called the old

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* Dr. Wilkinson of Bath has favoured the Public with the following analysis of this water. A pint of it gave 8,5 grains of solid contents, which after the proper experiments produced,

Muriat of Lime.....	,6
Muriat of Magnesia.....	,9
Sulphat of Magnesia.....	1,5
Sulphat of Lime.....	1,
Carbonat of Iron.....	4,
	8,0
Loss.....	5
	8,5

This spring has the same properties as the Tunbridge water, and may be employed in similar diseases. For the proper dose, instructions with regard to its use, and the disorders in which it is indicated, see Tunbridge Water.

Spa, and the new Spa. These hold in solution the same salts; but the old Spa contains a larger proportion of them than the new Spa.

According to the analysis by Dr. Gibbes, their ingredients are, muriat of soda, muriat of magnesia, muriat of lime, and the carbonat of lime, magnesia and iron. The Melksham water is, therefore, aperient and tonic, possessing the active properties of the Cheltenham water. It will be found serviceable in the cure of scrofula; indigestion, bilious and cutaneous disorders; female diseases, and other maladies dependent on a depraved state of the alimentary canal, and the organs connected with it.

The dose is from half a pint to a pint, according to the constitution of the invalid. A course of it may be persevered in, without interruption, for a considerable length of time, even in states of apparently great

prostration of strength, without producing any inconvenience to the system.*

Regular habits of life, and daily exercise in the open air, will greatly contribute to the beneficial effects of this water.

THORP-ARCH WATER.

The village of Thorp-Arch is romantically situated upon the banks of the river Wharfe; between Tadcaster and Wetherby. The mineral spring which has given celebrity to the place, was discovered on the 4th of June 1744. The water issues from the bottom of a lofty limestone rock, overhanging in some measure the river, and is conveyed, by means of a pump, into a room built for the purpose.

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* See a pamphlet entitled Melksham, Saline, Aperient, and Chalybeate Spa, &c. &c.

When recently drawn, it has a clear sparkling appearance; but on standing a short time, it becomes slightly turbid. It is brisk and decidedly saline to the taste. Its temperature was 49°, the surrounding atmosphere being 57°. The specific gravity at 55°, 1,0097.

A wine gallon of this water contains the following constituent parts:*

	Grains.
Muriat of Soda	562,00
Muriat of Lime	12,25
Muriat of Magnesia	7,25
Carbonat of Iron	1,75
Silica	0,75
	584,00
	Cubic Inches.
Carbonic Acid	10,56
Azotic Gas	6,00
	16,55

* See an Essay on two mineral springs recently discovered at Harrogate, with remarks on the springs of Thorp-Arch and Ilkley, by A. Hunter, M. D.

This water is aperient and tonic. It operates very mildly, and with considerable certainty. Its chalybeate impregnation and gaseous contents, prevent the stomach suffering inconvenience from its continued use. It is, therefore, peculiarly well fitted to remove all diseases of debility, arising from a morbid condition of the alimentary canal, and the organs connected with it, as dyspepsia, nervous disorders, and female weaknesses; glandular obstructions, and bilious complaints. The dose may be from half a pint to a pint, taken in the morning, in divided doses, with an interval between of twenty minutes spent in gentle exercise, to aid its operation.

The use of acid fruits and fermented liquors should be avoided during a course of this water. The diet should be light and nutritive. Regular habits of life, and daily exercise in the air will essentially aid in the restoration of health.

APERIENT, DIURETIC, AND TONIC WATERS.

THESE waters differ principally from the preceding, in having a warm temperature, and an alkaline impregnation, from which they derive* a decided diuretic quality.

VICHY WATER.

THE town of Vichy is situated in a very fertile plain, watered by the river Allier, full of vineyards and fruit trees. This plain, which is not distant far from the lofty mountains of Auvergne, abounds with springs of different kinds; hot, tepid, and cold waters being found here, almost contiguous to each other.

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* See Dr. Saunders's Treatise on Mineral Waters, p. 304.

There are six sources at Vichy, which vary a little in temperature, and in the proportion of their foreign contents. They all leave in their channels a yellowish mud, which is principally oxide of iron, and they have a saline and bitter taste. They are consequently warm, chalybeate, and alkaline aperient waters, and are serviceable in all disorders of the stomach, attended with acidity and flatulence; in bilious diarrhœa, and cholic, arising from derangements of the hepatic organs; and in a sluggish torpid state of the bowels, causing loss of appetite, and irregularity in the functions of the whole body.

The employment of these warm waters, for the purpose of bathing, extends their utility to rheumatism, sciatica, gout, and many other diseases. In these cases the internal use of the waters very properly accompanies the external; particularly in many of the disorders peculiar to the fe-

male sex, owing to a defect in the functions of the uterine system.

Hence, these springs have acquired great reputation for the cure of irregular menstruation, chlorosis, and barrenness.

The waters of the Mont d'Or in Auvergne, of Bourbon Lancy, and Bourbon l'Archambault, are equally frequented, on account of their efficacy. To those of Bourbon Lancy, the celebrated Catharine de Medicis, the mother of several French princes, is said to have been much indebted for her fertility.*

CARLSBAD WATERS.

Carlsbad, in Bohemia, contains several

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* See Dr. Saunders's Treatise on Mineral Waters, p. 307.

springs, all of which resemble each other in temperature, and in chemical properties. The most important of these is one which is intolerably hot to the touch, and has been denominated *Prudel*, or furious spring, from its boiling up with violence. This is the fountain which supplies the drinkers and the greater number of baths. Its temperature is 165 degrees, which is hotter than any other mineral water employed medicinally. It requires to be cooled before it can be drunk, or used as a bath.

In consequence of this great heat, there is always a thick vapour hovering about the mouth of the spring, from the density of which, and tardiness in dispersing, the country people foretel the approach of rain.

The solid contents of this water, as given by evaporation, are estimated by Bergman to be

	In an English Wine Pint. Grains.
Carbonat of Lime.....	4,15
Sulphat of Soda.....	41,51
Muriat of Soda.....	5,53
Carbonat of Soda (crystallized).....	11,76
	62,95

Total, about sixty three grains, along with a small quantity of iron.

The gaseous contents have not been estimated with accuracy; but a correct analysis would probably give a considerable quantity of carbonic acid.

The taste of this water is ungrateful, being alkaline, saline, bitter, and strongly chalybeate.

In its operation it is tonic, aperient, and diuretic. It has been found eminently advantageous in dyspepsia, and other derangements of the stomach, and

in a depraved condition of the biliary secretion.

In consequence of its alkaline quality, it has long been celebrated for the cures of those disorders of the kidnies and bladder, attended with a discharge of sabulous concretions, and a tendency to calculus; and, in consequence of the activity of its chalybeate ingredient, it is highly esteemed for restoring the healthy tone of the uterine system, and thereby removing sterility.

In short, great virtues reside in this water, and from its temperature and abundant quantity, it affords excellent warm bathing, at any degree of heat.

The Emperor Charles IV. in 1370, frequented the village of Carlsbad, for its waters, and brought them into notice; hence they have received the name also of the Caroline Waters.

Besides the Prudel Fountain, there is another held in considerable estimation, called the *Muhlbrunn,* from its turning a mill. Its temperature is 114 degrees. It differs from the Prudel water, in containing more carbonic acid, more soda, and less calcareous earth. It is found in consequence to open the bowels with more certainty. It is employed in the same diseases.

These waters are contra-indicated in plethoric and irritable habits. The dose and duration of the course necessarily varies with the nature of the disease, and their effects on the body; and cannot consequently be specifically stated.*

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* See Saunders's Treatise on Mineral Waters, p. 313.

TONIC AND ASTRINGENT WATERS.

THESE waters owe their medical properties to iron and alumine, held in union with a fixed acid, which is always the sulphuric. They are very rare, the most common chalybeate springs being impregnated with carbonic acid.

HARTFELL WATER.

THIS water rises from the base of a very high mountain of the same name, about five miles from Moffat, in Dumfrieshire. When taken from the well it is perfectly clear; but it gradually deposits a quantity of an ochrey substance, which is the oxide of iron in excess, even when closely corked. Notwithstanding, it retains at all

times a large portion of this metal in solution. It will consequently bear transporting to any distance, without losing materially its ferruginous quality.

A wine gallon of this water, according to Dr. Garnett's analysis, contains:

	Grains.
Sulphat of Iron.....	84
Sulphat of Alumine.....	12
Oxide of Iron.....	15
	111

Total, one drachm and a half, and 21 grains of foreign matter, of which the principal part is sulphat of iron, with an excess of the oxide of this metal.

It has a considerable power on the human frame.

From its tonic and astringent property, it is of importance in the cure of many diseases arising from debility and laxity of the solids; as in certain disorders of the

stomach and bowels, bloody flux, bloody urine, immoderate flow of the menses, or their suppression, fluor albus, gleet, and in old and languid ulcers, when the texture of the diseased parts is very lax, and the discharge profuse and ill conditioned. In such local affections it is employed as a topical application also with advantage.

The dose of this water should, in all cases, be very small, and the whole quantity taken during the day should not exceed an English pint, but it may be continued for a long period. Should, at any time, its operation be too powerful, it may be rendered mild by dilution with a little spring water.

In common with other chalybeate waters it is apt to occasion in some persons a degree of nausea, and a sense of weight in the stomach, when taken cold; but these effects are easily prevented by drinking

the water moderately warm. As the iron is combined with a fixed acid, the required temperature may be given to it without occasioning any material change in its properties.*

BRIGHTON WATER.†

THE chalybeate spring near Brighton, commonly called the Wick, has long been noticed as a ferruginous water; but it is to the labours of Dr. Marcet that the public are indebted for an accurate knowledge of its chemical composition.

