

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.
SOLIDS.								
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	48.766	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.
Total	69.502	75.267	93.874	78.215	47.946	76.745	33.764	31.042
GAS.								
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.
SOLIDS.							
Carbonate of soda	6.175	1.097	1.107	0.625	1.375	4.251	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	.....	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	.....	.....	.....	.....	0.875	.....	.....
Silicate of soda	.....	.....	.....	.....	0.500	.....	.....
Silica	0.013	0.160	0.339	0.067	.....	20.125	0.401
Organic matter	trace.	trace.	.....	.....	.....	.....	trace.
Total	105.834	68.650	21.003	31.827	64.343	59.897	60.089
GAS.							
Carbonic acid	Cubic in. 57 (1870.)	Cubic in. 50	Cubic in.	Cubic in. 29	Cubic in. 31	Cubic in. 40	Cubic in. 39 (1870.)

¹ Alumina and sesquioxide of iron.

² Silica and alumina.

Ballston Spa, Ballston, Saratoga County, New York.

These waters are similar in composition to the waters of the Saratoga Springs, but they are richer in mineral constituents. The proportion of chloride of sodium ranges from 53.12 grains to 93.753 grains in a pint. The Lithian Well contains 13.378 grains of carbonate of magnesia, 20.675 grains of carbonate of lime, 4 grains of chloride of potassium, to the pint, besides carbonates of soda, iron, lithia, strontia, baryta, phosphate of soda, sulphates of potassa and soda, iodide and bromide of sodium. Carbonic-acid gas, from 30 to 57 cubic inches.

These waters are applicable to the treatment of the same cases as the Saratoga waters.

2. EUROPEAN.

Cheltenham, Gloucestershire, England.

These spas are saline aperient, iodureted saline, iodureted-magnesian saline, and the waters contain a good deal of carbonic acid. The season is from July to October. These waters are chiefly serviceable in *dyspepsia*, *hepatic affections*, and *constipation*. Some of the springs at Cheltenham contain iron, and the water of these is employed in *chlorosis* and *anaemia*.

Leamington, Warwickshire, England.

These waters contain chlorides of calcium and sodium, and sulphate of soda, with carbonic acid. They are much prescribed in *dyspepsia*, *acidity*, and *hepatic troubles*, *constipation*, etc.

Adelheidsquelle, Heilbrun, Bavaria. Altitude, 2,000'. Temperature of spring, 50° Fahr. Season, May to September.

This valuable water contains chloride of sodium, carbonate of sodium, iodide and bromide of sodium, etc.; carbonic acid, 13.18 cubic inches. It is highly prized in *strumous diseases*, *rheumatism*, *gout*, *affections of the skin*, and pelvic troubles of females (*chronic metritis*, *fibroids*, etc.).

Baden-Baden. Altitude, 616'. Mean annual temperature, 48° Fahr. Season, May to October.

According to Bunsen's analysis, these waters contain chloride of sodium, bicarbonate of lime, magnesia, and iron, sulphates of lime and potash, arseniate of iron (a trace), chloride of potassium, bromide of sodium (traces), etc.; carbonic-acid gas. The Meurquelle contains 2.3694 grains of chloride of lithium in 20 ounces.

Carlsbad, Bohemia. Altitude, 1,200'. Season, June to September.

These waters contain sulphate of soda, carbonate of soda, chloride of sodium, sulphate of potash, carbonate of lime, etc. Marktbrunnen contains, besides these ingredients, a small quantity of carbonates of lithia, strontia, and manganese, and iodide and bromide of sodium; the gas is carbonic acid.

The Carlsbad water is highly prized in *affections of the liver and portal system*, *uterine diseases*, *gout*, *rheumatism*, and *diabetes*.

Friedrichshall, Saxe-Meiningen, Germany. Bitter water.

According to Liebig, this water contains sulphate of soda, 46.51 grains; sulphate of magnesia, 39.55; chloride of sodium, 61.10; chloride of magnesium, 30.25; sulphates of potash, 1.52, and of lime, 10.34 grains. Carbonic-acid gas, 5.32 cubic inches.

