

the simpler cases a saturated solution may be applied, but in epithelioma and cancer the powdered chlorate is thickly placed over the sore. It is said to allay pain, remove fœtor, and promote cicatrization when so applied. The internal use of the salt is recommended in conjunction with the topical application in cancer, epithelioma, and lupus.

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ALKALINE MINERAL SPRINGS.

I. NORTH AMERICA.

Bladon Springs, Choctaw County, Alabama. A rolling, pine-woods region.

They contain carbonate of soda, carbonate of magnesia, carbonate of iron, carbonate of lime, sulphate of lime, carbonic-acid gas, sulphureted hydrogen (traces), and chlorine.

Congress Springs, Santa Clara County, California. In the Coast Range of mountains.

They contain carbonate of soda (15.418 grains to the pint?), carbonate of iron, carbonate of lime, chloride of sodium (14.894 grains to the pint), sulphate of soda, etc. They are highly charged with carbonic-acid gas.

California Seltzer Springs, Mendocino County, California.

They contain carbonate of soda, carbonate of magnesia, carbonate of lime, carbonate of iron (a trace), and chloride of sodium. They are also highly charged with carbonic-acid gas.

Perry Springs, Pike County, Illinois.

They contain carbonate of potassa, carbonate of magnesia, carbonate of iron, carbonate of lime, sulphate of soda, silicates of soda and potassa. Temperature of the water is from 48° to 50° Fahr.

St. Louis Spring, Gratiot County, Michigan.

This water contains carbonate of soda (7.684 grains to the pint), carbonate of magnesia, carbonate of iron, carbonate of lime (5.019 grains to a pint), sulphate of lime (6.925 grains to a pint), silicate of lime, and silica. This is one of the so-called "magnetic springs"—the magnetic property being due not to the water, but produced by the magnetization with terrestrial currents of the vertical iron tube through which the water flows. It is unfortunate that this part of the peninsula of Michigan, in which the numerous alkaline and saline springs abound, is very decidedly malarious.

Buffalo Lithia Spring, of Virginia. Contains well-defined traces of lithia, and is alkaline. This has been used with great advantage in gouty, rheumatic, and renal affections.

The Hot Springs, Bath County, Virginia, contain carbonates of lime and magnesia, sulphates of lime, magnesia, and soda, and chlorides of sodium, calcium, and magnesium. The temperature of the water ranges from 100° to 106° Fahr.

The Warm Springs, Bath County, Virginia, have a composition similar to the hot springs, but the temperature of the water is somewhat less. At these springs, extensive bathing-pools have been constructed. The best results have been obtained from the bathing, conjoined with the internal use of the water.

Berkeley Springs are also situated in Bath County. The waters

are alkaline, of a constant temperature of 72° to 74° Fahr., and are employed by bath and internally.

Rockbridge Baths, Rockbridge County, Virginia. A mountainous region.

They contain magnesia and iron, with a small quantity of iodine. Temperature, 74° Fahr. Used chiefly in the form of baths.

Capon Springs, Hampshire County, West Virginia.

This water contains carbonate of soda, carbonate of magnesia, and traces of iodine and bromine. The temperature of the water is 66° Fahr. These springs are situated in a romantic mountain-region.

Besides the above, there are numerous weakly-alkaline waters, such as Bethesda and others of the Waukesha region of Wisconsin, in Southern Michigan, and in many parts of the United States. It is impossible to mention all of them, and especially to set forth the rather pretentious claims, or recognize the apocryphal cures, so persistently and profusely published by their owners. Unquestionably good results have been wrought by these waters. Besides the positive there are negative virtues in these numerous mineral springs: they take the place of the indiscriminate drug administration which is one of the evils of the time.

#### 2. EUROPEAN.

Vichy, Central France.

There are several springs—*Grande Grille, Puits Carré, Hôpital, Celestins, De Mesdames*, and others. The waters contain carbonates of soda, of potassa, magnesia, and lime, sulphate of soda and chloride of sodium, phosphate of soda, arseniate of soda (a trace), carbonates of strontia and iron. The gas, which is abundant, is carbonic acid.