From his analysis it appears, that 100

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* See Dr. Garnet's Observations on Moffat and its Mineral waters; and Saunders on Mineral Waters.

† See Dr. Marcet's Chemical Account of the Chalybeate Spring near Brighton, in Dr. Saunders's Treatise on Mineral Waters, p. 331.

parts of the solid residue obtained by evaporation, and dried at the temperature of 160°, have given:

	Grains.	
Sulphat of Iron	21,2	Equal to 35,3 grains of crystallized green Sulphat.
Sulphat of Lime	48,2	
Muriat of Soda	18,	Dried at 160°
Muriat of Magnesia	8,9	
Silicious Earth	1,7	
Loss	2,	
	100	

And a pint of the water (which is equal to 8,5 grains of the solid residue) contains Carbonic acid gas, about $2\frac{1}{2}$ cubic inches, or $\frac{1}{13}$ part of its volume.

	Grains.	
Sulphat of Iron	1,80	Equal to 3 grains of crystallized green Sulphat.
Sulphat of Lime	4,09	
Muriat of Soda	1,53	Dried at 160°.
Muriat of Magnesia	,75	
Silicious Earth	,14	
Loss	,19	
	8,50	

The Brighton water thus appears to hold in solution, in common with the

Hartfell water, a large proportion of the sulphat of iron; and as it is to this metallic salt that their active character is to be ascribed, they may be considered with a practical view as similar, and to be indicated in the same diseases; namely, in all those arising from general debility, and relaxation of the solids, unconnected with visceral obstructions, or an inflammatory condition of the system.

The means which Brighton possesses, from its situation on the coast, of affording sea-bathing, a useful auxiliary in the cure of many of the disorders, for which its chalybeate spring may be employed, render it a valuable watering place to the invalid.

There is an aluminous chalybeate spring of equal virtues in the Isle of Wight, and which has been used with decided benefit

in cases of general weakness, brought on by previous diarrhœas, dysenteries, and fevers, particularly of the remittent and intermittent kind.*

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* See Dr. Lampriere's Report on the Medicinal Effects of an Aluminous Chalybeate Spring lately discovered at Sand Rocks, in the Parish of Chale, in the Isle of Wight.

PURGATIVE WATERS

Are those in which, without any large proportion of aerial matter, there is an impregnation of some neutral salt, with either an alkaline or earthy basis.

The salts which communicate their purgative power, are the muriats of soda and magnesia, and the sulphats of soda and magnesia. The two last are familiar to every one under the name of Glauber's salt and Epsom salt.

These waters are mostly cold, although they are found sometimes warm.

SEIDLITZ OR SEYDSCHUTZ WATER.

SEIDLITZ water is found at a village of that name in Bohemia, and was brought into notice, as a medicine of considerable efficacy, by the celebrated Hoffman, about the year 1721.

The spring of Seydschutz is situated at a very short distance from that of Seidlitz, and resembles it in chemical composition.

To the taste these waters are very saline and bitter; but not in the least acidulous. They are not brisk.

The solid contents procured by evaporation to dryness, according to Bergman, are in the following proportion. The English wine pint of 28,875 cubic inches contains,

	Grains.
Carbonat of Lime.....	,944
Sulphat of Lime.....	5,140
Carbonat of Magnesia.....	2,622
Muriat of Magnesia.....	4,567
Sulphat of Magnesia.....	180,497
	193,770

From this analysis it appears that they are decidedly purgative, and that they owe this medical property to their strong impregnation with the sulphat of magnesia, or Epsom salt.

They operate very speedily, and are particularly useful in freeing the body from crude, viscid, acid, and acrid bilious matters. They do not commonly cause griping pains, flatulency, and weakness, like the drastic purges, exhibited in a solid form, or even the milder aperients, such as manna, cassia fistula, or senna; but they gently stimulate the stomach and bowels to expel their morbid contents

and, assisted by their bitterness, tend to restore the tone of these organs, and with it the appetite and digestive powers. Thus they are particularly efficacious in disorders arising from a torpid action of the liver, in a bilious state of the stomach, in habitual costiveness, in hypochondriacal complaints, in sick head-ache, with bilious vomiting, in some kinds of bilious purging, in exudations and watery tumours of the skin, in scrofulous tumours, inflammations of the eyes and eyelids, in ulcers and discharges of the legs, in piles, fistulas, intestinal worms, and in that cachexy of females, attended with costiveness and suppression of the menses, whereby general debility, febrile heat, irritation, loss of appetite, and wasting of the body are induced.

In short, as a loaded and constipated state of the alimentary canal is a common cause of general bad health, it is obvious that these waters may be of infinite service,

The dose is from half a pint to two pints taken in divided portions, with a sufficient interval interposed, to prevent offending the stomach by the mere bulk of the liquid.

Exercise should daily be taken, and the diet should consist principally of soups, and not of solid food. Fermented and spirituous liquors should be avoided. The habits of life should be regular.

EPSOM WATER.

THE spring which yields this saline water is situated about half a mile from Epsom, a considerable market town in the county of Surrey, about sixteen miles south of London.

The water is transparent, and colourless, and leaves a bitter and saline impression

on the tongue, It is a purgative, and the salt to which it owes this property, denominated in consequence Epsom salt, was formerly prepared from it. This salt is now procured by a chemical process from sea water, for the purposes of medicine, and is chemically termed sulphat of magnesia.

The disaseas to which Epsom water is applicable, are precisely those for which the Seidlitz water is recommended; but, being a weaker aperi ent, the dose should necessarily be larger.

LEAMINGTON WATER.

The villiage of Leamington, two miles from Warwick, and forty from Cheltenham, has acquired considerable reputation on account of containing springs of a strong saline water, which supply numerous cold and hot baths.

These springs contain muriat of soda, sulphat of soda, muriat of magnesia, a small quantity of sulphat of magnesia, and a very large portion of sulphat of lime. They gently affect the bowels in a moderate dose, and are consequently useful in all diseases where a purgative operation is required.

There are many other saline springs, in this country, containing a notable proportion of some purging salt, particularly in the neighbourhood of this metropolis, viz. the salt springs of Acton, of Kilburne, of Bagnigge Wells, and of the Dog and Duck, in St. George's Fields.

SEA WATER

Is the strongest in saline impregnation of all the mineral waters used medicinally.

Near the shore, it is a very heterogeneous compound, holding in solution, besides saline substances, an infinite number of minute animal and vegetable particles, which being prone to spontaneous putrefaction, render it unfit for keeping.

When taken up near a rocky or clean sandy coast, or at a considerable distance from the shore, it is quite clear and colourless, void of smell, and shews no signs of any unusual quantity of air of any kind. To the taste it is very salt, nauseous, and bitter. It much exceeds in the extent of saline impregnation any common mineral water. The proportion varies in different latitudes, according to the temperature, producing greater or less evaporation, and the addition of fresh water from the discharge of large rivers into the ocean. On an average, however, the quantity is about $\frac{1}{29}$, of which, from the experiments of Bergman and

Lavoisier, it appears, that about 20 are muriat of soda, 5 muriat of magnesia, 3 sulphats of magnesia and soda, and 1 sulphat of lime.

There is, apparently, but very little Epsom salt in sea-water, in its natural state, although this salt is procured from it for the purposes of medicine by the addition of sulphuric acid. Sea water has, notwithstanding, a purgative property, and owes this to the muriat of magnesia, the source of its bitter taste.

Among its sensible effects may be mentioned thirst. It is, on this account, too heating for some invalids, occasioning in them considerable disorders of the organs of digestion; particularly remarkable in persons of an irritable, hectic, or, what is commonly termed, bilious habit.

The disorders for which sea water is

generally resorted to, are the same for which all the purgative saline waters are used.

In the quantity of a pint taken before breakfast, it usually proves purgative; when employed simply for this purpose, it should not be repeated oftener than once in eight or ten days, for it produces an increased action of the intestinal canal, which continues for some time.

Beneficial effects frequently result from employing it in smaller quantities, as an alterative. A wine-glassful taken every evening at bedtime, neither operates as a purgative, nor causes thirst; but keeps the bowels regular, amends the appetite, promotes digestion, and improves the general health. It is of infinite service, thus administered, in scrofulous cases, and visceral obstructions.

If children can be induced to take it in this manner, which may sometimes be effected by mixing it with milk, it generally succeeds in expelling worms, with which they are so commonly troubled.

It forms a useful auxiliary to sea-bathing in restoring the general health. It is, however, by great patience and perseverance only that this medicine has produced any decided advantage, and can be made to assist materially in the cure of many diseases.*

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* See Dr. Saunders' Treatise on Mineral Waters, and Dr. Russel on the Use of Sea-water on the Diseases of the Glands.

ALTERATIVE WATERS.

THESE waters owe their distinguishing character to an impregnation with sulphur, united either to hydrogen, or to an alkali, or to both, whereby they acquire very sensible qualities of smell and taste, and become very powerful agents on the human frame.

There are several varieties of sulphureous waters, such as hot and cold, simple or saline; and they form a highly valuable medicine.

They are all at once detected by the smell, which is very fetid, resembling the scouring of a foul gun-barrel, or rotten eggs.

None of them will bear carriage to any distance, in consequence of the ready decomposition of the sulphureous ingredient, and the separation thereby of the sulphur in an inactive form, even in close vessels.

To this class of waters belong the celebrated springs of Harrogate, Moffat, and the still more famous thermal fountains of Aix-la-Chapelle, and Bareges in the south of France.*

HARROGATE WATER.

