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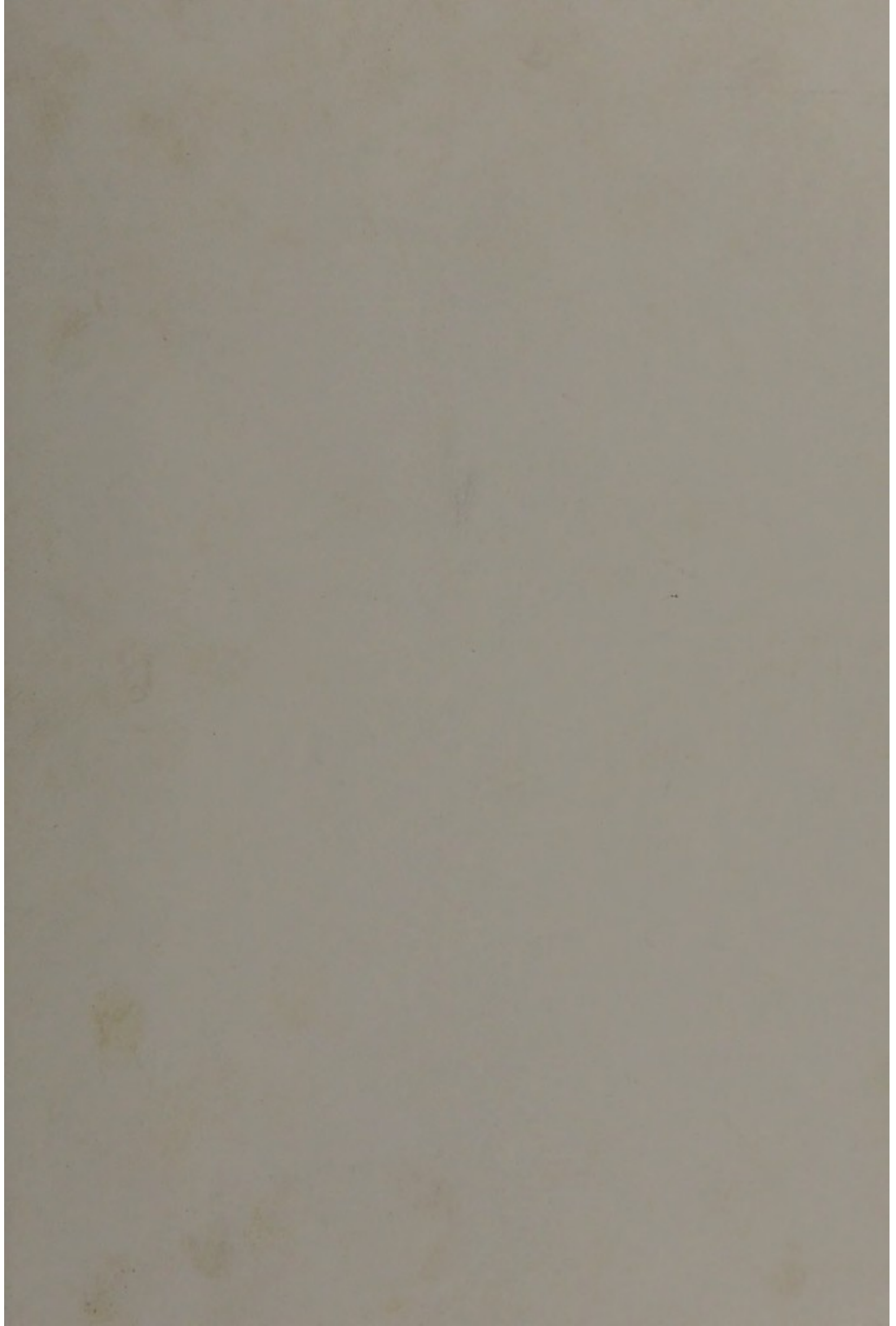
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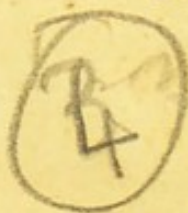




To Mr. Tait
with Mr. Lyall's Consent

AN

ESSAY



ON THE

CHEMICAL AND MEDICINAL QUALITIES

OF THE WATER OF

CANDREN WELL,

IN RENFREWSHIRE :

WITH INTRODUCTORY OBSERVATIONS ON WATERS

IN GENERAL.

BY

ROBERT LYALL, SURGEON,

*Corresponding Member of the Literary and Philosophical
Society of Manchester, &c. &c. &c.*

PAISLEY :

PRINTED BY J. NEILSON,

1814.

