To open the dura and remove a cerebral growth without an anesthetic was an experience which, so far as we knew, was unique, and the principle may possibly prove to be applicable to other cases.[6]

I have always dreaded a second-stage operation in cases of brain tumor, although this method of procedure is advocated, as is well known, by the highest authorities. I believe that one reason why the complete operation at a single sitting has been found inadvisable, in the hands of many, is the undue loss of blood which occurs during the process of forming an osteoplastic flap, or of otherwise entering the skull when rapid methods are followed and no tourniquet used. Painstaking hemostasis—one of the guiding principles of all surgical work in Dr. Halsted's clinic—should be observed in cranial as strictly as in other operations, and the fact that postoperative shock is a complication which is almost never seen is doubtless attributable to this custom. Possibly owing to this I have not been impressed by the arguments in favor of a two-stage operation, and it has been my custom to open the dura and if possible to remove the tumor at the first sitting—only twice in my ten cases of successful extirpation has a second-stage procedure been employed. Thus not only are the risks of a second anesthetization avoided, but also the period of anxiety for patient, friends and physician which is inevitable when the procedure is carried out in two sittings.

If it should prove to be possible, however, to carry out the second stage of an intracranial exploration without an anesthetic this would be a stronger argument for the two-stage procedure than the mere avoidance of shock. One paramount advantage, of course, would lie in the absence of such complications from cyanosis as have been described in the case here reported.

It was truly remarkable in this patient to find that the extensive manipulations which were essential to the removal of the tumor could be carried out while the patient was perfectly conscious, was chatting and was taking a lively interest in the progress of the operation. The complete freedom from venous stasis was all the more apparent, inasmuch as so much difficulty had been experienced during the four preceding sessions.

Since this original experience another opportunity has offered itself of conducting the second-stage of an extirpation operation in similar fashion without an anesthetic, and although in this second patient, owing to the extraordinary size and deep situation of the tumor, a complete enucleation proved to be impossible, the opening of the dura and partial extirpation of the growth showed the feasibility of procedure of this kind without anesthesia even in the case of a young child.

One thing I greatly regret not having done in the final operation (March 26, 1907) on the first patient, namely, to stimulate the exposed cortex while the patient—a particularly intelligent and interested subject—was conscious. The enucleation was carried out slowly and carefully, sufficient time being taken to allow Mr. Brödel to make a sketch showing the partly exposed cyst, and it would have taken but a few moments to have gone over the postcentral parts of the field with the electrode, especially since our orientation was assured owing to the detailed faradization of the motor strip on Nov. 27, 1906. It is quite possible that stimulation, particularly of the postcentral convolutions in a conscious patient, may throw light on the somewhat obscure localization of sensory function. This, however, can only be a conjecture, for it is notable that although the incision was made down to the tumor along the crest of the widened postcentral convolution—in other words, in the middle of the supposed sensory field—the patient experienced no subjective sensations whatever. It may, of course, be a different matter when this field is faradized.[7]

[EDITOR'S NOTE.—THIS ARTICLE WAS READ AND DISCUSSED IN A SYMPOSIUM. THE DISCUSSION WILL APPEAR LATER.]

6. In his Toronto address (The Technic of Operations on the Central Nervous System: Brit. Med. Jour., Aug. 25, 1906, 484) Sir Victor Horsley emphasized the fact that profound narcosis is unnecessary except at the early and late stages of an intracranial operation; and the same thing is true for most intra-abdominal procedures, little anesthesia being needed while the viscera are being handled.

7. Once, more recently, I have had the opportunity of making a single observation in this direction. In a simple case of subtemporal decompression for an unlocalizable tumor an emissary vessel from the meningeal was injured while rongeuring away the bone, and as it was beyond the reach of a ligature the wound was temporarily packed. The dura, consequently, was not opened until 48 hours later, at which time no anesthesia was needed for the completion of the operation. After making the dural defect the exposed right temporal lobe was faradized. When the electrode was applied to certain areas of the superior temporal gyrus the patient said that he heard a ringing sound which was distinguishable from the "buzz" of the interruptor. The observation is suggestive, though it would not be safe to draw too definite conclusions from it: for the conditions were abnormal owing to tension, and his mental processes were a little dull.