HARROGATE, situated in an agreeable country, ornamented with a variety of

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* During a course of these waters, whether used internally or externally, the body acquires the smell of sulphur; and silver worn in the pockets becomes tarnished.

elegant seats, in the center of the county of York, adjoining to the town of Knaresborough, has long possessed considerable reputation by containing very valuable chalybeate* and sulphureous springs.—Sometime ago the former was confined to internal, and the latter to external use. At present the sulphureous springs are employed largely as an internal remedy likewise. They are four in number, and they resemble each other closely in all their properties. As one of these springs is, however, more strongly impregnated with

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* There are two mineral springs recently discovered at Harrogate, called the New Saline Chalybeate, or Caledonian Spring; and the New Chalybeate, or Hibernian Spring. The former possesses the medical character of the Cheltenham water, and may be substituted in all disorders requiring that natural remedy; and the latter has the Tonic virtue of the Tunbridge water, and will be found equally efficacious in all the various forms of pure functional debility.

the sulphureous principle than the other three, it is appropriated to internal use, while the remainder are employed to supply the baths.

The water of the drinking well, when first taken up, is perfectly clear and transparent, and sends forth a few air-bubbles. It has a strongly fetid smell, like rotten eggs, and has a nauseous, bitter, and saline taste; but such is the power of habit in reconciling the palate to the most disagreeable flavour, that most persons soon drink this water without disgust.

On exposure to the air it loses its transparency and becomes pearly and greenish; at the same time the sulphureous odour abates, and the sulphur is precipitated.

Its specific gravity is 1,0064. Its

foreign contents, according to Dr. Garnett's analysis, are the following:*

	In a Wine Gallon. Grains.
Muriat of Soda	615,5
Muriat of Lime	13,
Muriat of Magnesia	91,
Carbonet of lime	18,5
Carbonat of Magnesia	5,5
Sulphat of Magnesia	10,5
	754,0
	Cubic Inches.
Carbonic Acid Gas	8
Azotic Gas	7
Sulphuretted Hydrogen	19
	34

This analysis shews that the Harrogate water is very compound in its composition, holding in solution a number of

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* See a Treatise on the Mineral Waters of Harrogate, by J. Garnett, M. D. 1794.

purgative salts, with a twelfth of its bulk of sulphuretted hydrogen, or hepatic gas. To this combination of active principles it seems to owe its valuable properties; but particularly to the sulphuretted hydrogen gas, which has on the secretory organs a powerful action, resembling that of mercury, but without any of its injurious effects.

Harrogate water is therefore an excellent alterative, and particularly well calculated for those diseases where such an operation is required, as elephantiasis, leprosy, all those pimply eruptions, called in popular language scorbutic, and for every other cutaneous disorder; for painful contractions of limbs, the remains of rheumatism, gout, or palsy; for scrofula, for some other morbid effects of atmospherical impression, for various obsructions of the liver, and other organs connected with the alimentary canal, and for all affections

arising from a depraved condition of the body.*

The virtue of sulphur, as a mild unirritating aperient, has caused this water to be esteemed as a valuable remedy in piles, and fistula in ano, and its character of being a poison to intestinal worms, has brought it into use as a safe and powerful anthelmintic. When thus employed, it should be in such a dose as to prove a brisk purgative. In cases of ascarides, it may be used in the form of a clyster.

The dose of this water is generally such a quantity as produces a sensible effect on the bowels. Three or four glasses, containing half a pint each, taken at moderate intervals, are usually found sufficient. They should be drunk fresh from

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* See Dr. Armstrong's most excellent observations on the efficacy of Sulphureous Waters in chronic complaints added to his work on Scarlet Fever.

the spring, and cold; for the sulphureous impregnation is dissipated by heating. Sugar comfits and aromatic seeds are frequently eaten to correct the nauseous taste of the water; but Dr. Garnet recommends a small quantity of sea-biscuit or coarse bread, as more effectual, without cloying the stomach.

The duration of a course of Harrogate water necessarily varies according to the nature and inveteracy of the disease.

The warm sulphureous baths should be conjoined with the internal use of the water, which should in all diseases, requiring a powerful determination to the skin, be taken warm, and repeated at proper intervals, to assist the full perspiration promoted by the bathing. For the same purpose, the invalid should be wrapped in flannel, and confined for some hours in bed.

These baths being artificially heated, some of the sulphuretted hydrogen gas, on which their activity depends, is thereby lost. They are consequently inferior to the natural warm baths on the Continent, the waters of which receiving the temperature within the earth, under circumstances of great pressure, suffer no material loss of hepatic gas, when immediately used.

During the use of this natural remedy the habits of life should be regular, and the diet light and nutritive.*

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* See Dr. Garnett's Treatise on the Mineral Waters of Harrogate; and Dr. Walker's Essay on the Waters of Harrogate and Thorp Arch.

MOFFAT WATER.

THE village of Moffat, surrounded by lofty hills, is situated at the head of a valley on the banks of the Annan, about fifty-six miles south-west of Edinburgh.

The chief of the sulphureous waters which have given celebrity to this watering place, is contained within a stone-building enclosing a pump. The supply of water is sufficient for every demand.

When first drawn it appears rather milky and blueish; the smell resembles that of bilge-water, being precisely the same as that of Harrogate; and the taste is saline and sulphureous, but not bitter.

When exposed to the air it becomes more turbid, then separates a thin film,

which is pure sulphur, and loses thereby all its distinguishing qualities, as a sulphureous water. As this change takes place, even in close vessels, it cannot bear transporting to any distance.

A wine gallon of Moffat water contains, according to Dr. Garnett's analysis,*

	Grains.
Muriat of Soda	36
	Cubic Inches.
Carbonic Acid Gas	5
Azotic Gas	4
Sulphuretted Hydrogen	10
	19

It is, therefore, more simple than the Harrogate water, and produces, consequently, effects somewhat different, having a determination to the urinary organs,

* See Garnett's Observations on Moffat and its Mineral Waters. 1800.

without any certain operation on the alimentary canal, unless when taken in a very large dose. Some purgative salts therefore should always be conjoined with the internal use of this water to keep the bowels regular.

Its medical virtue depends principally on the sulphuretted hydrogen gas which it contains, and which has a powerful influence on the secretory organs; but particularly on the skin, through the innumerable pores of which it operates with considerable activity. It is as efficient in the cure of many chronic diseases as mercury, and possesses this superiority, that its continued use induces no debility, nor distressing consequences.

Moffat water is a decided alterative, and is employed principally for the cure of cutaneous disorders. In these cases its

sulphureous warm baths are judiciously made a part of the plan of treatment.

In the early stages of scrofula it is often of infinite benefit. Glandular tumours are frequently dispersed by its use, without suppuration, or any unpleasant consequences.

As an internal remedy, this water is prescribed in various quantities, according to the age, sex, disease, and morbid irritability of the stomach.

The dose is usually from one English pint to four pints, drunk in divided portions, and with a sufficient interval of time interposed between them.*

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* See Dr. Garnett's Observations on Moffat, and its Mineral Waters.

NOTTINGTON WATER.

THIS water is supplied by a spring in the vicinity of Weymouth. It is impregnated principally with pure sulphuretted hydrogen gas, which is readily detected by its peculiarly fetid odour, and by its tarnishing silver. From the powerful action of this gas on the secretory organs, it has been found a very useful agent in the cure of many chronic diseases.

The Nottington water has been employed with benefit in various disorders arising from obstructed perspiration, particularly diseases of the skin, and in some cases of visceral congestion,* both as an internal and external remedy.

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* See a Treatise on the quality and virtues of the Nottington Water, near Weymouth, by J. D. Peckford, M. D.

From half a pint to a pint will be a sufficient dose, which may be repeated during the day, when the stomach is empty.

This course should be continued for a considerable time, to produce any favourable result.

During it, the bowels should be kept open by the occasional use of purgative salts, the diet should be light, and the habits of life regular.

Daily exercise in the open air should not be neglected.

ALTERATIVE
AND
DETERGENT WATERS.

The medical properties of these waters are greatly increased by their high temperature, which renders them more valuable for certain diseases, as those of the skin, than the simple alterative waters.

They are principally employed as external applications and baths.

AIX-LA-CHAPELLE, OR AKEN WATER.

The City of Aix-la-Chapelle, or Aken, as it is called by the Germans, has long possesed a very high distinction among

the other towns in Flanders, in consequence of the celebrity of its hot sulphureous baths. In these Charlemagne so much delighted, that he frequently held his levees in them, and made, for a long time, this city his residence, and endowed it with valuable privileges. There are several sources of hot sulphureous waters in it. The principal of them is enclosed within a stone cistern, kept closely shut, whence the water flows into several spacious and elegant baths, distributed through various parts of the city, and distinguished by the name of the Emperor's Bath, the Nobles' Bath, and the Poor's Bath. There are besides every necessary apparatus for vapour bathing, and for the douche, or pumping on any particular part of the body.

The water rises in the spring with continual sparkling, and at the same time, according to Dr. Lucas's account, separates a considerable number of air bubbles,

that break on the surface with a slight explosion. It is at first perfectly colourless and clear. It emits a large volume of vapour, and with it a very fetid odour, similar to that of Harrogate water, but more powerful.

The taste is saline, bitter, and rather alkaline.

The temperature of the several baths vary considerably. The hottest bath being 136 degrees, while the others are found to possess different degrees of heat, from this point down to 116 degrees.

On cooling, the water loses its clearness, acquires a milky hue, and deposits a sediment which is principally sulphur. At the same time it loses much of its offensive smell, and, when cold, retains scarcely any.

Its solid contents are variously esti-

mated. Bergman gives the following, in the proportion of an English wine pint.

	Grains.
Carbonat of Lime.....	4,75
Muriat of Soda.....	5,
Carbonat of Soda.....	12,
	21,75

The quantity of gas has not been ascertained with any degree of accuracy, nor the proportion of the sulphur (which is considerable) to the hydrogen in the hepatic gas. There is, besides, some carbonic acid; but not more, apparently, than is sufficient to saturate the soda and hold the lime in solution.