ESSAY

CHEMICAL AND MEDICAL QUALITIES

OF THE

AMBER OF WIND

BY

JOHN HARRISON

OF THE UNIVERSITY OF CAMBRIDGE

IN A DISCOURSE

DELIVERED AT THE PUBLIC EXERCISES

ON THE 15TH OF JULY 1751

AT THE UNIVERSITY OF CAMBRIDGE

BY

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P R E F A C E.

THE object of the following Essay is to treat of the chemical and medicinal qualities of the Candren Well Water. After a few preliminary observations on waters in general, and on mineral waters, I have given, 1. The history of the Well. 2. The analysis of the water, 3. An account of its medicinal powers, and manner of using it. 4. I have stated the diseases in which it is likely to be useful. And, lastly, I have added a few words on air, exercise, diet, &c.

The analysis of mineral waters, it is acknowledged by all, is one of the most difficult and complicated processes in chemistry; it is therefore with diffidence I present the public with the following analysis of the Candren Well, though I have spared no labour in

making or repeating experiments, so as to obtain accurate results. I have additional confidence in my analysis, on account of most of the experiments having been made with a set of accurate tests, kindly presented to me by my friend, that distinguished Chemist, Dr. Henry of Manchester. The details of the most important experiments are stated, so that any who examine this water, may see the method I have followed, and the data from which I formed conclusions.

Paisley, 24th June 1814.

AN

ESSAY

ON THE

CHEMICAL AND MEDICINAL PROPERTIES,

&c. &c.

General Observations on Water.

WATER is so necessary for the existence of Man, all animals, and vegetables, that it has attracted serious attention in every age. It is well known, even to the most illiterate, that waters differ materially from each other, in their source, appearance, colour, smell, and taste; and accordingly they speak of rain water, river water, spring or well water, sulphur water, iron water, brackish or salt water, &c. But the most comprehensive and common division, is into hard, soft, and mineral waters, which differ essentially, both in their sensible and chemical properties. Soft

water answers every purpose in the preparation of food, and of domestic œconomy, as well as of the arts; while hard waters, which decompose soap, in many cases, are useless, or hurtful.

The difference of waters is occasioned by foreign bodies suspended or dissolved in them. Some waters contain so small a quantity of foreign ingredients, as to require chemical tests, in order to discover them, as they have little influence on the taste or other properties of water; and these are generally reckoned *pure waters*, though it is admitted, that water in its natural state has never been found in a complete state of purity. Other waters, on the contrary, hold so many foreign matters in solution, that they are rendered unfit for the common purposes of life, or of manufactures. When the foreign ingredients are very abundant, the waters in general acquire medicinal properties, and are then called *mineral waters*. Besides differing, however, in their chemical qualities, waters are found to possess very different degrees of temperature, and hence are distinguished into hot, warm, and cold springs.

At the common temperature of our atmosphere, good water is a colourless, transparent fluid, without smell, has very little taste, and, in general, the lighter it is, the nearer purity. It assumes the solid form, or becomes ice, by a low temperature, and is converted into steam, by a high temperature; but resumes its fluid state, whenever the temperature is properly moderated.

Water is most extensively diffused. Besides forming the sea, rivers, springs, wells, &c. it exists as a constituent part in all animals and vegetables, and forms the basis of all their fluids and secretions, and indeed of most of the excretions: it is a component part of the atmosphere, and enters into the composition of many minerals and salts, and even of the most solid rocks.

Water was considered as a simple body, and reckoned one of the elements, by the ancients: but the discoveries of modern chemistry have enabled philosophers to ascertain, that it is a compound fluid, that is, composed of more ingredients than one. It is formed of two airs, or gases, viz. Inflammable air, (which occurs so frequently in coal-pits) and of vital

air, which, when united in certain proportions, assume the fluid state.

1. Rain water, when collected in the country, as it falls from the heavens, after it has rained some time, is the purest of all natural waters, and is so nearly of the same specific gravity as distilled water, that it requires the utmost accuracy to determine the difference. When collected, at the commencement of the rain, in towns, or as it falls from the roofs of houses, rain water is contaminated with soot and other impurities; the smell and taste of which it long retains. Under such circumstances, if long kept, especially in warm climates, it acquires a strong smell, becomes full of animalculæ, and in some degree putrid. Rain water, after it falls, either remains on the surface of the earth, forming lakes, ponds, and marshes;—descends along its declivities in streams, which unite to form rivers;—or, being absorbed, penetrates through its strata till it meet some obstruction, when it bursts out, at some depth beneath the soil, forming a spring or well.

