

that the circulation should occasionally show the evidences of marked, and even fatal disturbance, but that the nervous system attacked from so many directions, should, as a rule, triumph over the adverse forces. In the old days of torture, shock often mercifully put an end to the victim's anguish. Women in childbirth are at times subjected to pain exceeding that of the rack and the thumb-screw. Now it is not sound pathology to ignore these facts, and to banish as unworthy of consideration a well established pathological condition, simply because in the days of ignorance the terms exhaustion and shock were indiscriminately employed to explain a multitude of cases, which, with our present enlightenment, we know are due to the entrance of air into the circulation and to pulmonary embolism. As the nervous organization of women loses in powers of resistance as the penalty of a higher civilization and of artificial refinement, it becomes imperatively necessary for the physician to guard her from the dangers of excessive and too prolonged suffering. Especially I would raise my voice in warning against the current opinion that the length of the first stage of labor before the rupture of the membranes is a matter of indifference, a teaching which I believe has cost the lives of many women; in a few, death resulting from shock; in more, the exhausted condition in which the woman is left after childbirth rendering her an easy prey to the perils of the puerperal state.

THE THERAPEUTIC USE OF MINERAL WATERS.

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It is always a question how much of the benefit experienced by invalids who visit springs and water cures is due to the water and how much to the change of air, scene, occupations, diversions and living. Doubtless both are important. That much is due to the change must be evident to any one who has observed the remarkable effects upon a chronic invalid of a vacation from effort and a journey from home. A few weeks spent out of the usual routine of cares and perhaps drudgery, in rest and amusement, will nearly always put new life into the chronic invalid not yet past recovery or improvement. But the water drank and the baths taken are often, and may nearly always be, of great advantage to the sick. Invalids make all sorts of mistakes in the use of both, often drinking too much or too little water, and taking too many baths or too few, or at improper times and in the wrong way. But, with all their mistakes, they receive a balance of positive benefit whose value it is impossible to calculate. Moreover, they receive **benefits** that no one from a study of the chemical analysis of the waters would expect. Nor can the help derived always be explained by any known

effects of the chemical ingredients of the water in any doses or taken in any way. Artificial compounds made to imitate as nearly as possible the composition of the natural waters have frequently failed utterly to produce the same effect on the sick.

Mineral waters are therapeutic agents; they cannot all be used with benefit in the same way nor in a given state of system, and care and judgment are required in their use as in that of other therapeutic agents.

The different kinds of mineral waters. Waters may be classified as well as foods or drugs or clothes, but none of the classifications in vogue are entirely satisfactory. Waters in which the alkaline carbonates predominate are called *alkaline waters*. There is usually the greatest proportion of the carbonate or bicarbonate of sodium; in lesser quantities are the corresponding salts of potassium, calcium and magnesium. Other elements may enter which vary the therapeutic capabilities of the water, as sulphate of sodium and potassium, iron, etc. The milder waters of this class are diuretic in their effect, without irritating the kidneys or urinary passages. Of such springs are the Ems, Vichy, Apollinaris.

Saline waters, so-called, are mostly alkaline waters, but contain chloride of sodium in marked quantity. They affect the organism much as the pure alkaline waters do, only if the common salt is in large proportion, the waters are cathartic. The Saratoga springs—a dozen or more in number—are of this class, as are the Kissingen, the Selters and the springs of Manitou, Colorado.

Purgative waters contain the alkalies and the common salt in varying proportions, and in addition, Epsom or Glauber's salts or both, and in quantity sufficient to make them more or less cathartic. Of such are the Carlsbad in Bohemia, the Crab-Orchard in Kentucky, the Hunyadi-Janos in Hungary, and the Pagosa in Colorado.

Chalybeate waters contain, among many other ingredients of differing value, iron in tonic quantity. The Sweet Chalybeate Springs of Virginia, the Pyrmont of Germany, and the St. Moritz of Switzerland are examples.