AMERICAN MINERAL WATERS;

IN THE LIGHT OF RECENT ANALYSES.

JAMES K. CROOK, A.M., M.D.
Author of "The Mineral Waters of the United States."
NEW YORK.

Bulletin 91 of the Bureau of Chemistry, United States Department of Agriculture, relates to a recent chemical investigation of American commercial mineral waters. The waters examined by the government chemists are all found in the markets of the country and are recommended to the public in virtue of certain valuable mineral ingredients they are stated to contain, or on the score of their purity and freedom from harmful substances. Included in the analyses are many of the best known springs of the United States, some of which have long held a high place in the estimation of physicians. It is proper, therefore, that the results be given wide publicity and the essential facts reviewed.

Ranged in contrast with their own tables the bureau chemists present the analyses of the waters as hitherto advertised by the owners or managers of the springs, and upon which the medical men of the country have relied in judging as to their nature and value. Of the forty-two analyses, covering the waters of as many different springs, we find that twenty-one, or exactly one-half, agree essentially with those hitherto in use; ten show very considerable variations, but admit of fairly satisfactory adjustment. In four instances the owner's analyses were not obtainable, while in the case of seven springs the differences are totally irreconcilable, in several instances entirely eliminating the spring from the class to which it had been assigned by the confiding collator of mineral water facts and figures. For purposes of critical comparison I converted the analyses of twenty of the most prominent and best-known waters in the Bureau of Chemistry list from parts per million to grains per United States gallon, to conform to the method of expression most common in this country. These analyses are ranged in parallel columns with those hitherto in vogue. For convenience, the Bureau of Chemistry tables are set down under the head of "New Analysis," the advertised analyses are referred to as the "Old Analysis."

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CHAMPION WATER, SARATOGA SPRINGS, NEW YORK.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. C. F. Chandler, 1871. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	0.54	Calcium fluorid	trace
Potassium chlorid	5.90	Potassium chlorid	40.45
Sodium chlorid	262.65	Sodium chlorid	702.24
Sodium sulphate	1.71	Potassium sulphate	0.25
Potassium bromid	1.16	Sodium bromid	3.58
Potassium iodid	0.01	Sodium iodid	0.23
Sodium metaborate	small amt.	Sodium biborate	trace
Sodium nitrate	trace	Sodium phosphate	0.01
Lithium chlorid	0.31	Lithium bicarbonate	6.25
Sodium bicarbonate	10.31	Sodium bicarbonate	17.62
Magnesium bicarbonate	28.32	Magnesium bicarbonate	193.91
Calcium bicarbonate	81.81	Calcium bicarbonate	227.07
Barium bicarbonate	0.69	Barium bicarbonate	2.08
Strontium bicarbonate	trace	Strontium bicarbonate	0.08
Ferric oxid and alumina	0.07	Iron bicarbonate	0.65
Mangano-manganic oxid	trace	Alumina	0.46
Silica	0.71	Silica	0.70
		Organic matter	trace
Total	392.84	Total	1195.58

The remarkable discrepancy in these analyses, especially in quantitative determinations, would appear to indicate either that the Champion Spring had materially declined in strength in the last 36 years, or that it was suffering from a heavy ingress of fresh water at the time the government samples were collected.

VICHY WATER, SARATOGA SPRINGS, NEW YORK.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. C. F. Chandler, 1871. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	0.05	Calcium fluorid	trace
Potassium chlorid	0.43	Potassium chlorid	14.11
Sodium chlorid	86.94	Sodium chlorid	128.69
Potassium bromid	trace	Sodium bromid	0.99
Potassium iodid	trace	Sodium iodid	trace
Sodium sulphate	1.73	Potassium sulphate	trace
Sodium metaborate	trace	Sodium biborate	trace
Sodium bicarbonate	48.56	Sodium bicarbonate	82.67
Magnesium bicarbonate	3.52	Magnesium bicarbonate	41.50
Calcium bicarbonate	8.71	Calcium bicarbonate	95.52
Ferric oxid and alumina	0.18	Iron bicarbonate	0.05
		Barium bicarbonate	0.59
Calcium silicate	1.60	Strontium bicarbonate	trace
		Organic matter	trace
Silica	0.11	Silica	0.76
Lithium chlorid	0.03	Lithium bicarbonate	1.76
		Alumina	0.48
Total	151.96	Total	367.32