2. Ice, or snow water, equals rain water in purity, and, when newly dissolved, con-

tains no air. Thawed snow, although not used in this country, "in cold climates, and in high latitudes, forms the constant drink of the inhabitants; and the vast masses of ice which float in the polar seas, afford an abundant supply of fresh water to the mariner*."

3. Spring waters are very numerous, and vary in quality, according to the soil through which they flow; being either soft, or hard, or saline. Well water is essentially the same as spring water, but generally more impregnated by the soil through which it passes, in consequence of stagnation, or slow filtration.

4. River water being chiefly formed by rain water and spring water, is generally more free from foreign ingredients, and of course softer than spring water.

5. Lake water is merely a collection of rain water, river water, and spring water, and contains more or less of their ingredients. But in many small lakes it is contaminated

* The polar seas are brackish tasted: but when exposed to a moderate freezing cold, it is only the watery part that congeals. *Saunders on Mineral Waters.*

by the decomposition or putrefaction of animal and vegetable bodies, and hence becomes possessed of noxious qualities. The water of extensive lakes, such as some of those in Cumberland, Lochlomond, &c. being much agitated, and having a free and constant outlet, are remarkably pure and well adapted for the purposes of the arts.

Marsh water, being completely stagnant, is still more contaminated and noxious than lake water.

6. The taste and qualities of sea water are so well known as to require no notice here.

Use of Water.

NOT to speak of the use of water for the common purposes of life, in the arts and manufactures, as before remarked, it is essential for the existence of animated beings, and besides entering into the composition of almost every kind of diet, is the best, most useful, and most extensively used kind of drink:—kindly provided for us by Providence.

Water is an essential constituent in the organization of all living bodies; and as it is continually expended during the process of life, that waste must also be continually supplied, and this supply is of such importance, that it is not left to reason, or to chance, but forms the object of an imperious appetite. When taken into the stomach, water acts by its temperature, its bulk, and the quantity absorbed by the lacteals, and mixed with the blood. Water about 60° gives little or no sensation of heat or cold; between 60° and 45° it gives a sensation of cold, generally followed by a glow and increase of appetite and vigour; below 45° , the sensation of cold is permanent and unpleasant, and it acts as an astringent and sedative; above 60° it excites nausea and vomiting. In the stomach, and in the intestines, it acts also by its bulk, producing the effects arising from the distension of these organs, and it is probably in part decomposed by them. It likewise dilutes the contents of the stomach and intestines, thus often diminishing their acrimony, and aiding digestion. The part of it carried into the system by the lacteals, dilutes both the chyle and the blood, and afterwards assists in the formation of all

the secretions and excretions *. “ Water renders every kind of food less stimulating, lessens irritation in the bowels, dilutes the bile when acrid, moderates its stimulus in the bowels, and renders the discharge of the excrementitious part of the food more regular and easy †.”

Water-drinkers are in general longer lived, are less subject to decay of the faculties, have better teeth, more regular appetites, and less acrid evacuations than those who indulge in a more stimulating diluent for their common drink ‡.

Though nobody be ignorant of many uses of water, yet the effect of taking a large quantity may not be generally known. Some can drink a Scotch pint, or even more, of common cold water, without any other effect than quenching thirst. This quantity to some would prove laxative, or increase the flow of urine; but in others it would bring on immediate uneasiness, fulness, and oppression

* Duncan's Dispensatory.

† Saunders' Treatise on Mineral Waters.

‡ Ibid.

of the stomach, followed by cramp, cholic pains, or inflammation; or it might end in severe diarrhoea or looseness, or even affections of the head. Hence the necessity of attending to the rules laid down hereafter, even in using mineral waters.

Mineral Waters.

WATERS, differing materially from common water, in taste, smell, colour, &c. are called Mineral Waters.

Mineral waters occur in different parts of the earth, forming wells, springs, and fountains, sometimes of the temperature of the soil through which they pass, sometimes warm or hot, or even at the boiling temperature. The mineral waters, both of this and foreign countries, have long engaged attention, and have been used both internally and externally, for the relief or cure of diseases.

Mineral waters, like common waters, differ from each other, according to the nature of the ingredients held in solution, and to the

temperature which they possess. Therefore, besides acting on the body in the same manner as common waters, when taken in the same quantity, they have also a specific action, according to the nature of their foreign ingredients. It has been often remarked, however, that the effects of mineral waters are generally much greater than might be expected from the strength of their impregnations, owing no doubt to the circumstance of their great dilution, by which every particle is presented in a state of activity. The quantity of water taken at the time also assists the operation of these waters, containing purgative salts, by acting as a stimulus to the stomach and bowels by its bulk. Gentle exercise tends so much to keep all the organs of the body in motion, that it greatly assists the operation of purgative mineral waters. This reasoning satisfactorily explains to us the cause why a pint of the Candren water, although not containing much more than 110 grains of a compound salt, is for most constitutions an over-doze, or, if taken, purges repeatedly.