In the Vichy region there are numerous alkaline springs having similar properties. The temperature of the waters varies from 58° Fahr. (*Celestins*) to 178° Fahr. (*Chaudes Aigues*).

Mont Doré, valley of the Dordogne, France.

The waters are weak alkaline, and have a temperature from 90° to 104° Fahr. Their principal constituent is carbonate of soda. These springs lie among the volcanic mountains of Auvergne, at an elevation of 3,300 feet.

Vals, Ardèche, France.

The waters of these cold springs are remarkable for the quantity of carbonate of soda which they contain. They are abundantly charged with carbonic-acid gas.

Ems, on the Lahn, Germany.

These waters contain, according to the analysis of Fresenius, 14 to 15 parts of bicarbonate of soda, 7 parts of chloride of sodium, and 1.7 part each of bicarbonate of lime and bicarbonate of magnesia, with sulphates of soda and potash, and bicarbonates of iron, manganese,

baryta, strontia, and alumina in small quantity, to the pint. The gas is carbonic acid, from 6 to 8 cubic inches to the pint.

Neuenahr, valley of the Ahr, between Bonn and Coblenz, Germany.

The waters of these springs have a composition similar to those of Ems, but have about half as much soda and very little salt.

Salzbrunn, upper Silesia, near Freiburg, Germany.

These waters are very rich in carbonate of soda.

Gleichenberg, near Gratz, Styria, Austria.

These springs are much more alkaline than Ems. The waters contain from 20 to 27 parts of carbonate of sodium, 19.5 of chloride of sodium, and 7.8 of carbonate of magnesium. The water is highly charged with carbonic-acid gas.

*Therapeutical Uses of the Alkaline Mineral Waters.*—As we have seen that alkalies taken before meals increase the production of acid gastric juice, the alkaline mineral waters are serviceable in *atonic dyspepsia*. They are especially useful in *catarrh of the duodenum and of the bile-ducts*, and in the *jaundice* dependent on this state of the mucous membrane. In *incipient cirrhosis*, in *congestion of the portal circulation*, and in *hemorrhoids* due to the hepatic obstruction, they render important service. *Obesity*, which is frequently diminished by a course of alkalies, is better treated by alkaline waters, for at the springs these patients can be induced, more easily, to conform to the plan of exercise and diet necessary in these cases.

The alkaline springs have long had a deserved reputation for the cure of *gout and rheumatism*. With the internal use of the waters should be conjoined baths, douches, etc. *Gout and rheumatic affections of internal organs* are equally amenable to the same treatment.

These alkaline waters, long used, are especially serviceable in the so-called *lithic-acid diathesis*. There is little doubt that the continuous use of alkaline waters for a long period will cause the solution of *uric-acid renal calculi*. For this purpose those alkaline waters rich in potassa are preferable.

When *diabetes* is hepatic in origin, and occurring in obese subjects, the alkaline mineral waters are extremely useful. A suitable diet should be enjoined.

The following domestic mineral waters may be advised in the above states: Bladon Springs; the California Seltzer; Perry Springs; St. Louis Springs; but especially Capon and the alkaline springs of Wisconsin.

Of the foreign, the most important are Vichy, which is imported at a moderate price, Mont Dore, Vals, Ems, Salzbrunn, and Gleichenberg.

The psychical influences of change of scene, associations, and cli-

mate, are largely concerned in the results of treatment with the waters of mineral springs.

SALINE MINERAL WATERS.

1. NORTH AMERICAN.

St. Catharine's Wells, St. Catharine's, Ontario, Canada.

These contain chloride of sodium (217 to 375 grains to the pint), chlorides of potassium, magnesium, calcium (108 to 127 grains to the pint), sulphate of lime, and iodide and bromide of magnesium. A concentrated water prepared by evaporation is used, properly diluted by patients at a distance for internal diseases, and at the wells, externally.