Sulphur waters, many of them, resemble very closely waters of the other classes named, but they are distinctive in containing sulphur in the form of sulphuretted hydrogen, or sulphuret of sodium, calcium, potassium or magnesium. The Blue Lick Springs of Kentucky, and the Aix-les-Bains of France are good examples of this class.

Hot springs give forth water varying in temperature from 90 to 150° Fahr. Some of them contain minerals that make them valuable on that account, some are indifferent as to minerals and depend for their value entirely upon the heat, and are used chiefly or entirely in the form of the bath. The Carlsbad are mineralized and the Hot Springs of Arkansas are in different waters of this class.

The Calcic or Alkaline Calcic waters, so-called, are but slightly mineralized. The predominating element is some calcic salt, but they all contain more or less of the alkaline carbonates or bicarbonates and most of them some carbonic acid gas. They are nearly or quite tasteless, and their effect on the sys-

tem is in general that of an unirritating diuretic. The Contrexville, Leuk, Wildungen and Bagnères-de-Bigorre waters are old and the Waukesha waters new examples of this class.

Diseases likely to be benefited by mineral waters. Only a few of the many diseases that afflict mankind are susceptible of relief by the use of mineral waters. These are now fairly well understood, and although few, they make a list that is somewhat formidable. The following are among the more notable of them:

1. *Debility* and the digestive and assimilative disturbances attendant upon it. Victims of these conditions are numerous among men and women who work with brain or hands and who have cares. They are the drudges of all sorts who are ever improved by a vacation and whose indigestion and malassimilation always disappear upon an increase of vigor. Some of them are the *anæmic*, bloodless subjects of blood losses and wasting discharges of pus, and who lack recuperative ability; some are chlorotic.

2. The large class of diseases and disorders of the *digestive apparatus*, including: catarrh of the stomach, duodenum and bile ducts; formation of gall stones in the liver, bile ducts and gall bladder; catarrh of the intestines, with alternations of diarrhoea and constipation; constipation and hemorrhoids. From these conditions result perhaps every symptom ever ranged under the designation of dyspepsia.

3. Various *rheumatoid affections*. These are: gout (rare in this country); chronic rheumatism and rheumatoid arthritis or rheumatic gout; muscular rheumatism, and many cases of obstinate neuralgia, including some of sciatica.

4. *Syphilis*, not primary.

5. Certain diseases of the *skin*, such as eczema, psoriasis and pityriasis.

6. *Acute febrile diseases* in which there is a tendency to nephritis, albuminuria, and irritation of the urinary organs from deposits of solid matter from the urine, and from the concentration of this secretion incident to the fever state.

7. *Diabetes mellitus*—perhaps and probably.

8. *Disorders of the urinary apparatus*. Among these are inflammations of the kidneys (certain forms of Bright's disease), inflammation of the pelves of the kidneys, with or without gravel as a cause or a result, inflammation of the ureters and bladder—including catarrh of the bladder in all its multifarious shapes and degrees of severity.

The use of mineral waters in disease. Every chronic invalid who desires to get the best effect from the powers of the springs, should, if possible, visit them and drink the waters there. The change of life involved in such a visit will prove of great benefit, in addition to the good effect of the water.

The patient with *debility* from overwork or overworry, with some *indigestion and derangement of the bowels*, should have a radical change of diet. He should discard all condiments, new bread and pastry, and eat the most digestible and nourishing food, such as milk, stale bread with butter, eggs, oysters, tender meats, plain vegetables and fruits. He should eat slowly and without fluids to "wash down" his food,

and the quantity of the food should be restricted to what can be digested without discomfort.

In choosing his mineral drink he should take a mild alkaline water, either a plain alkaline, or one in which the saline or purgative elements slightly predominate. It must never be strongly alkaline nor strongly purgative, either from the chloride of sodium or the purgative salts.

If the conditions of the case and the character of the water will allow, he should take the water in rather large draughts, for the purpose of securing to some extent a diuretic effect, and to wash out the stomach. If in any case the stronger waters are used, particularly the laxative varieties, of course only a limited quantity can be drank. Yet a slight laxative effect is not objectionable, and is usually desirable.