We shall now give the history of the well.

CANDREN WELL.

THE Candren Well is situated between two and three miles northwest from Paisley, nearly at the termination of a plain of considerable extent from east to west, with gentle elevations, surrounded by hills not far distant, on the south and west. The air is pure, the situation healthy, and the surrounding soil is highly cultivated. Pleasant walks abound in the neighbourhood, and the views are extensive, varied, and delightful.

No houses are as yet erected in the vicinity of the well, but invalids or visitors, who come from a distance, will find accommodations in Paisley, Johnstone, or Linwood. It is to be hoped that the attention of the noble proprietor, Lord Douglas, will be drawn to this well, and that he will find pleasure and interest in erecting buildings for the accommodation, convenience, and comfort of strangers. A handsome building should enclose the well, and a number of trees should be planted, so as to render this spot an agreeable and useful place of resort.

For many years past pigeons have been observed to collect daily in great numbers in the site of the well, the reason of which was not understood till the saline nature of the water was discovered*. Saline depositions had also been noticed last year on the sides of the ridges and holes in the fields, after a long continued drought, but excited no other attention than as an object of curiosity. A lad, who resides in the neighbourhood, while at work in April 1813, being very thirsty, accidentally took a draught of the water from a hole, and perceived it to have a strong saline taste. He mentioned this circumstance to the neighbours, who, being in Paisley, communicated it to some of their acquaintances. The water was then brought to Paisley in bottles, and tasted by a great number of individuals. At this time Dr. Rodman exa-

* “ The usual way to entice pigeons to remain where they are intended, is to place what is called a *Salt-cat* near them; that is composed of loam, old rubbish, and salt, and will so effectually answer the purpose, as to decoy them from other places, and is therefore held illegal.” *Encyclopæd. Brit. Article, Columba.*

mined it, and stated that it was of the same nature, but stronger than the water of Pitcaithly Wells, in Perthshire, which have acquired so much fame.

The water excited more attention last spring; and, within this month, a regular well has been formed, and a pump placed in it by Mr. John Rowan, who has a lease of the ground. He has also erected a temporary building round it.

The well is ten feet deep, and fully five feet in diameter. In digging it, they cut through about a foot of common soil, four feet and a half of a brownish black soft clay, containing a great number of bivalve shells, many of which were decomposed, and about two feet of variegated clay. They then came to a very soft greyish coloured clay, which was so tenacious as to admit of being rolled off in layers. This was succeeded by about two inches of loose gravelly soil; and, at the depth of ten feet, they met with a sandstone rock, through the fissures of which the water sprang up freely to some height, especially on the east side. It is calculated that, even in dry weather, the spring yields above fifteen

gallons per hour. On the east side the water at times still rises through the earth, where it is proposed to dig another well.

This water, at first, being collected in small holes and ridges, exposed to the air and heat of the sun, varied greatly in strength. In drouthy weather it was found much stronger than after heavy rains, and therefore people differed widely in opinion as to its qualities and effects, according to the state in which they found it. Being now covered, and raised by a pump, it may be obtained in its natural state, and free from impurities, but so many visitors attend the well, that it is often emptied, and the sediment greatly disturbed at the bottom. So anxious are they, however, for the water, that they very improperly take it when milky, or even muddy, and time cannot be got for cleaning out the well.

The water of the ditch adjoining to the well is quite fresh.

ANALYSIS

OF

CANDREN WELL WATER*.

THIS water is transparent and colourless, when drawn very early in the morning. It has no smell. Its taste is saline. Its temperature 50° to 55° . Its specific gravity is to distilled water as 1140 to 1000.

Exp. 1. When solution of sulphate of iron is added to the water, and kept in a corked bottle, on standing a yellowish brown precipitate falls down, shewing the presence of oxygen; but in no greater quantity than enters into the composition of the common air, which this and (snow water excepted) all waters contain.

2. It decomposes solution of soap in water, or in alcohol, and flakes immediately swim on

* The water was analyzed in June, in a dry season.

the surface, indicating that it is, what in common language, is called a very hard water.

3. It gives out no gas or air, when the mineral acids are mixed with it.

4. Iron filings were added to a bottle of the water, which was well corked. After standing eighteen hours, it was not affected by tincture of galls nor prussiate of potash.