When taken internally it produces some degree of cheerfulness and gaiety; but, if taken largely, it induces giddiness and sleepiness, and these effects are the greater in proportion to the heat. It often proves mildly laxative, if liberally drunk. But it

more certainly determines to the kidnies and skin.

It is found serviceable in disorders of the stomach and biliary organs, that follow a life of continued indulgence in the luxuries of the table; and in affections of the kidnies and bladder, marked by pains in the loins, thick mucous urine, and difficult micturition.

As the heating quality of this water is very decided, it should be avoided in all cases of an inflammatory tendency, in hectic fever, and a disposition to active hæmorrhagy.

The dose is from half a pint to a pint, to be repeated more or less frequently according to the effect on the head, and the intention of drinking it. If taken to produce a determination to the bowels, some saline purgative should be added to quicken its action.

This water is still more extensively employed as an external, than an internal remedy. The baths of Aix-la-Chapelle are in consequence resorted to, for the cure of a number of diseases. They have been found salutary in stiffness and rigidity of the joints and ligaments, which are the consequences of the inflammation of gout and rheumatism; in debility from palsy, in that which follows a long course of mercury, and in all cutaneous diseases.

Aken water is sufficiently hot to be used as a vapour bath, without the aid of artificial heat. For this purpose the vapour is detained as it passes through the channels that supply the common baths, and is applied, by means of a suitable apparatus, either generally or partially, to the body, as occasion may require.

This sulphureous vapour bath is preferable to the common warm bath, and is a more efficient remedy in rheumatic and

paralytic affections of the joints, and cutaneous disorders of long standing.*

BAREGES WATERS.

THE village of Bareges, distinguished for its thermal springs, stands in a wild and romantic part of the Pyrenees, between the Mediterranean and the Bay of Biscay. It is composed of two small hamlets, the principal of which, the lower Bareges, contains the baths, and lodgings for the accommodations of visitants.

The reputation of these waters has for years been established.† "Julius Cæsar, and the Roman General, Sertorius, bathed

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* See Dr. Saunders's Treatise on Mineral Waters.

† See Sir Arthur Clarke's Essay on Warm, Cold, and Vapour Bathing, p. 94.

in them to restore energy to their rigid limbs, after their campaign in Gaul and Spain. Henry IV. of France frequented them in his youth, and Louis XVI. dignified them with an hospital for his wounded officers, and another for his soldiers, who, when past all other means of cure, were, from the remotest parts of France, sent to Bareges as a *last resource.*"

These hot springs are four in number, le Grand Bain,[a] le Petit Bain,[b] le Bain Neuf,[c] et les Bains de Delices,[d] and are inclosed in a vaulted stone building, erected by the King of France. They contain the same ingredients, but differ in temperature and in the proportion of sulphur; the hottest being the most strongly impregnated with this active substance, which

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[a] The Great Bath. [b] The Little Bath. [c] The New Bath. [d] The Baths of Delight.

they all, however, lose by contact with the air, and by cooling.

Their respective degrees of heat, according to Farenheit's thermometer, are the following:

	Degrees of heat.
That of the hottest bath, named Le Grand Bain, is at.....	111¼
That of the Petit Bain.....	110
That of the Bain Neuf.....	109½
That of the temperate baths, called Les Bains de Delices..	94½

They are extremely light and transparent—impart the taste and smell of liver of sulphur, and emit a quantity of smoke, or vapour, which is more or less visible, according to the changes of heat or cold in the atmosphere.

The coolest are used chiefly for bathing, and the hottest for drinking, and topical applications.

Chemical analysis shews that they are composed of sulphuretted hydrogen, united to soda—of an excess besides of this alkali —of a little common salt—of carbonated lime and alumine—and of a small quantity of a bituminous substance of a peculiar nature, combined with a part of the soda, and thus forming a kind of soap.

From the innumerable instances recorded of their power in the cure of diseases, they appear to possess alterative and detergent properties.

They have been employed with wonderful success in all gun-shot wounds, in those attended with loss of substance, or with the complication of caries and extraneous bodies; in contusions, in fistulas, schirrhuses, and cancerous affections of the womb, and every sort of ulcer, requiring digestion and suppuration; in muscular contractions, in rigid and palsied

limbs, in chronic rheumatism, in certain states of gout, in disordered menstruation, in diseases of the stomach, marked by acidity, flatulency, and heartburn; in obstinate colics; in debilities, brought on by intemperance or the abuse of mercury; in jaundice, gravel, and other affections of the urinary organs; and above all, in leprosy, in the dry red scurvy eruptions, commonly called *scorbutic*, which affect principally the hands, arms, and legs, in spots of various dimensions; and in cutaneous diseases arising from obstructed, or checked *sensible* and *insensible* perspiration.

Before entering on a course of these waters, it is necessary that the invalid be perfectly recovered from the fatigues of the journey; if much excited, should lose a little blood; and if the stomach and bowels are loaded and foul, should take a gentle vomit and purgative.

The costiveness which these baths frequently induce must be obviated by occasional doses of some aperient, as Epsom salts, &c.

Whenever the causes of disease are internal, the waters must constantly be drunk ; and when they are thus administered, with a view to their alterative properties, their operation then will essentially be assisted by calomel, James's powders, or Plummer's pills.

The most favourable time for drinking these waters is the morning. The quantity must be regulated by the condition of the stomach, and disease of the invalid. It should not however exceed three pints, and should be for a due continuance. As it is of consequence not to load the stomach, the interval of a quarter of an hour between each draught will be proper.

The addition of milk, in the proportion of a fourth, a third, or a half, according to circumstances, renders the waters less offensive.

In external wounds, tumours, and ulcers, the hot douches,* with some previous tepid baths, are indicated; but should these be accompanied with constitutional depravation, the internal use of the waters should also be conjoined.

The head and body should not be exposed so freely to the douches as the extremities. They are inapplicable in cases of inflammation. Fomentations of the water, with temperate baths, will be the more judicious remedies.

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* The *French* mean by *douche*, a fall of water directed on any part, to operate by its percussions. It is, therefore, what the *English* term *pumping*, and which is in great reputation at Bath.

The most favorable time for dressing wounds is immediately after the douche, and while in the bath-room, for the advantage of its air and warmth. The dressings should be kept constantly wet with the waters; but when the healing process has commenced, dry lint must be substituted to perfect the cure.

The douche may be employed both morning and evening, and its duration may be from ten to fifteen minutes. When the disease is so seated as not to be reached by the douche, then injections will be found convenient. For both of these applications the hottest water should generally be preferred.

When both baths and douches are required, the former should precede, to prepare the parts for the impressions of the latter, as in indurated tumours, rheumatisms, and other disorders of long stand-

ing, caused by checked perspiration, and characterized by aridity and hardness of the skin; in obstructions of the viscera; in gravel; and impeded menstruation.

The douches should always be applied near to the seat of the disease.

After its application to stiff, contracted, or hardened parts and tumours, the bituminous oil of the waters well rubbed upon them, will expedite considerably the cure.

The proper time for having the douches and baths is the interval between meals, when digestion is concluded. One hour is the ordinary duration of the temperate bath, after which and the douche the invalid should, in inveterate cases, go to bed to elicit perspiration.

The diet should be light and nutritive, consisting of soup, mutton, veal, chicken,

partridge, roasted or boiled; and the ordinary beverage, the water of the cold fountain, boiled to render it pure, should that of the mineral spring be found too disgusting for the use of the table.—Those who require wine may mix a little with it.*

Thus much for the medical powers of water, pure or impregnated with mineral substances, internally employed; I shall now proceed to the consideration of it as an external remedy, either general or partial, and at any temperature, from ice-cold to a degree of heat as great as the skin can bear.

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* See Meigham on the Nature and Powers of the Baths and Waters of Bareges, 1764.

ON

BATHING IN GENERAL.

THE perpetual exhalation from the human skin, wisely provided to purify the blood, and to regulate its temperature, being composed of noxious particles,* must, when condensed upon the surface of the body, and allowed there to accumulate, be productive of foulness, the source of

* "Putrefaction which is always going on in living bodies, is corrected by food supplying new matter to their system, and by the exhalation of noxious particles from the surface: hence both animals and plants are rendered healthy by frequent washing." —*Dr. Jameson's Treatise on Cheltenham Waters*, *p.* 196.

many diseases; ablution, therefore, is an essential object of bathing. But this excellent quality of removing all obstructions from the cutaneous pores, and giving thereby activity to the vessels of the skin, is not the sole effect of bathing, for it has a certain influence on the animal heat, and operates powerfully on the nervous system.

Bathing is distinguished into *general* and *partial*;—*general*, when the whole body is plunged into water, or when it receives the water by means of an apparatus, causing it to descend in a shower, which is called a *shower-bath*: and *partial*, when the lower part of the body is immersed in water, denominated *hip-bath*, (semicupium,) and when the feet only are bathed, called *foot-bath*, (pediluvium).

There are numerous modes of *general bathing*, which, according to the nature

of the impregnations, and degrees of heat of the water employed, are denominated salt water, medicated, cold, cool, tepid, warm, hot, and vapour baths. The differences of temperature, however, form their most important varieties, and embrace a range from near the freezing point to a heat considerably above that of the human body.

COLD BATH.