This is *aperient*, and is used in *diseases of the stomach, liver, intestines, and kidneys*. It is imported in quart-bottles, and is much prescribed as a laxative in *habitual constipation*, in *hepatic troubles*, *plethora of pelvic organs*, etc.

Homburg, Central Germany. Altitude, 600'. Open all the year, but the season is from May to September. Temperature, 50° to 53° Fahr.

According to the analysis of Liebig and Hofmann, these waters contain chlorides of sodium (79 to 104 grains), potassium, magnesium, and calcium, carbonates of lime, magnesia and iron, and sulphates of soda and lime. Free carbonic acid, 48 cubic inches.

In therapeutical action they are laxative, and are prescribed in *habitual constipation*, *dyspepsia*, *abdominal and pelvic plethora*, *obesity*, *hypochondriasis*, *hysteria*, etc.

Kissingen, Bavaria. Altitude, 800'. Temperature of springs, 50° Fahr. The season is from May to September.

Liebig's analysis has shown that these waters contain chlorides of sodium (17.52 to 44.71 grains), potassium, lithium, and magnesium, sulphates of lime and magnesia, carbonates of lime and iron, bromide and iodide of sodium, etc. They are highly charged with carbonic acid.

Kissingen waters are laxative, and are used in *dyspepsia*, *hepatic obstructions*, *albuminuria*, *diabetes*, etc.

Kreutznach, Rhenish Prussia. Altitude, 285'. Season is from June to September.

This powerfully alterative water contains chloride of sodium (72 to 108 grains to the pint), chloride of calcium (13 to 22 grains to the pint), chlorides of magnesium, potassium and lithium, carbonate of lime and iron, bromide and iodide of magnesium.

The mother-liquor of Kreutznach contains 2,484 grains of solid matter in sixteen ounces.

These waters are extremely serviceable in *constitutional syphilis*, *strumous diseases*, *affections of the skin*, *rheumatism*, *gout*, *engorgement of the abdominal and pelvic organs*, *hepatic diseases*, etc.

Marienbad, Bohemia. Altitude, 1,900'. Season is from May to September.

The principal constituents of this water are sulphate of soda, bicarbonate of soda, chloride of sodium, bicarbonate of lime, bicarbonate of magnesia, and salts of lithia, strontia, iron, and manganese, in small quantity; carbonic-acid gas.

Laxative, and used in *hepatic disorders, dyspepsia, habitual constipation, gravel, gout, etc.*

Reichenhall, Upper Bavaria. Altitude, 1,407'. Mean temperature of spring, 56° Fahr.; of summer, 64° Fahr.; of autumn, 54° Fahr. Season, July and August.

Used only for baths. Inhalations are practiced here on a large scale. "The compressed-air cure" is also a prominent feature of the curative methods. *Scrofula, phthisis, and affections of the throat,* are chiefly treated.

The waters are rich in chlorides of sodium and magnesia, and sulphates of soda and lime.

Seidlitz, Bohemia.

The chief constituents are sulphate of magnesia, sulphate of soda, carbonate of lime, sulphate of lime, sulphate of potash, and chloride of magnesium.

Saline purgative.

Selters, Nassau.

Kastner's analysis has shown that this water contains bicarbonate of soda, chloride of sodium, bicarbonates of lime and magnesia, iron and manganese, phosphates of lime, alumina and soda, bromide of sodium, etc. Highly charged with carbonic acid.

Laxative and alterative.

Authorities referred to :

BRAUN, DR. JULIUS. *Systematisches Lehrbuch der Balneotherapie*, Berlin, 1873.

MACPHERSON, DR. JOHN. *The Baths and Wells of Europe*, second edition, London, Macmillan & Co., 1873.

MOORMAN, DR. J. J. *Mineral Springs of North America*, Philadelphia, J. B. Lippincott & Co., 1873.