It will be observed that the Bureau analysis shows about 60 per cent. less solid contents than is given by Professor Chandler. The proprietor of the spring writes me that the Saratoga waters fluctuate in volume and strength during the year. It is possible that the government analysis was made from samples taken during or just after a wet season when the water was more or less diluted. The Saratoga Vichy Springs Company sends the writer an analysis bearing date of April 17, 1907, by Professor Ellery, of Schenectady, in which the total solid contents of the spring are placed at 173.90 grains per United States gallon. It would appear probable that the water has suffered more or less decline in potency since the date of the old analysis.

CONGRESS WATER, SARATOGA SPRINGS, NEW YORK.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. C. F. Chandler, 1871. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	1.77	Calcium fluorid	trace
Potassium chlorid	19.78	Potassium chlorid	8.05
Sodium chlorid	248.65	Sodium chlorid	400.44
Potassium iodid	0.05	Sodium iodid	0.14
Potassium bromid	2.32	Sodium bromid	8.56
Sodium sulphate	0.74	Potassium sulphate	0.89
Lithium chlorid	1.89	Lithium bicarbonate	4.76
Sodium bicarbonate	36.41	Sodium bicarbonate	10.77
Magnesium bicarbonate	97.14	Magnesium bicarbonate	121.76
Calcium bicarbonate	131.03	Calcium bicarbonate	143.40
Barium bicarbonate	0.77	Barium bicarbonate	0.93
Strontium bicarbonate	trace	Strontium bicarbonate	trace
Sodium metaborate	trace	Sodium biborate	trace
Sodium nitrite	trace	Sodium phosphate	0.02
Ferric oxid and alumina	1.21	Iron bicarbonate	0.34
Silica	1.14	Silica	0.84
		Alumina	trace
Total	542.90	Total	700.90

Professor Chandler's analysis here shows an excess of 158 grains over that of the Bureau of Chemistry. Of this 151 grains is represented by sodium chlorid. The remainder is more than made up by the excess of magnesium bicarbonate and calcium bicarbonate. It will be observed that the government analysis shows some 25 grains more of sodium bicarbonate than that of Professor Chandler. The differences are not essential, and, according to a letter from the proprietor to the Bureau of Chemistry, may have been caused by fresh water finding its way into the spring at the time the government samples were taken.

HATHORN WATER, SARATOGA SPRINGS, NEW YORK.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. C. F. Chandler, 1871. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	2.19	Calcium fluorid	trace
Lithium chlorid	2.60	Lithium chlorid	11.45
Potassium chlorid	19.28	Potassium chlorid	9.60
Sodium chlorid	425.93	Sodium chlorid	509.97
Potassium bromid	0.40	Sodium bromid	1.53
Potassium iodid	0.12	Sodium iodid	0.19
Sodium sulphate	0.24	Sodium phosphate	trace
Sodium metaborate	trace	Sodium biborate	trace
Sodium nitrite	trace	Organic matter	trace
Sodium bicarbonate	12.81	Sodium bicarbonate	4.29
Magnesium bicarbonate	114.53	Magnesium bicarbonate	176.46
Calcium bicarbonate	179.70	Calcium bicarbonate	170.65
Barium bicarbonate	0.80	Barium bicarbonate	1.74
Strontium bicarbonate	trace	Strontium bicarbonate	trace
Ferric oxid and alumina	0.55	Iron bicarbonate	1.13
Silica	0.95	Silica	1.26
		Alumina	1.13
Total	760.10	Total	888.40

The chief discrepancy in these tables is represented by the excess of magnesium bicarbonate, lithium chlorid and sodium chlorid in Professor Chandler's analysis. It may be remarked here that samples of many other Saratoga water taken from their nearest outlets, the springs being walled up at the time, all showed on analysis by the government chemists a much smaller mineral content than those of Professor Chandler's analysis. It is possible that this loss is due, as has been suggested, either to the opening up of many new springs at Saratoga, resulting in the withdrawal of a much larger volume of water than formerly, or to the abstraction from the springs of the powerful solvent CO_2 gas, for use as the carbonic acid of commerce.