This bath possesses the ordinary temperature of the atmosphere, from above 32 to 65 degrees of Fahrenheit's thermometer. When a healthy person is immersed in it, he first experiences a general sensation of cold, called *the shock*, and immediately afterwards an equally universal sense of warmth; but if the immersion be continued, the body, by degrees, becomes

chilled—shiverings and drowsiness, with a disinclination to motion, supervene—the extremities grow pale and numb, and are affected with pains and cramps. The respiration is then hurried—the pulse feeble—a sense of coldness, faintness, and sickness of the stomach are felt, followed by a great dimunition of vital heat—the pulse gradually ceases to beat, and life is ultimately extinguished.

Should the bath be much below 60 degrees, the sensation of cold is more perceptible, a shivering is immediately experienced, and as the water rises towards the belly and chest, a shuddering, with convulsive sobbings, takes place, followed frequently by sickness and head-ache.—This convulsive sobbing is to be attributed to the intensity of the cold, by which the vessels on the surface are rendered torpid, and the blood determined to the interior; and to the sympathetic torpor which, at

the same time, takes place in the capillary vessels of the lungs, thereby preventing that regular transmission of blood through them, so essential to free respiration.

The glow which in healthy persons follows the cold of the first immersion is to be referred to the reaction of the system, which enables the body to resist an injurious external impression. It seems to be a peculiar effort of the living power to which, and to the intensity of the exciting cause it is proportionate. This reaction, then, is necessary to the salutary operation of the cold bath.

Should the use of the cold bath be not succeeded by this glow, it should by no means be persisted in, for the absence of it is a proof that either the water has been too cold, or immersion in it continued too long, relatively to the vigour of the constitution, and that the powers of life are not

sufficiently strong to overcome the torpor of the superficial vessels. Head-ache, indigestion, and many other alarming symptoms will, invariably be the consequence of this abuse.

During immersion in the cold bath, the pulse is at first variously affected, owing, probably, to the relative vigour of different constitutions. In some it is accelerated; but in others it is rendered slower. In all cases of improperly prolonged immersion, both its frequency and strength are diminished.

It is commonly supposed that it is dangerous to go into a cold bath while the body is heated by any exertion; accordingly, it is the custom with bathers so circumstanced to wait until they are cool, before they bathe. This popular opinion and practice are, however, founded in error, and are sometimes productive of

very alarming consequences. In such cases the injury is usually imputed to going into the water too warm, whereas, in truth, it arises from going in too cold. "But though it be perfectly safe (as the late Dr. Currie has justly observed) to go into the cold bath in the earliest stage of exercise, nothing is more dangerous than this practice, after exercise has produced profuse sweating, and terminated in languor and fatigue; because, in such circumstances, the heat is not only sinking rapidly, but the system parts more easily with the portion that remains."*

To obviate as much as possible this evil, the cold bath should be taken when the heat of the body is by some gentle exercise brought to its highest point; and the bather should undress as quickly as

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* See Dr. Currie's Medical Reports on the Effects of Water, cold and warm, as a Remedy in Fever, &c.

possible, and should wrap his body in a large flannel gown which should not be laid aside until the very moment of entering the water. The shock of immersion will thus be diminished, and the occurrence of the salutary glow, which ought always to succeed bathing, will, in most instances, be insured.

The period proper for the bather to remain in the bath, should be regulated by his peculiar constitution and state of health. He should, however, not forget that it is safer to continue completely immersed in the water during a short time, than to take repeated plunges. After the bath, the body should immediately be dried, and covered from the air.

A notion is by some people entertained, that the morning before breakfast, is the only proper time for persons of all descriptions to bathe, to avoid the injurious

effects of a full stomach at the moment of immersion. Although there can be no doubt of the impropriety of plunging into cold water, while digestion is going on, yet the propriety of bathing immediately on leaving bed in the morning is questionable.

Individuals of a feeble constitution should not take the cold bath till some hours after breakfast; when the system, by the digestion of that meal, will have acquired some degree of strength to sustain the reaction necessary to health. The vigorous and robust need not such precautions. They may bathe early in the morning, provided they have not been intemperate the preceding night. If they have been so, the time of bathing should be deferred till noon, when they may be supposed to have recovered from the debilitating effects of their irregularity.

It was formerly the practice to bathe in

the evening. Horace recommends it, in order to induce sleep. It will doubtless refresh the healthy, when fatigued; but it will equally injure the feeble, and those who indulge in the luxuries of the table.

The beneficial effects of cold-bathing may be considered to be ablution, or cleansing of the skin; the reduction of excessive heat, and a salutary reaction of the system, upon which its tonic power depends.

By these means the irritability of the skin is lessened, and its susceptibility to slight impressions of a disagreeable nature destroyed, constituting that condition of the body denominated in common language, *hardiness*.

It is thus well calculated to brace the constitution during the middle periods of life, when the powers of the body are

firmly established; provided no predisposition to visceral or cutaneous diseases exists.

After the body has, by the previous use of the warm, tepid, and cool baths, been prepared for its tonic impression, it is an excellent remedy in all cases of pure weakness of the system; but it is too powerful, not to produce much mischief, when injudiciously used: it should, therefore, never be employed without the advice of a physician; for I have seen invalids and puny children suffer materially in their healths by its abuse.

Cold bathing is indicated, says Dr. Saunders, in all those disorders characterized by "a languor and weakness of circulation, accompanied with profuse sweating and fatigue on very moderate exertion, tremors of the limbs, and many of those symptoms usually called nervous,

when the moving powers are weak, and the mind listless and indolent; but, at the same time, when no permament morbid obstruction, or visceral disease is present."*

It has been found useful in certain states of madness, in the hot stage of some fevers;† in that irregular febrile affection, which Dr. Saunders has denominated febricula, occurring in persons naturally of a sound constitution, but who lead a sedentary life, and are engaged at the same time in some occupation requiring much exertion of mind, and causing great anxiety; and in that species of convulsions to which children are liable. In these cases the head as well as the body should be immersed in the cold bath.

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* See Dr. Saunders' Treatise on Mineral Waters, p. 499.

† See Dr. J. Currie's Medical Reports on the Effects of Water, cold and warm, as a Remedy in Fever, &c.

During my practice in India I employed with great success the cold affusion* during the hot stage of both the intermittent and remittent fever, unconnected with visceral disease, having previously cleansed the bowels by calomel and salts, and bled the patient, when signs of high arterial action were present.

In cases of convulsions, Dr. Currie recommends the patient to be plunged into the cold bath at the height of the paroxysm. This, however, should never be done, except in the presence of some able medical practitioner. As these affections in children are commonly caused by an accumulation of slimy matter in the intestines, calomel and castor oil should be premised to produce a full purgative effect.

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* This mode of applying cold water to the surface is, in some cases, more convenient and efficient than the cold Bath, and is therefore preferred by medical men, in cases of fever, &c.

The cold bath is inadmissible in very early infancy and in old age: the powers of life in the one state, not being sufficiently established: and, in the other, too rapidly decaying to support the shock of the sudden application of cold water.

It is injurious in all cases of internal inflammation, in scrofula, or king's evil, in chlorosis, fluor albus, in visceral obsructions, gout, rheumatism, and in erysipelas, or St. Anthony's fire.

SEA BATHING.

Autumn is usually selected in this country as the season most proper for this purpose, in consequence of the superior warmth of the sea at this period of the year, while the heat of the atmosphere is at the same time moderated by the cool western gales, then generally prevalent.

The temperature of the sea during the warm and temperate months, ranges from about 58 to 60° Farhn. During the month of August, it will seldom be found much below 60°, while that of the atmosphere is calculated by Mr. Kirwan, to be on an average, somewhat about 65°. The heat of the fluid then, in which we bathe, being thus but a few degrees inferior to that of the medium in which we are accustomed to live, the sea at this time of the year is, therefore, more a temperate, than a cold, bath.

The sensation of cold, called the shock, and that of warmth, which follows in healthy persons, constituting the glow, are equally the effects of immersion in the sea, or the simple cold bath. The rules, therefore, to be observed in the use of the one, are also applicable to the other.

The superior power of conducting heat,

which water possesses over air, causes the body, while continuing in that cold medium, after the first effects of reaction already stated, to constitute the glow, to be constantly employed in producing an unusual quantity of heat to support the temperature essential to life. This appears to be a great effort in the constitution, which, if carried too far, is destructive of the animal powers. The exercise of swimming then, in such universal estimation, although requiring in itself comparatively but little muscular exertion, being performed under circumstances calculated to exhaust the animal strength, proves more fatiguing than any other kind of motion. Much caution, therefore, should be observed in the indulgence of this favourite amusement,* for when con-

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* The inhabitants of hot climates, protected by the unctuosity of their skins, from the constant use of

tinued too long, it is apt to occasion the cramp. This painful and dangerous affection, however, may, in general, be removed, by vigorously jerking out the attacked limb.

Many of the circumstances which precede the present mode of sea-bathing seem calculated to induce a state of the system the very reverse of that with which it is most proper to enter the water. The machines, too, as they are called, which are provided to convey the bathers into the sea, being exposed to all kinds of weather, are occasionally so completely pervaded by rain as to be rendered cold and dangerous; and their frequently insufficient number for their demand is too often productive of delay in bathing, and of conse-

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oil, which diminishes their permeability to heat, and favoured by the warmth of their seas and rivers, are enabled to lead almost an amphibious life.

quent exposure to all those debilitating causes which are inimical to a healthy and vigorous reaction on plunging into the sea. The invalid should, therefore, have in readiness a dry machine, to avoid the exhalations of moisture from one that is wet, and to prevent the abatement of spirits, which arises from disappointment in not having the means of bathing, when the mind was fully prepared for it; for these are circumstances which tend to impair the energies of life, and to diminish the benefits to be derived from sea-bathing.

Although the time of bathing must always be regulated, in some measure, by the state of the tide, yet, at most bathing places, a person may, at all times of the day, with the assistance of the machine, get into the sea. But in different situations of the tide, the temperature of the water will be found to vary considerably.