These Experiments (3d and 4th) indicate that it either contains no free carbonic acid, or in very small quantity.

5. Lime-water, added sparingly, has little or no effect; in equal quantity, milkiness is produced, and a small precipitate falls down, soluble in muriatic acid, with effervescence. This shews the presence of carbonic acid, not combined with a base, or combined in excess.

6. Infusion of litmus, or paper stained with radish scrapings, undergo no alteration, which leads us to conclude that there is not much free carbonic present, and that there is no mineral acid.

7. Muriate of lime has no effect, indicating the absence of alkaline carbonates.

8. By boiling the water for fifteen or twenty minutes, a small precipitate falls down, soluble with effervescence, in muriatic acid. This demonstrates that the water contains a carbonate, or rather a super-carbonate. The precipitate was found to be carbonate of lime.

9. Paper stained with turmeric, is not changed in colour, so that it contains no alkali or pure earth.

10. Tincture nor infusion of brazil wood, nor paper stained with brazil wood, are affected;—nor is litmus paper reddened by vinegar, restored to its blue colour by the water; which would indicate that no alkaline or earthy carbonate is present. Experiment 8th, however, shewed the presence of an earthy carbonate; it is therefore in so small quantity as not to affect the above re-agents*.

c

* In making experiments with infusion of brazil wood, great care must be taken to avoid deception, for when the alkalies or their carbonates are added

11. Tincture of galls, {
 12. Prussiate of potash, { are not affected.

This demonstrates the absence of iron.

13. Muriate, nitrate, and acetate of barytes cause milkiness, and, on standing, a white precipitate is deposited, insoluble in muriatic acid; shewing the presence of sulphuric acid.

14. Acetite of lead, produces a copious precipitate, insoluble in muriatic acid, but soluble in acetic acid, also indicating the presence of sulphuric acid, or muriatic acid, and at the same time, the absence of boracic acid.

15. Nitrate of silver instantly causes a very copious, flaky, white precipitate, which becomes dark coloured, and is insoluble in nitric acid: Sulphate and nitrate of silver produce cloudiness and a precipitate, which blackens

to it, by transmitted light, the mixture appears red, orange, or yellow coloured, and, by reflected light, it seems of a lighter or darker blue, according to the strength of the infusion, and the quantity of alkali used. Are the preparations of brazil wood capable of detecting as minute quantities of the alkalies or alkaline and earthy carbonates, as some represent?

as it falls. These experiments indicate, that the water contains muriatic acid.

16. The addition of sulphuric acid has no immediate effect, so that the water contains no barytes.

17. Oxalic acid, and oxalate of ammonia, cause a white precipitate, shewing the presence of lime.

18. The alkalies, and carbonated alkalies, produce a white precipitate, indicating the presence of an earth, or earthy salts.

19. The precipitate caused by pure ammonia, is insoluble by boiling in pure potash.

20. Carbonate of ammonia was added to a portion of the water, till no farther precipitation ensued; the liquor was filtered and heated to near the boiling temperature, and then pure ammonia was added, which caused a flocculent precipitate. This precipitate was also insoluble when boiled in potash.

These experiments (19, 20.) permit us to conclude that the water contains magnesia.

22. The water evaporated to dryness, leaves a salt, soluble in muriatic acid, exhibiting the absence of silica*.

Most of these experiments were repeated on the water, after it had been boiled for fifteen or twenty minutes, and when reduced by evaporation to one half or even less of its bulk, with nearly the same results.

It is to be understood that every precaution recommended in the chemical works here referred to, was carefully observed, before drawing any conclusion from the result of the experiments †.

Having discovered by these experiments that the Candren Well Water contains car-

* If the water be examined after it has been much disturbed at the bottom of the well, it has a milky appearance, and contains both alumina and silica, mechanically suspended. If it be evaporated, of course these earths will be mixed with the compound salt. Alumina and silica exist in the soil around the well.

† Thomson's system of Chemistry.

Henry's Elements of Experimental Chemistry.

Saunders on Mineral Waters.

bonate of lime, sulphuric acid, muriatic acid, lime and magnesia; and by decomposing the compound salt, obtained by evaporating the water to dryness, that it also contains soda; my next object was to ascertain the manner in which these ingredients are combined, and the proportion which the combinations bear to each other in a given quantity of the water.

To give a detail of all the experiments performed, with these views, would be very tedious; and useless, as the processes followed are contained in the Chemical Works already referred to.

A wine gallon of the water, evaporated to dryness, yields 220 grains of a compound salt, which is at first extremely pungent to the taste, then saline and bitter. It deliquesces readily when exposed to the air.