VALENTINER, DR. TH. *Handbuch der allgemeinen und speciellen Balneotherapie*, Berlin, 1873.

WALTON, DR. GEORGE E. *Mineral Springs of the United States and Canada*.

AMMONIUM AND ITS PREPARATIONS.

PREPARATIONS.—*Ammonii Benzoas*. Benzoate of ammonium. Benzoic acid and ammonia. In minute, white, shining, thin, four-sided, laminar crystals; bitter, saline, and somewhat balsamic in taste; soluble in water (1 in 5), and in rectified spirit (1 in 12). Dose, gr. v—gr. xv.

Ammonii Carbonas.—Carbonate of ammonium. In white, translucent masses, with a pungent and ammoniacal odor, soluble in water (1 in 4). Dose, gr. v—gr. x.

Ammonii Chloridum.—Purified chloride of ammonium. Sal-ammoniac. In a snow-white, crystalline powder, soluble in three parts of cold water, and sparingly soluble in alcohol (1 in 55). Dose, gr. j— \mathcal{D} j.

Trochisci Ammonii Chloridi.—Troches of chloride of ammonium.

(Ammonium chloride, sugar, tragacanth, and sirup of tolu.) Each troche contains two grains of chloride of ammonium.

Ammonii Valerianas.—Valerianate of ammonium. A white salt in quadrangular plates, having the odor of valerianic acid, and a sharp, sweetish taste, and is very soluble in water and in alcohol. Dose, gr. j—gr. v.

Ammonii Phosphas.—Phosphate of ammonia. In colorless, transparent prisms, soluble in water (1 in 4), but insoluble in alcohol. Dose, gr. v— \mathcal{D} j.

Aqua Ammonia.—Water, or solution, of ammonia; contains ten per cent by weight of gas. A transparent, colorless liquid, having a very pungent odor, and a strongly alkaline reaction. Dose, \mathcal{M} v—3 ss, well diluted with water.

Liquor Ammonii Acetatis.—Solution of acetate of ammonium. Spirit of Minderer. Dose, 3 j— \mathcal{Z} j.

Spiritus Ammonia.—Spirit of ammonia. A solution of ammoniacal gas in alcohol. Dose, \mathcal{M} x—3 j.

Spiritus Ammonia Aromaticus.—Aromatic spirit of ammonia. Solution of carbonate of ammonia and aqua ammonia, oils of lemon, pimento, and lavender, in alcohol and water. Dose, 3 ss—3 ij.

Linimentum Ammonia.—Liniment of ammonia. Cotton-seed-oil and aqua ammonia (30 parts to 70).

Raspail's Eau Sédatif.—Liquor ammonia, two ounces; chloride of sodium, two ounces; camphorated spirits of wine, three drachms; water, thirty-two ounces. (Not official.)

ANTAGONISTS AND INCOMPATIBLES.—The vegetable and mineral acids, acidulous salts, earthy salts, and lime-water, are incompatible with the carbonate. In addition to the acids, potash, soda and their carbonates, salts of lead, silver, and metallic sulphates, are incompatible with the solution of the acetate. The persalts of iron, acids, and liquor potassæ, are incompatible with the benzoate. Alkalies, alkaline earths and their carbonates, and lead and silver salts, are incompatible with the muriate. In the treatment of poisoning by ammonia or its carbonate, the vegetable acids should be used to neutralize the poison, and its irritant action on the mucous membrane should be limited as much as possible by the administration of oil and demulcents.

Therapeutically, ammonia is antagonized by veratrum viride, aconite, digitalis, cold, and other cardiac sedatives.

SYNERGISTS.—The action of ammonia is favored by heat, opium, iodine, by the antispasmodics, as valerian, asafœtida, etc., by the diffusible and aromatic stimulants, as alcohol, ether, etc. The therapeutical activity of the iodides and bromides is promoted by combination with carbonate of ammonia.

PHYSIOLOGICAL ACTION.—Ammoniacal gas, brought in contact with