When the bland waters are taken constipation sometimes occurs. This must be prevented in some way, and a very good way is to add to the morning draught the old-fashioned pinch of salt, or what is much better a pinch of some saline mixture which the physician may prescribe. Such a mixture would need to be varied according to the case, but it should always contain a major proportion of the sulphate of sodium. The patient will soon learn the dose of the mixture that is necessary for his case. No violent or prolonged purgative effect should be permitted.

Patients with *anæmia* and *chlorosis* should be advised to drink an alkaline iron water of only moderate strength, or a mild laxative alkaline water. Waters altogether too strong of iron are often taken by such patients. Chalybeate waters are liable and likely to aggravate any existing congestion of the liver or duodenum, and for this reason they are contraindicated in many cases of malarial anæmia, in which condition such congestions are common. All anæmic patients should have every aid of rest, recreation and change, with a most nourishing, digestible and full diet. Constipation and purgative effects are equally damaging to such cases.

Catarrh of the stomach of the usual form nearly always improves on the use of the alkaline, saline-alkaline or alkaline-purgative waters, with some rest of the organ. The amount of water proper to be taken is, to a certain extent, in inverse ratio to the concentration of the minerals. The bowels must be made to act rather freely, by the water unaided or by some mild laxative.

Catarrh of the duodenum and bile ducts improves on the use of the same class of waters, but a considerable admixture of sulphate of sodium (Glauber's salts) with the alkalies, is of advantage, particularly to the catarrh and congestion of the bile ducts and liver, the jaundice sometimes resulting and the tendency to the formation of gall stones. It is doubtless this salt that gives much of its value to the world-famous Carlsbad waters. If, in chronic cases of the last named disorders, the weaker alkaline waters are selected and anything like constipation should occur, benefit will be found in the addition of an artificial mixture of saline substances such as already suggested, with this difference, that the bicarbonate of sodium as well as the sulphate should enter quite largely into its com-

position. Chalybeate waters usually disagree with these patients, and should not be advised. Many cases of this class of ailments are caused by too much alcohol or some other stimulant, by over-eating or by some other abuse. Such cases are frequently called engorgement of the liver, and they seek the spas abroad and the springs at home in great numbers. A rigid adherence to a simple, unstimulating, and, unless there is debility, a rather low diet, must be insisted on with all such patients. This, with a prolonged use of the alkaline waters, will generally be followed by marked relief. Patients often feel so much improved after a short course of this treatment that they believe themselves to be well, and, returning to their old ways, are soon as bad off as ever. Nothing but patience in the regimen and prolonged use of the waters, or a frequent return to them, will give anything like permanency to the recovery. Many of these patients are plethoric, and can use waters much stronger in alkalies and purgative salts than the anæmic; for the latter the milder waters are preferable. The mistake is often made with the anæmic patient of trying, by violent purgation, to cure a congestion of some of the organs referred to, while the anæmia is growing worse. This is a serious mistake indeed, and it reminds one of a great French surgeon and his female patient with a bad skin disease. He gave her such powerful alteratives that, as the eruption grew less the patient did also, and finally died just as the eruption was disappearing, whereupon the surgeon triumphantly declared that "she died cured."

Jaundice, in the majority of cases, is due to catarrh or inflammation of the duodenum and bile ducts; hence, the relief of these possible conditions is the first thing to be thought of in connection with the treatment of icteroid troubles.

Catarrh of the intestines without constipation will experience more benefit from the mild alkaline or the alkaline-calcic waters than any other, unless there be also anæmia, in which case the element of iron as found in some of the mild chalybeate waters will be a good addition, provided it does not happen to cause constipation. A strong chalybeate water is likely to do this.

Obstinate constipation is benefited by the purgative waters taken regularly, a draught, large or small as required, daily before breakfast. In choosing water for this purpose, it is well to remember that the sulphate of sodium has a better effect on the intestinal mucous membrane than the salt of magnesium.