Of these 220 grains

8	are	carbonate of lime.
5	sulphate of lime.
30	(epsom salt)	sulphate of magnesia,
27	muriate of magnesia,
40	muriate of lime.
110	(common salt)	muriate of soda.

220

The salt procured by evaporation to dryness, is of a greyish or brownish colour. It may be obtained pure white and crystallized, by evaporating a gallon to three or four gills, allowing it to stand till any sediment subsides, along with the carbonate of lime, and then evaporating to half a gill or less, and pouring out the liquor into a shallow dish. On cooling, the crystals form, mostly of a cubical shape.

Mode of Action, and Manner of using
THE WATER, &c.

BY the experience of an immense number of individuals, who, being in good health, drank this water out of curiosity, it is completely ascertained that it possesses laxative or purgative qualities, according to the quantity used, the constitution of the individual, and the state of the body at the time. If used properly, in due quantity, and at a proper time, in many cases it purges easily and efficaciously in half an hour or an hour.

Sometimes it operates in a few minutes ; and sometimes not for two or three hours. In many individuals, besides acting on the bowels, it produces an increased discharge of urine, and, in some constitutions, tends to promote perspiration.

Those in health, who wish the water merely to act as a laxative, find it necessary to drink from four to eight or ten gills ; but, when they wish it to purge smartly, they use from eight to fourteen gills, or even take a Scotch pint. Those of a loose habit are purged smartly by six or eight gills, while those of a costive habit, or robust constitution, require a Scotch pint or three choppins, to have the wished-for effect. I have heard of some individuals who have drunk above three choppins, with scarcely any effect. This is what might be expected : for purgative medicines require to be given in triple dozes to some people of particular constitution and habits. Who does not know, for instance, that an ounce, or ounce and half, of common salts is generally a sufficient doze ; but that two ounces will not affect some individuals in the smallest degree, while half an ounce purges others violently ?

Valetudinarians, particularly if much debilitated, will find four, six, or eight gills a sufficient doze; but that they may not injure themselves, they should always commence with a small doze, and ascertain how the water affects them, and then regulate the quantity. If they are continuing to drink of the water daily, a much less quantity will be found in general to have sufficient effect, after the third or fourth, than on the first and second day. As happens with most purgative medicines, costiveness sometimes follows the use of a single doze of this water, which may be completely prevented by taking a small quantity for two or three succeeding days.

That the water may not produce uneasy feelings, or prove hurtful, great attention must be paid to the following directions.

Never commence drinking when much fatigued, when very warm, or under a perspiration, nor when chilly or cold.

Suppose it be intended to drink eight gills altogether in a morning, let two gills be taken at first, and then walk about for a few mi-

nutes—drink other two, then walk, and so on alternately, drinking and walking, till the whole quantity be used. This prevents that fulness, oppression, and coldness of the stomach complained of by some. The whole quantity intended being drunk, keep walking about for some time, which will greatly facilitate the operation of the water.

Those who find any uneasiness from taking the water cold, in the dozes recommended, may warm it to their pleasure. Those of very costive habits may add a little epsom salt, or even common salt, to the water to assist its operation.

From the nature of its contents, I am certain the Candren water, in proper dozes, may be used daily without impairing the digestion, or the strength; on the contrary, I am confident it will in general improve the spirits, appetite, and general health.

I am aware that immense quantities of some mineral waters are used daily, yet I would advise people to proceed with caution in drinking the Candren water. Some have taken a gallon of it in the course of a day, and

others such quantities daily, as have brought on and kept up severe purging, which has been attended with uneasy feelings, and loss of strength*.

The time best adapted for drinking the water is in the morning, or about noon, when the stomach in general is not overloaded with food or drink; for the emptier the stomach is, the more speedily and efficaciously will the water act on the bowels. Some prefer taking half the quantity on going to bed, which they work off by means of the other

* Though I have given this caution, and know that there is less danger in drinking a large quantity of this mineral water, than of common water, as in general it will soon stimulate the bowels, and work its way out of the body; I may mention that, at Pitcaithly wells, it is not uncommon to drink from three choppins to a gallon in a morning, and, at Moffat, (a water similar to the Seedhill well) the common people frequently take, in one morning, from three to five Scots pints, (or from six to ten English quarts) and one individual, in eight hours, swallowed the enormous quantity of thirty-two English quarts, without feeling any other inconvenience than a slight giddiness and headach.

Saunders on Mineral Waters, p. 338.

half in the morning. This method may suit some individuals, but cannot be generally recommended;—one half, however, may be taken before breakfast, and the other half at noon, and thus delicate people may use it.