It must, therefore, be of importance to invalids, to know that, by selecting a sandy situation, and bathing in a flowing tide about noon, or within an hour or two afterwards, they have it in their power to use a bath ten or twelve degrees warmer, than at a more early hour in the morning. This alteration of temperature, however, at different times, can only take place, where there are considerable tracts of level sand. Such situations, therefore, should be selected, if possible, for bathing.

To accommodate the peculiarities of the various states of health in different invalids, the warmth of the water should be tempered in such a manner as gradually to accustom the feelings of the more delicate to endure greater degrees of cold. This might be effected by the use of a warm salt water bath, its commencing temperature being 90°, to be lowered 5 degrees every second time of employing it,

and to terminate at 65°, with the time of each immersion abbreviated in proportion to the dimunition of heat. The transition from this bath to the open sea would hardly be perceptible, and many invalids, by this initiation, might derive advantage from it, who would have been injured by abruptly plunging into the sea at its common temperature. After bathing, the body should be rubbed with a coarse towel, or hard flesh brush, until it glows. This will be found a salutary practice.

It is a common mode of bathing to plunge head foremost into the water. Although, it is unquestionably true, that to sink the head under it with all expedition, is highly proper; yet, to effect this purpose, a headlong plunge is by no means necessary. In the words of Dr. Buchan, " let the bather, holding by the rope, if timid, or with the assistance of the guide,

quickly descend the steps of the machine, then immediately stooping, or crouching down, permit the water to flow over the whole body, including the head. The more speedily the whole of this process is performed, the less will the person be affected by convulsive respiration. The sobbing is always most harrassing, while one half of the body is under water, and the other remains exposed to the air. For reasons which have already been detailed, the more delicate will find it much better to leave the water immediately, after having remained in this situation as long as convenient, than to persist in repeated immersions of the upper part of the body. A single complete immersion of the whole body is sufficient."

After bathing, a moderate degree of exercise will greatly aid its salutary operation; but fatigue and exposure to

the rays of the sun, so far as to induce perspiration, should sedulously be avoided. Should an alarming perception of cold and convulsive shivering occur, in consequence of the abuse of cold bathing, the sufferer should, without delay, be removed into a warm bed, his chest should be rubbed with hartshorn, which should also be snuffed up his nose, a cup of warm tea should be given him, and a bladder filled with hot water, applied to his stomach. This last is one of the most efficacious and ready means of restoring warmth to the system. The frequency of bathing should be regulated by the strength of the constitution. To bathe on alternate days is sufficient for the preservation of health. The employment of caps made of varnished silk, or of any other expedient to protect the hair from the water, is improper, and is frequently the cause of head-ache, and other disstressing symptoms. The head should therefore be

wetted as soon, and as completely as possible after immersion in the water.

Those to whom the open sea is an object of terror may substitute, with equal benefit, a bath within doors, such as most of the bathing places afford.

Much has been alleged in favour of the advantage of salt over fresh water used as a bath.* Although the saline ingredient of sea-water may have a certain action on irritable skins, and by its stimulating effects on the superficial vessels prevent the debilitating action of cold†, yet there

* In situations distant from the coast, an artificial water, possessing all the properties of sea-water, may be made for the purpose of a bath, by dissolving a pound of bay salt in four gallons of fresh water.

† The salutary effect of the saline impregnation is shewn by the healthy appearance of the guides, whose occupation exposes them so much to the influence of sea water.

is no doubt that sea-bathing has frequently received the credit of a cure, which was entirely owing to temperature and change of air. Thus its utility in scrofula, or king's evil, and glandular swellings of the neck, is extremely questionable. Dr. Hamilton, in his excellent observations on these diseases, corroborates this opinion.* He says, "that during the summer months sea-bathing is constantly used, when the time of high water will admit of it, by men of all descriptions; and many boys are seldom out of the water in the day-time, except at school hours, all summer. Yet it is no less strange than true, there are no where more distressed victims to scrofula to be met with than at Lynn! and they are as frequently to be met with among the lower orders of the inhabitants, who are used to the water daily, as

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* See Observations on Scrofulous Affections, by R. Hamilton, M.D. p. 159.

in the other ranks of life, whose business has no connexion with it."

The tepid salt water bath, however, may be an auxiliary to other remedies in these complaints.

Sea-bathing is found beneficial in renovating the constitution, when exhausted by the heat, the impure atmosphere, and enervating modes of life prevalent in great towns;* as an auxiliary in the cure of rickets, by restoring the tone and healthy action of the organs of life; and, in the same manner, in removing nervous complaints and all other maladies originating in pure debility. It is contra-indicated in all cases wherein the application of cold

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* "Towns, being formed of stone or brick, are warmer in summer than the open country, unless the streets be so close as to intercept the free action of the sun's rays.—*Kirwan's Estimate of Temperature.*

is injurious, as jaundice, and all those disorders called bilious; in indigestion, consumption, gout, acute rheumatism, gonorrhœa, chlorosis, and cutaneous diseases.

One of the principal means provided in the economy of nature, for preventing the contamination of the air, by the gradual accumulation of noxious vapours, and for maintaining the atmosphere in that state of purity, best calculated for the support of human life, is the operation of rivers, and lakes; but chiefly that of the ocean. From this circumstance arises the salubrity of the sea air, indicated by the clear complexion, the animated look, and the elastic frame of those by whom it is habitually respired. It is therefore a powerful auxiliary to sea-bathing in the cure of diseases. Notwithstanding, the air on many parts of the coast is contaminated during the summer and autumnal months, by the putrefaction of sea-weed, and other vegetable sub-

stances. Such situations must be peculiarly unfavourable to invalids, and ought consequently to be carefully avoided. Those districts where the soil is dry and calcareous, where the coast lies high, and where the surrounding country is open and free from the inconveniences just mentioned,* should be selected in all diseases of relaxation, since, in these situations, the beneficial action of cold or warm sea-bathing may be assisted by gentle exercise in a wholesome atmosphere. Besides purity, which the sea air has for its recommendation, there is a large portion of saline particles, held in solution by it, which appears to have a great share in producing the benefit known to arise from living on the coast. This saline impregnation is peculiarly useful in checking that species of chronic catarrh,

* Ramsgate and Margate possess, in an eminent degree, these advantages.

characterised by an increased secretion of the mucus of the bronchia, which the patient is perpetually endeavouring to bring up by a short cough. This affection attacks many people towards the latter end of summer, especially those who reside in great towns. The sea air is salutary to all sluggish temperaments, but injurious to the irritable, and particularly so when pulmonary consumption is present. This may be considered a general rule to be modified, however, by circumstances.

SHOWER BATH.

The cold shower bath possesses all the good qualities of cold immersion, with a less tendency to produce chilliness and cramps. It is, perhaps, the best and safest mode of cold bathing.

I have known it of infinite service in that species of head-ache, commonly called nervous, in hysterical affections, in cases of loss of muscular motion, and in habitual costiveness, from pure debility, unconnected with organic injury. It has been prescribed with success in a peculiar sore throat, characterized by a relaxation of the uvula, and a honeycomb appearance of the glands, situated in the inside of the throat, attended with sallowness of complexion, great listlessness, and aversion to corporeal exertion, with occasional loss of voice, when occurring in the female sex, to which persons of delicate constitutions, who reside in great towns, are liable; and it has been applied to the head with benefit in insanity, while the patient's body was immersed in a warm bath. In this mode of employment, it might be of use in some cases of obstinate head-ache, and in apoplexy, after previous full depletion by bleeding and purging.

COOL BATH

EMBRACES a temperature from above 65 to 85 degrees. At 75 degrees it forms an excellent preparatory bath to the cold one, which should never be taken until the body has previously been prepared for its powerful impression, by a warm, a tepid, and a cool bath. This gradual *initiation* may, in most cases, be accomplished by a bath taken every other day from the commencement of the warm bathing to the end of two or three weeks.

TEPID BATH.

As the sensation of heat or cold varies according to the temperature of the bathers' body, it is not possible to fix any

exact limits to the term, tepid; it may, however, be defined to be that which gives the least possible sensation of either heat or cold to the skin, and whose operation, consequently depends principally on the nature of its medium, and not on the circumstance of temperature. In general, it may be applied to water heated to about 92 degrees. In this temperature the healthy body can bear immersion for a considerable time, without experiencing any general effect. It is, therefore, well fitted to cleanse the skin from any impurity which may adhere to it, and thus to promote its natural secretion.

The quantity of white scaly matter that may be observed floating on the surface of the bath, after its use, proves the necessity of ablution, to prevent the occurrence of those diseases arising from obstructed perspiration.

" For while the effluence of the skin maintains
" Its native measure, the pleuritic spring
" Glides harmless by; and Autumn, sick to death
" With sallow quartans, no contagion breathes."

ARMSTRONG.

The occasional employment of this bath, then, is essential to the preservation of health.

In the early periods of infancy it is highly beneficial, by facilitating the developement of the corporeal organs, and by maintaining the skin in that state of softness and perspirability, which diminishes the danger of *teething*, and of the various convulsive and cutaneous diseases, to which children are liable. The practice, therefore, of plunging children indiscriminately into cold water, for the purpose of bracing their constitution, is unsafe; for in them there is a morbid disposition to visceral inflammation and congestion, which can only be prevented

by a free and healthy circulation of blood on the surface of the body.

It is a useful remedy in the hectic state of the system, whether arising from general or local irritation, in fistulous ulcerations of the perineum, in fevers, and all those diseases in which the animal powers are weak, and cannot support the reaction of cold immersion. In these cases tepid affusion, when the bath would be inconvenient, will prove an efficacious substitute.