These waters are diluted with ordinary water to three fourths or seven eighths, before they are drunk. They are chiefly used as warm baths. The diseases in which they have been found most beneficial are *chronic gout, rheumatic gout, chronic rheumatism, and gouty and rheumatic diseases, strumous diseases, engorgement of the pelvic viscera, chronic metritis, uterine fibroids, hæmorrhoids, etc.*

Spring Lake Well, Ottawa County, Michigan.

The water of this spring contains chloride of sodium (50.691 grains to the pint), chloride of calcium (14.177 grains to the pint), chloride of magnesium, carbonates of soda, manganese, and iron, in small quantity, sulphate of soda (5.837 grains to the pint), bromide of magnesium and a trace of lithia.

These waters are applicable to the treatment of *gout, rheumatism, strumous diseases, etc.* The waters are drunk and used as warm baths.

Saratoga Springs, Saratoga, New York.

In general terms, these waters contain chloride of sodium, the alkaline carbonates, and are highly charged with carbonic-acid gas. The springs are numerous, and differ somewhat in composition. I subjoin a tabular statement (see page 207) of the analyses of the different waters, from the excellent work of Dr. Walton.

These waters are useful in *plethora of the abdominal viscera, in obesity, in habitual constipation due to deficient secretion, in plethora of the pelvic viscera, hæmorrhoids, etc.* The waters of the Pavilion and Geyser Springs, owing to the quantity of lithia which they contain, are especially serviceable in *chronic gout, chronic rheumatism, rheumatic gout, and affections dependent on these diatheses.* The Columbian, Pavilion, Eureka, and Excelsior, containing a considerable proportion of iron, are more especially adapted to cases of the above-mentioned disorders, in which anæmia exists, but they must be drunk with caution by the plethoric.

ONE PINT CONTAINS—	High Rock, 52° Fahr. Prof. C. F. Chandler.	Geyser, 52° Fahr. Prof. C. F. Chandler.	Hasbarn, Prof. C. F. Chandler.	Empire, Prof. C. F. Chandler.	Columbian, J. H. Steele, M. D.	Pavilion, Prof. C. F. Chandler.	United States, Prof. C. F. Chandler.	Selzer, 50° Fahr. Prof. C. F. Chandler.
<b>SOLIDS.</b>								
Carbonate of soda	8.024	0.984	0.373	0.782	1.386	0.327	0.405	2.552
Carbonate of magnesia	4.069	9.019	13.072	3.182	3.461	5.650	5.399	2.988
Carbonate of iron	0.185	0.031	0.101	0.079	0.693	0.233	0.065	0.155
Carbonate of lime	11.443	12.449	14.815	9.520	8.500	10.432	8.084	7.804
Carbonate of lithia	0.154	0.374	.....	0.163	.....	0.744	0.350	0.071
Carbonate of strontia	trace.	trace.	trace.	trace.	.....	trace.	0.001	trace.
Carbonate of baryta	0.050	0.095	0.173	0.005	.....	0.090	0.034	trace.
Chloride of potassium	1.122	1.006	1.199	0.536	.....	0.953	1.073	0.167
Chloride of sodium	43.766	50.055	63.746	63.323	33.375	57.480	17.734	16.786
Sulphate of potassa	0.201	0.111	trace.	0.346	.....	0.254	.....	0.069
Sulphate of soda	.....	.....	.....	.....	.....	.....	.....	.....
Sulphate of magnesia	.....	.....	.....	.....	.....	.....	.....	.....
Phosphate of soda	trace.	0.002	0.001	0.003	.....	0.001	0.002	trace.
Phosphate of lime	.....	.....	.....	.....	.....	.....	.....	.....
Iodide of sodium	0.011	0.017	0.025	0.001	0.320	0.000	0.005	0.004
Bromide of sodium	0.091	1.069	0.192	0.033	.....	0.123	0.106	0.079
Fluoride of calcium	trace.	trace.	trace.	trace.	.....	trace.	trace.	trace.
Biborate of soda	trace.	trace.	trace.	trace.	.....	trace.	trace.	trace.
Alumina	0.153	trace.	0.016	0.032	.....	0.041	0.012	0.047
Silicate of potassa	.....	.....	.....	.....	.....	.....	.....	.....
Silicate of soda	.....	.....	.....	.....	.....	.....	.....	.....
Silica	0.283	0.105	0.157	0.182	0.256	0.394	0.393	0.320
Organic matter	trace.	trace.	trace.	trace.	.....	trace.	trace.	trace.
<b>Total</b>	<b>69.502</b>	<b>75.267</b>	<b>93.874</b>	<b>78.215</b>	<b>47.946</b>	<b>76.745</b>	<b>33.764</b>	<b>31.042</b>
<b>GAS.</b>								
Carbonic acid	Cubic in. 51 (1866.)	Cubic in. 49 (1871.)	Cubic in. 47	Cubic in. 43 (1872.)	Cubic in. 34	Cubic in. 41	Cubic in. 30	Cubic in. 40