The end of spring, the summer, and autumnal seasons, are the periods best adapted for using this water at the well.

Diseases in which the Water is likely to be useful.

BESIDES primary diseases of the stomach and bowels, there are few internal or external complaints, of any duration, in which they are not sooner or later, attended with diminution or loss of appetite: and it may be laid down as an almost invariable truth, that according to the regular or irregular action of the stomach and bowels, the person is healthy or unhealthy.

It is a common opinion, that the more you use purgative medicines, the weaker you become, but this is a false idea, for it is well

ascertained by medical practitioners, that in many complaints, nothing contributes so much to the restoration of health and strength, as the repeated use of laxatives or purgatives. Accordingly, purgative medicines, being well fitted for overcoming the morbid action of the stomach and bowels, have been of late years most extensively used in the treatment of diseases; and have been highly recommended by a medical gentlemen of the first ability, and of long experience, Dr. Hamilton of Edinburgh.

The Candren water being an effectual saline laxative or purgative, and very easy in its operation, may, of course, be used in a great variety of diseases.

Though I have already seen some who have benefited by the water, it would be premature to point out with confidence, the diseases in which it will be found of advantage. Time, I have no doubt, will make known its efficacy. Judging, however, from the nature of its contents—its mode of operation—and its approximation, in composition, to some celebrated waters, the effects of which are well known in relieving or curing diseases, or

bracing a constitution relaxed by confinement, sedentary employments, or intemperance, I shall at present slightly notice the complaints in which this water may be tried with the expectation of giving relief, or completing a cure.

1. *Scrophulā*, or King's Evil, is a disease unfortunately too well known in this country. It attacks, or rather makes its appearance in general, during childhood, or before puberty. It appears in some form or other in almost every part of the body: hence we see scrophulous tumours, boils, and ulcers, in many different situations—scrophulous ophthalmia, (or inflammation of the eyes) and tenderness and inflammation of the eye-lids—white swelling of the joints—diseases of the bones, &c.

The Candren Water may be used for a considerable time in such quantity as keeps the bowels moderately loose, having been previously evacuated by a larger doze. The water may also be used cold or warm, for bathing the ulcers. When used as a bath for the eyes, it will generally be found most beneficial when milk-warm. If used for white

swelling of the joints, it should always be warmed.

2. This water may be used daily for indigestion, and indeed for most stomach and bilious complaints, in regulated quantities.

3. For eruptions of the skin, (called scorbutic) the water may be taken internally, and used externally as a bath, either locally or generally.

4. It will probably relieve gravellish diseases, particularly if it act by increasing the secretion and discharge of urine.

5. Its effects may also be tried for that very common disease, *Hysterics*, as well as for hypochondriacism and melancholy, in small quantities. Exercise in the open air, and cheerful company, are of so much importance in these diseases, that they should always be attended to.

6. Its good effects have already been ascertained, when taken in the morning, after a previous debauch; and there is no doubt that, if taken in due quantity, it will be ser-

viceable to those who have led a life of intemperance.

7. There are many chronic diseases, in which this water, if aided by country air, exercise, &c. will prove highly beneficial.

On Air, Exercise, Diet, &c.

THOUGH there can be little doubt, from the nature of their composition, that mineral waters possess medicinal properties, and prove highly beneficial in many diseases; yet it need not be concealed, that valetudinarians, in general, are at the same time greatly benefited by change of air, exercise, &c. independently of the use of the waters. It is therefore by attention to these circumstances, at the time of using the waters, that a speedy restoration to health and strength may be expected, and hence the cause why those going from a distance to any mineral well or spring, have the most chance of deriving advantage. Their hope is generally high of being restored to

health, they experience a change of air, they obtain exercise, many new objects attract the attention, and employ the mind agreeably, and in general being free of worldly care for a time, they devote themselves, as far as their state permits, to enjoyment.—They meet with pleasant society, with whom they pass their time, in visiting, walking, drinking the waters, gaming, and in other amusements, all conducive to the return of health; whereas those in the neighbourhood of the wells, being near the scene of all their cares, have their minds more anxious, and do not attend sufficiently to the benefits of air, exercise, amusements, or cheerful society.

It is impossible to lay down rules which will be applicable to every case, with respect to diet or exercise, &c. The following, however, will generally be proper.

Exercise should be taken in such degree as not to produce fatigue.

Those who are able to walk about, will find it advantageous, in good weather, except very early in the morning, or in the evening.

Those of a very delicate constitution, or who are much debilitated by disease, should not go out of doors before breakfast, except in very warm weather.