Sir A. Clarke recommends the use of the tepid bath during pregnancy, as affording great comfort and relief to the more delicate and suffering part of the creation.*

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* See "An Essay on Warm, Cold, and Vapour Bathing, by Sir A. Clarke, M. D.

THE WARM BATH.

In the human constitution, heat exerts an influence proportionate to its intensity, the previous impression, and the density also of the medium of its application. The temperature, therefore, of a warm bath, should be regulated according to the animal heat of the person about to use it; for it varies in different individuals, being in some about 98° Fahr. and in others as low as 83° or 84°. The diversity of the animal heat is known to exist even in the same person, under various circumstances, more particularly of disease, so much so, that the use of a bath, at a certain temperature, may be of essential service at one time, while at another, it may be attended with very alarming effects, from the heat of the water not being properly adjusted to that

of the bather at the time.* This fact is of primary importance, especially to delicate persons, in the employment of the warm bath.

A bath, however, of a temperature from 92 to 98 degrees, is generally entitled to the epithet, warm. At 95 degrees it most commonly diminishes the frequency of the pulse, the animal heat, and produces the most soothing and refreshing effects.

By preventing the access of air, the proper solvent of the perspiration, it suspends the cutaneous secretion, while the pulmonary alone goes on, and thus ren-

* The temperature of the body is ascertained by placing a thermometer under the tongue for a few minutes, and marking the degree at which the quicksilver ceases to rise.

ders the loss of weight less than would have been sustained during an equal portion of time in the open air. It does not, therefore, relax and debilitate, but, on the contrary, it invigorates the system, and has a tendency to alleviate all local irritations, and thus to induce a state of repose peculiarly inviting to sleep.

During the periods of puberty, so critical to the female constitution, it will be found eminently serviceable in maturing the organs of the body, in establishing the balance of circulation, and in diminishing that irritability of the system, so productive of nervous disorders.

It has a salutary influence in chlorosis, in all those disorders commonly called female weakness, in gonorrhœa, gleets, in jaundice, chronic affections of the liver and spleen, atonic gout and rheumatism, and in all cases of debility arising from a

long residence in a hot climate. It is a safer remedy than the cold bath, and better adapted to very weak and irritable constitutions that have not sufficient vigour of circulation to resist the overpowering shock produced by cold immersion.

The soothing and refreshing effects of the warm bath caused it to be very generally employed by the ancients to renovate exhausted nature. During the time of the Republic it was a part of the duty of the officers, called Ædiles, to enter the baths, in order to judge of and to regulate their heat before the public in general were admitted.* The temperature, therefore, was considered of consequence. It is probable that 95 degrees was that employed.

The best time for employing the warm

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* See Practical Observations concerning Sea-bathing. By P. A. Buchan, M.D. p. 191.

bath of this temperature, for the purpose of refreshing and invigorating the system, is about two hours before dinner, and the immersion may be continued for the space of twenty minutes, or half an hour. During it, the body should be well rubbed with a flesh brush, to detach every kind of impurity from the skin, and to stimulate the superficial circulation. After the bath the usual dress should be worn, and gentle exercise taken.*

When the warm bath is heated to 98 degrees, it produces different effects, for it stimulates the circulation, accelerates the pulse, encreases the perspiration, and suspends that effort of the constitution requisite to support the animal heat; but which has a tendency to exhaust the strength of

* The fear of taking cold after warm bathing is founded in error.

the body. It is therefore, admirably fitted to retard the progress of old age, characterized by loss of irritability, suppressed perspiration, rigidity of fibre, and diminished energy in all the vital functions. The habitual use of the warm bath at this temperature ought then to be regarded as the most grateful solace of declining life.

"Pleased, on the boiling wave, old Œson* swims,
"And feels new vigour stretch his swelling limbs;
"Through his chill'd nerves forgotten ardours dart,
"And warmer eddies circle round his heart."

DARWIN.

It is an exellent remedy in chronic eruptions of the skin, wherein it acts chiefly as a detergent and sudorific, and it is advantageous as an auxiliary to other

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* The tradition of Œson being restored to youth by the medicated cauldron of Medea, was supposed, by Lord Bacon, to be an allegorical representation of the efficacy of warm bathing in retarding the approach of old age.

remedies, in suppression or irregularity of the menstrual discharge; in swellings of the legs, to which females are liable during a residence at the sea-side; in atonic rheumatism and gout, accompanied with stiffness and swellings of the joints; in slight cases of palsy; in chorea, (St. Vitus's dance,) in tetanus, (locked jaw,) in spasmodic cough, arising from obstructed perspiration, in dysentery, diarrhœa, colics, jaundice, chronic affections of the liver, suppression of urine, and other painful disorders of the urinary organs.

This bath being intended to excite perspiration, it should gradually be heated while the invalid remains immersed in it, till towards 100 degrees; and the time of immersion should not exceed fifteen minutes. The evening will be the most convenient time for it, that the invalid may go to bed immediately afterwards, to assist its operation.

The warm affusion is sometimes substituted for it, and is considered more effectual in reducing a morbid temperature.

The powerful influence of the warm affusion on the sensorium is exemplified in the following case, related by Dr. Gregory, of Edinburgh.

" H. D. a young man in an apothecary's shop in that town, intending to take an ounce of the tincture of rhubarb, swallowed, by mistake, an ounce of laudanum. He immediately perceived his error, and took, as quickly as he could, three grains of tartar emetic, attempting at the same time to bring on vomiting, by irritating the internal fauces. Finding his efforts unsuccessful, he took immediately six grains more; and a sudden terror seizing him, from perceiving the effects of the laudanum, he left the shop,

and ran as fast as possible to the doctor's house (but a short distance) for further assistance. The Doctor was in his study when he heard a furious ringing at the hall-door, which was instantly opened, when the young man rushed in upon him with marks of the greatest agitation; before he had time to speak vomiting came on him; and learning the circumstances of the case from the master of the shop, who followed close after, he encouraged the vomiting by warm water, and incessant irritation of the fauces. Experience had taught the Doctor that there was no safety without keeping up the vomiting for a considerable time, and it was continued for half an hour or upwards; at the end of which time the stomach became irritable, and debility and stupor increased upon him; he, however, contrived to walk home, with considerable difficulty, supported all the way. When laid upon a sofa, his eyes appeared suffused and heavy—his pulse was 95, and

rather feeble—and drowsiness, notwithstanding constant external impressions, was fast gaining ground; in this state, several gallons of *warm water* were poured on his naked body, which had the singular effect of removing entirely the drowsiness for about ten minutes, but it returned again, and he could scarcely be kept awake by constant shaking—this agitation however brought back the vomiting, and he threw up some vegetable acid, which had been given him. The *warm affusion* was repeated a second time, with the same effects as the first. The tongue soon after looked white, the skin grew hot, and the pulse rose to 105. The *warm affusion* was repeated a third and last time, immediately after which a very cold fit took place, with great tremor and faintness. He was put into a warm bed, and allowed to sleep, but the disposition to it was gone; about nine hours after the accident he was able to take sago, and fell into

a sleep. In this state he continued throughout the succeeding night, and awoke in the morning languid, but refreshed, and free from all complaint."*

HOT BATH.

This bath possesses a temperature above 98 degrees, and communicates a striking and permanent sensation of heat.

Its powerful and extensive stimulant operation is indicated by the force and frequency of the pulse being increased, the superficial veins distended, the face flushed, the respiration rendered hurried and laborious, and the perspiration augmented by it. If the bath be heated much above this temperature, all these

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* See "An Essay on Warm, Cold, and Vapour Bathing," by Sir A. Clarke, M. D.

symptoms are aggravated, the arteries of the neck and temples throb violently, the bather grows giddy, and is ultimately carried off by apoplexy.

It is, therefore, too dangerous a remedy to be resorted to in ordinary cases of disease; and its use has accordingly been superseded by the vapour bath.

It has, notwithstanding, been found efficacious when partially applied as a hip-bath, in suppressed and irregular menstruation; and as a foot-bath in inflammatory disorders of the head and throat, by causing a determination of blood to the parts immersed.

It is in this manner that dry pumping relieves obstinate rheumatic and paralytic affections of the limbs, and fomentations of the external surface, internal congestions, and inflammations.

VAPOUR BATH

Is simply a hot bath, employed in the form of steam, which being a weaker conductor of caloric than hot water, whilst its actual temperature is much higher, affords the means of applying this stimulus to the body with considerable intensity; and by uniting the two circumstances of heat and moisture, it speedily brings on a copious perspiration, and thus diminishes its otherwise heating effects.

It is therefore a valuable remedy, and, from the comparative ease with which it might be employed, is worthy of public attention. In most of the hot natural waters on the Continent, it forms a regular part of the bathing apparatus, and is there in high estimation.

Its immediate effect is an increase of

activity in the superficial arteries, by which the determination of blood to the internal organs is lessened, and a copious flow of perspiration induced.

It has been prescribed with success in the cold stage of fever, in inflammation of the bowels, in bilious complaints, in obstinate cases of atonic rheumatism and gout; in palsy, in glandular swellings of the neck, and in cutaneous diseases.

In these cases the vapour bath should be taken in the evening, and the invalid should go to bed immediately afterwards, to induce perspiration, which should be promoted by a liberal use of warm drinks.

Should the bath be intended to restore the balance of circulation, and to renovate the system, it should then be employed like the warm bath for the same purpose, about two hours before dinner. The body

should properly be dried and rubbed after it, and gentle exercise be taken in the open air, when its coolness will be found grateful and salutary. The perfect safety of this exposure is satisfactorily shewn by the mode of bathing universal in Russia. The inhabitants plunge at once from the vapour to the cold bath, or expose their bodies to the rigorous frost; and derive, from this sudden transition, a hardiness of constitution which enables them to endure every severity of climate, and vicissitude of weather.