ONE PINT CONTAINS—	Geyser, 46° Fahr. Prof. C. F. Chandler.	Star, 52° Fahr. Prof. C. F. Chandler.	Red Spring, Prof. J. H. Appleton.	Eureka, R. L. Allen, M. D.	Excelsior, R. L. Allen, M. D.	Hamilton, R. L. Allen, M. D.	Crystal, 50° Fahr. Prof. C. F. Chandler.
<b>SOLIDS.</b>							
Carbonate of soda	6.175	1.097	1.107	0.625	1.375	4.231	1.212
Carbonate of magnesia	10.322	4.586	2.618	3.667	4.042	4.883	5.568
Carbonate of iron	0.089	0.110	.....	0.375	0.402	0.578	0.185
Carbonate of lime	14.793	10.795	7.324	5.165	9.625	12.249	8.845
Carbonate of lithia	0.549	0.124	0.016	.....	.....	.....	0.339
Carbonate of strontia	0.041	trace.	.....	.....	.....	.....	trace.
Carbonate of baryta	0.206	0.010	.....	.....	.....	.....	0.074
Chloride of potassium	3.079	1.212	0.686	.....	.....	.....	1.040
Chloride of sodium	70.260	49.795	8.699	20.832	46.330	37.332	42.058
Sulphate of potassa	trace.	0.675	.....	.....	.....	.....	0.269
Sulphate of soda	.....	.....	.....	.....	0.165	.....	.....
Sulphate of magnesia	.....	.....	.....	.....	.....	.....	.....
Phosphate of soda	trace.	trace.	trace.	0.263	.....	.....	0.001
Phosphate of lime	.....	.....	.....	.....	.....	.....	.....
Iodide of sodium	0.031	0.015	.....	0.583	0.529	0.449	0.008
Bromide of sodium	0.276	0.071	.....	0.196	.....	.....	0.051
Fluoride of calcium	trace.	trace.	.....	.....	.....	.....	trace.
Biborate of soda	trace.	trace.	.....	.....	.....	.....	trace.
Alumina	trace.	trace.	10.210	0.029	.....	.....	0.033
Silicate of potassa	.....	.....	.....	.....	.....	.....	.....
Silicate of soda	.....	.....	.....	.....	0.875	.....	.....
Silica	0.013	0.160	0.339	0.067	0.500	.....	.....
Organic matter	trace.	trace.	.....	.....	.....	20.125	0.401
<b>Total</b>	<b>105.834</b>	<b>68.650</b>	<b>21.003</b>	<b>31.827</b>	<b>64.343</b>	<b>59.897</b>	<b>60.089</b>
<b>GAS.</b>							
Carbonic acid	Cubic in. 57 (1870.)	Cubic in. 50	Cubic in.	Cubic in. 29	Cubic in. 31	Cubic in. 40	Cubic in. 39 (1870.)

<sup>1</sup> Alumina and sesquioxide of iron.

<sup>2</sup> Silica and alumina.