Light nutritious diet will, in most cases, be requisite; but the regulation of this must depend on the age, the constitution, the habits, and disease of the individual.

It may be stated as a general rule, that invalids should wear a quantity of clothes, that neither oppress them, nor allow them to feel chilly or cold.

APPENDIX.

Seedhill Well Water, Paisley.

IT is transparent, when newly drawn, but very soon acquires a blueish milky appearance. It exhales strongly the odour of sulphuretted hydrogen gas, or of rotten eggs, but soon loses it.—Its taste is sulphureous.—It slightly curdles solution of soap in water, but soap in alcohol merely causes blue cloudiness, so that it is rather a soft water.—Lime water, and tinc-

ture of litmus, are scarcely affected.—Turmeric paper, infusion of brazil wood, tincture of galls, nor prussiate of potash, are changed.—Muriate of barytes causes a little cloudiness.—Nitrate of silver produces great cloudiness, and a greyish brown precipitate is deposited.—Acetate of lead has the same effect, but the precipitate is of a grey colour. Oxalic acid, and oxalate of ammonia, cause perceptible cloudiness, and very little precipitation.

The Seedhill water is similar in composition to that of Moffat (except that it contains a little carbonate and sulphate of lime), and, had it been a few miles distant from town, it is probable it would have been as much famed for the cure of diseases.

Seedhill water containing few foreign ingredients, and being deprived of its sulphuretted hydrogen, by boiling, and also of its carbonate of lime, becomes remarkably pure, to be well water:—Hence we account for the high estimation of this water in rapidly extracting the strength of tea; for the purer water is, the more solvent power does it possess.

Dr. — examined the Paisley waters in 1808, and, after stating that their chief heterogeneous ingredients are sulphate of lime, or gypsum, and common salt, gives the following table, except of Canal-street well, and Cart water, which I have added.

1. Foot of Sneddon, moderately pure.
2. Quay-lane, less pure, though still tolerable.
3. Head of Hospital-lane, little worse than No. 1.
4. At Hope Temple, the same as No. 1.
5. Balcony, intermediate between No. 1 and 2.
6. Seedhill, the same as No. 3.
7. Foot of New-street, very much contaminated with
gypsum.
8. Cumberland, a little purer than the preceding.
9. Mr. Love's, New-street, very much loaded, worse
than No. 7.
10. Bailie Stow's, moderate.
11. P. Wright's, foot of Storie-street, very pure.
12. Storie-street, in George-str. moderate, but purer
than No. 10.
13. Do. near the middle, the same purity as No. 2.
14. Mr. Bissland's, Ferguslie, considerably purer.
15. At Ferguslie, leading to Maxw. similar to No. 12.
16. Head of West-street, moderately pure.
17. Cowieston, a little muddy, but not strongly saline.
18. Back-row, Sandholes, as bad as No. 7.
19. Back of Queen-street, rather worse than No. 7.
20. Castle-street, a little better than No. 7.
21. At James Urie's, medium purity.
22. Lady-lone, medium purity.
23. Mr. Barclay's, pretty pure.
24. Mr. Gibb's filtrated water, very pure.
25. Lone-end spring, nearly the same.
26. Canal-street, same as No. 8.
27. Cart water, very pure.

All the Paisley well waters also contain carbonate of lime, which is easily ascertained, by scraping a little of the earthy incrustation, or *furr*, from the inside of the kettles in which they have been boiled. It will be found to effervesce, when muriatic acid is poured on it. The furr is partly carbonate, and partly sulphate of lime. Cart water, as might be expected, (see p. 9.) is very pure, especially when taken from the river before it enters the town, except in very wet weather.

	Atmospheric air,	Carbonic acid gas,	Sulph. hydrog. gas,	Azotic gas,	Carbonate of lime,	Sulphate of lime,	Muriate of soda,	Muriate of lime,	Muriate of magnesia,	Sulphate of magnesia,	Specific gravity,	
East Well.	4	8		5	5 $\frac{1}{2}$	100	180				216	
West Well.	4	8		5 $\frac{1}{2}$	5	92	168				198	
Spout Well.	4	6		5	3 $\frac{1}{2}$	82	146				172	
Dumbarny Well.	4	5		5 $\frac{1}{2}$	3	57	102				124	
South Park Well	4	5		5	3	44	84				98	
Candren Well.	6	4		8	5	110	40	27			140	
Moffat Water.		5	10	4		36						
					Grains.				Cub. inch.			

TABLE, shewing the contents in a wine gallon of the Paisley, Dumbarny, Candren, and Moffat Mineral Waters.

FINIS.

J. Neilson, printer.