The temperature of the vapour bath may be from 110 to 120 degrees, and the time for continuing in it from ten to forty minutes, according to the circumstances of the case.

MEDICATED BATHS

ARE so called in consequence of their impregnation with some substance belonging to the materia medica. They are numerous, of various temperatures, and have been found of great assistance in the cure of many dieases.

NITRO-MURIATIC ACID BATH.

THE nitro-muriatic acid, recommended by Dr. Scot, for the use of this bath, is made by mixing together equal parts of the concentrated nitric and muriatic acids.

To avoid the inconvenience arising from the fumes, which are evolved on their

coming into contact, and which are extremely prejudicial to the lungs, the acids should be added separately to a quantity of water, equal in bulk to both of them, and put previously into a bottle.

As the nitro-muriatic acid acts very readily on the metals and earths, the vessels employed to contain it should be composed either of glass or of porcelain, extremely well glazed. For the purpose of bathing, however, oblong wooden tubs answer sufficiently well.

The bath may be prepared in the following manner:—To the requisite quantity of water, heated to about 96 degrees of Fahrenheit's thermometer, add so much of this nitro-muriatic acid as will make the bath as acidulous to the tongue as weak vinegar. Should this strength be too irritating to the invalid's skin, it should then be diluted so as merely to occasion a slight sensation of pricking.

The bath may be taken daily, or more frequently, according to the exigency of the disease; and the time of immersion may be from fifteen to twenty minutes.

Its sensible effects are an occasional sense of weakness, some nervous irritation and restlessness, a metallic taste, with pain in some part of the palate or mouth, followed by small ulcerations on its surface, and on that of the tongue, and attended by a considerable discharge of saliva.

These effects resemble those of mercury; but they may be distinguished by their being very transient, by the ulcers being confined to the cuticle, and by the total freedom of the mouth and breath from any offensive smell.

The nitro-muriatic acid appears, according to its advocates, to affect, in a particular manner, the glands, and to alter

their secretions, and thus to be valuable in all disorders connected with derangements of the liver and skin. In these cases Dr. Scot remarks, "that there is no security against a relapse, till the health and strength are fully restored; and that till then, some repetitions of the remedy are necessary."*

SULPHUREOUS BATHS.

These baths are also of various temperatures. The natural hot ones, such as are found at Aix-la-Chapelle, Bareges, &c. on the Continent, are most valuable; for those that are cold, by being artificially heated, as at Harrogate, &c. lose much of their

* See Dr. Scot's paper on the Medical Use of the Nitro-Muriatic Acid, in the 8th. vol. of the Medico-Chirurgical Transactions.

sulphureous impregnation, on which their medical power depends.

They are particularly efficacious in the cure of all diseases the consequence of obstructed perspiration, as cutaneous and bilious disorders. In these cases the sulphureous vapour baths will be found more efficient than the sulphureous water baths.

As England possesses no sulphureous thermal springs, and those on the Continent are inaccessible to the mass of British subjects, in consequence of their distance, and the great expense attendant on a journey to them, it is of importance to possess the power of imitating them. With this chemistry has fortunately favoured us, and enabled us to extend, in some degree, their benefits to every climate.

The following formula for a sulphureous bath was presented to Sir A. Clarke,

of Dublin, by a Freneh physician, as the medicated bath used by Buonaparte. It possesses properties resembling that of the Source Royal at Bareges.

For every gallon of water, take
Two grains of alumine,
Two grains of carbonat of lime,
Two grains of hard Spanish soap,
Four grains of muriat of soda,
Twenty grains of dried carbonat of soda, and
Sixteen grains of the sulphuret of potash.

Grind these materials together, and boil them in as much water as will dissolve them; stir them over the fire, till the sulphuretted hydrogen gas is disengaged, which is known by the smell of rotten eggs; then mix this solution with the water of the bath, previously heated to 96 degrees.

Such are the medical powers of the various modes of bathing. From a review of their comparative excellences I cannot but regret that the warm and vapour baths are so little used in this country, and that the erection of public baths, for the use of the people, has not yet been considered of adequate national importance to attract the attention of the British Government. In the words of Dr. Clarke, "I hardly know any act of benevolence more essential to the comfort of the community than that of establishing, by public benefaction, the use of baths for the poor, in all our cities and manufacturing towns. The lives of many might be saved by them; in England they are considered only as articles of luxury; yet throughout the vast empire of Russia, through Finland, Lapland, Sweden, and Norway, there is no cottage so poor, no hut so destitute, but it possesses its vapour bath; in which all its inhabitants, every Saturday at least,

and every day, in cases of sickness, experience comfort and salubrity. Lady Mary Wortley Montague, in spite of all the prejudices which prevailed in England against inoculation, introduced it from Turkey. If another person, of equal influence, would endeavour to establish, throughout Great Britain, the use of warm and vapour baths, the inconveniences of our climate would be done away. Perhaps at some future period they may become general; and statues may perpetuate the memory of the patriot, the statesman, or the sovereign, to whom society will be indebted for their institution."*

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* See Travels in various Countries of Europe, Asia, and Africa, by E. D. Clarke, LL. D. part I. chap. VII. p. 147.

CONCLUDING OBSERVATIONS.

THE necessity of the due performance of the functions of the alimentary canal, to ensure the beneficial effects of all the mineral waters, or of any mode of bathing, renders the knowledge how to regulate the alvine evacuations, essential to those who either wish to preserve health, or to recover it when lost. One or two motions, then, of a form too well known to require description, of a yellow colour, and of a certain odour, should daily be procured; and for this purpose, it may generally be considered, that during a course of the diluent, diuretic, stimulant, and tonic waters, and of the various baths for the purpose of strengthening the sys-

tem, the saline or vegetable purgatives are proper; but during that of the alterative and detergent waters, and of the warm and vapour baths, when resorted to for the same object; then these aperients may be advantageously combined according to circumstances with the blue pill, Ethiop's mineral, or calomel, with antimony.

The prejudice against purgatives entertained by some people from a notion of their weakening tendency, has, by inducing frequently a neglect of the state of the bowels, been the cause of general derangement of the system. There is no doubt that their abuse, as well as that of every other medicine, is prejudicial; but it is equally true, that a discriminate and judicious use of them is productive of infinite benefit to the constitution. To their utility in the treatment of disease, I can, without hesitation, bear testimony, having, during a practice of ten years, in different

climates, been often indebted to them for many cures, without the occurrence of a single occasion to regret their administration.

Although purgatives are at present more liberally employed than formerly, by physicians, yet, they are too sparingly made a part of general practice. Their action is not confined to the parts to which they are directly applied; but is extended to the neighbouring organs, promoting the secretion, and encreasing the discharge of bile, and the other fluids usually poured into the intestinal canal, and when torpor pervades both the internal and external surface of the body, they contribute, by exciting the due performance of the functions of the former, to the healthy action of the latter, through the sympathy* which exists

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* On this interesting subject, Dr. James Johnson's excellent work "On the Influence of the Atmosphere, &c." may be consulted with advantage.

between them, and which forms a link in the great chain of *functional association.*

The removal then of fecal accumulation from the intestines, is not the sole beneficial effect of purgatives, for they assist materially in restoring both the balance of circulation and of excitability. From the indications which they are thus capable of fulfilling, their utility in medical practice is obvious. In acute diseases they afford the means of prompt and copious depletion, and in chronic, they are not less serviceable by removing the vitiated and irritating contents of the alimentary canal.

There exists frequently a morbid state of this viscus occasioning a retention of its contents, which is not to be removed by the occasional administration of a cathartic; but which requires a continuation of its operation in a mild degree, until the healthy state of the bowels is restored. This

is commonly the case in fevers. On this account I am in the habit of prescribing through their whole progress, purgatives, so as to produce daily, complete and regular evacuations. In the remittent and intermittent fevers of India, in scarlet fever, and in some of the worst cases of typhus, which have been under my care in the Fever Hospital, I have seen decided advantage from this practice.

It applies equally to a great variety of chronic diseases, which will be found to depend on, or to be intimately connected with, this torpor. Hence the general utility of the saline and sulphureous mineral waters, which may be employed for days, and weeks, under circumstances of apparent great debility.

All cathartics have not an equally extensive range of action. Some, like jalap, stimulate the whole length of the intestinal

canal; and others, as aloes, principally the rectum.

There is some difference, also, in their mode of operation. Some act mildly, as castor oil, without causing any general excitement of the system, or without even stimulating perceptibly the vessels of the intestines. These evacuate, therefore, the mere contents of the canal. Others are more active, occasioning an influx from the exhalant vessels, and the neighbouring secretary organs, and extending their stimulant effects as has been stated to the general system. These, if taken in too large a dose, are apt to excite much irritation, and even inflammation on the surface of the bowels. Calomel is perhaps the best of this description of purgatives. It emulges most effectually the biliary ducts, dislodges scybala, and corrects morbid secretions. It is peculiarly suited to hepatic derangements. I have found it, combined

with rhubarb, an excellent remedy. In some cases I have substituted the blue pill, and have occasionally known it, more efficacious than calomel, in promoting the discharge of bile.

The saline purgatives being less irritating than the resinous, and having a very general and prompt action, are indubitably the best for common use. They may be taken like the aperient mineral waters, for a considerable length of time, without debilitating the constitution.

To the valuable observations of Dr. Hamilton, of Edingburgh, on the importance and extensive application of purgatives, the public are indebted for this improvement in medical practice.

Whatever may be the remedy, it must not be forgotten, that a strict observance

of a judicious regimen, of daily exercise in the open air, and of regular habits of life, will greatly assist in the re-establishment of health.

FINIS.

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