Hemorrhoids are relieved to a certain extent by anything that relieves or prevents constipation.

The chronic rheumatoid affections referred to are all susceptible of more or less relief by the free and prolonged use of the rather strong alkaline waters, particularly those that are laxative. In some cases, however, the milder waters seem to work better, but there is always benefit in a free action of the secretory organs, especially the skin, intestinal canal, liver and kidneys. Full function of the skin and kidneys may be maintained longer and more continuously by the milder alkaline waters than by any other. To do this rather large quantities must be drunk and they

may be taken continuously for an indefinite time. The body must be kept scrupulously warm at all times with woolen clothing, and wool or silk should be worn next the skin. Greater benefit than comes of drinking the water is derived from a long course of hot baths at the springs. It is not important that the water be mineralized; the indifferent thermal waters work quite as well as any. The product of the Hot Springs in Arkansas is an indifferent water, yet the resort is justly famous for this class of disorders. It is essential that the baths be taken regularly and for a number of weeks continuously. They must be of a uniform and high temperature and the air of the bath-rooms must be hot. It is next to an impossibility to attain all these conditions at the home of the patient, and they are rarely secured by a patient except at the springs. The bath treatment should always be directed as to all its details by a physician.

Syphilis, not primary, is benefited by hot air, hot climate, and hot baths, and the Arkansas resort has a great reputation in its treatment. Improvement occurs in most of the cases that resort to the baths faithfully, but most of the patients take large doses of the alterative medicines of mercury and iodine, while under the bath treatment, so that the results cannot all be attributed to the effects of the latter.

In using mineral waters for diseases of the *skin*, discrimination and care are necessary and it should be done under the advice of a physician. Eczema in certain forms, lichen, psoriasis and impetigo have been relieved by the waters. The sulphur and saline sulphur waters have seemed to do best, but if any catarrh of the stomach exists, which is not unfrequently the case, an alkaline water should be selected. Many cases of chronic skin disease have recovered at the springs, solely through the correction of some disorder of the internal excretory, or the assimilative organs, which had acted as a cause.

Mineral waters are generally supposed to be unadapted to *acute diseases*, or to do them positive harm. This view is irrational. Certain acute disorders receive the greatest benefit from laxatives, and a form of laxative medicine very grateful to many patients is such mineral waters as the Hunyadi, the Püllna, or the Friedrichshalle. To many fever patients the mild carbonated waters are extremely refreshing, and for the nausea and gastric irritability with which the sick are often annoyed, they frequently prove more soothing than anything else.

Such acute febrile diseases as are often attended by congestion of the kidneys and albuminuria may receive considerable benefit from the unirritating diuretic waters. They are grateful to the patient, cause probably an increased discharge of effete matter by the kidneys, dilute the urinary solids and render the passages more safe. The bland alkaline or calcic waters, with a touch of carbonic acid gas, will be found to agree best with such cases.

The water slightly carbonated is more grateful than the plain water, and the carbonic acid gas in small amount is oftentimes soothing to the stomach. Large doses of the gas are irritating. The charged waters as they come from the bottle are often too highly carbonated for a sensitive taste; they are too pun-

gent. When this is the case the water may be allowed to stand for a time exposed to the air to allow part of the gas to escape before using, or it may be briskly stirred with a spoon for half a minute. The patient will easily learn the proportion of gas that pleases him.

In *diabetes mellitus* the alkaline calcic waters may be taken freely, or the milder saline waters less freely, as a palliative. But the patient must subsist on the regulation anti-diabetic diet. Little hope of recovery need be entertained if ordinary diet is used.

Most of the *disorders of the urinary apparatus* are at beginning, and chiefly, irritation or inflammation of the mucous surfaces that are concerned in secreting the urine, in conveying it, in storing it for a time and finally in expelling it from the body. One of the first requirements in the proper management of such affections, is to put the disordered parts at rest and guard them from all irritating influences. Here rest of the parts is only to a very limited degree possible. Efforts must be mainly directed to relieving them from irritation. One of the first steps is to keep the skin uniformly warm, so that a large amount of blood may be retained in the surface of the body, and congestion of the deep organs be prevented. The general health should be maintained in a good condition, that the urine may be as nearly normal as possible. This principle is cardinal, since many of the diseases of the urinary organs are induced directly by the urinary aberrations of general ill health. Another thing to do, and that should never be omitted, is to decrease the irritation of the surfaces due to the urine, by diluting the solid matter thereof. Here is a means of some relief always within reach, and the wonder is, and the regret, that it is not always resorted to. Irritating substances in the urine, and substances irritating solely because they are in a concentrated state, may be made at once innocuous by the free dilution with water that a diuretic action produces. The employment of mineral water for ailments of the urinary apparatus, should be in this direction. Repeated and large draughts of the bland waters may be taken daily for a long time and with uniformly good results, particularly if the general health can be maintained, and the patient be under conditions of good hygiene. The waters adapted to such cases are the unirritating diuretic waters, the mild alkaline or alkaline calcic fulfilling this indication best.

In Bright's disease bodily exercise must be reduced to a low point for the purpose of lessening the labor of the kidneys. A restricted and very digestible diet should be taken, milk being one of the best foods. If the diet is restricted to this article and a large quantity be taken a diuretic action is induced not unlike that caused by the blander waters—the kidneys are, as has been said, washed out and their tubules are flushed. This is the purpose of the waters—to wash out, to flush the kidneys. Here hot baths are useful, but they must be used so as to increase the secretory action of the skin and keep it up to a high point of efficiency. The surface of the body must not be chilled; this is not enough—the possibility of chilling it must be prevented. Hence, hot

air and hot water, warm air and warm clothes must be the rule.

Owing to the great danger of disturbing injuriously the circulation in the kidneys in Bright's disease by a chill of the surface, it is unsafe for the patient to attempt to direct his baths himself. They should be taken under the direction, or better, under the observation of the physician.

How to drink mineral water. Do not drink it very cold unless it is a strong water and the dose is small. The milder waters must be taken in large doses (4 to 12 or more glasses daily) and should be drunk cool, tepid or hot, never cold, as this might hurt the stomach and retard absorption. Many of the stronger waters, especially those that have an unpleasant taste, may be best drunk hot, and, indeed, in the catarrhs of the upper abdominal portions of the digestive tube and in nearly all those conditions that go by the name of dyspepsia there is often great advantage in drinking the waters hot.

The water should in every case be taken slowly; several minutes should be given to each glass. With this precaution, several glasses may often be taken in succession without harm. The best time to drink is before a meal, especially before breakfast and supper. A meal must not immediately follow large draughts of water; half an hour at least should intervene. If any bad effect, like a sense of discomfort or fever should come on while using a water in large doses, reduce the daily quantum at once or stop it for a while altogether.

No discomfort at the stomach should be allowed to follow the taking of even moderate potions of the waters. If such should occur an effort must be made to learn the reason of it. Perhaps the water is taken too hot or too cold, too rapidly or in too large draughts, at the wrong time of day or in wrong relation to a meal. If the cause cannot be discovered and the difficulty corrected, the water is not adapted to the case and should be abandoned.

In this brief synopsis only a few of the more important facts and considerations regarding this interesting subject could be given; much has been omitted that might be said on the subject of baths, partly because much must be omitted and partly because the taking of baths, while often and best done at the springs, is nevertheless not so much a use of mineral water as it is a therapeutic use of hot water and air. Certainly the omission will not be taken as indicating any lack of appreciation of this valuable therapeutic measure.

CHOLERA---ITS DISASTROUS PAST AND ITS MORE HOPEFUL FUTURE.

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The absolute failure in the past to read aright the clearly defined symptoms of this disease has left it, as found to-day, one of the most obscure and incomprehensible of all diseases. The wrong reading of symptoms is indicated by the fact that the rate of