TATE EPSOM WATER, TATE SPRINGS, TENN.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. T. S. Antisell, Chemist to U. S. Dept of Agriculture, 1872. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace	Magnesium chlorid	0.62
Sodium chlorid	0.12	Sodium chlorid	40.27
Lithium chlorid	0.03	Iron chlorid	2.99
Potassium chlorid	0.91	Potassium sulphate	1.54
Sodium sulphate	4.38	Sodium sulphate	8.50
Magnesium sulphate	34.71	Magnesium sulphate	32.91
Calcium sulphate	76.53	Calcium sulphate	106.66
Sodium nitrate	0.02	Nitric acid	0.02
Calcium bicarbonate	20.05	Calcium carbonate	21.56
Calcium silicate	0.24	Calcium phosphate	1.14
Ferric oxid and alumina	0.23	Sodium iodid	trace
Silica	1.13	Silica	2.70
Total	138.35	Total	272.91

These analyses, both made by chemists of the United States Department of Agriculture, show considerable difference in total solid contents as well as in individual components. Of the 134 grains representing the excess of solids in Professor Antisell's analysis, 86 grains are made up of lime salts, ingredients of comparative unimportance, and 40 grains of sodium chlorid. The chief constituent, magnesium sulphate, which gives the water its name and essential characteristics, is found in the two analyses in nearly equal quantities. There is, of course, a possibility that some of the constituents of the

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spring have undergone alteration during the 35 years since Professor Antisell's examination.

MISSISQUOI SPRING, SHELDON, VT.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. S. Dana Hayes, 1867. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace		
Lithium chlorid	trace		
Potassium chlorid	0.20		
Sodium chlorid	0.12		
Sodium sulphate	1.43		
Sodium metaborate	trace	Total solid contents shown by Prof. Hayes' analysis, 15.75 grains. Hypothetical combinations not figured out.	
Calcium phosphate	trace		
Sodium nitrate	trace		
Sodium bicarbonate	1.06		
Magnesium bicarbonate	4.88		
Calcium bicarbonate	9.88		
Ferric oxid and alumina	0.12		
Mangano-manganic oxid	0.03		
Calcium silicate	0.50		
Silica	2.23		
Total	20.40	Total	15.75

According to the government chemists' report, "The two analyses do not differ more than would be expected in the case of samples taken on widely separated dates."

BEDFORD MINERAL WATER, BEDFORD, PA.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Victor G. Bloede, Chemist, of Baltimore. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace	Ammonium chlorid	0.02
Lithium chlorid	trace	Lithium chlorid	0.22
Potassium chlorid	0.53	Potassium carbonate	0.38
Sodium chlorid	0.53	Sodium chlorid	0.72
Magnesium sulphate	39.79	Magnesium sulphate	32.54
Calcium sulphate	95.34	Calcium sulphate	107.80
Sodium sulphate	1.68	Sodium carbonate	2.04
Calcium bicarbonate	14.81	Magnesium carbonate	6.06
Sodium metaborate	trace		
Sodium nitrate	trace		
Sodium nitrite	trace		
Ferric oxid and alumina	0.17	Ferric oxid and alumina	0.16
Calcium silicate	3.94		
Silica	0.08	Silica	0.35
Total	156.87	Total	150.29

These analyses agree very closely, both qualitatively and quantitatively.

BUFFALO LITHIA WATER, BUFFALO LITHIA SPRINGS, VA.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. Wm. P. Tonry, Maryland Institute, Baltimore. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace	Lithium bicarbonate	2.25
Lithium chlorid	trace		
Sodium chlorid	0.70	Sodium chlorid	4.92
Potassium chlorid	9.44	Potassium carbonate	29.30
Calcium bicarbonate	6.53	Calcium bicarbonate	14.96
Magnesium sulphate	1.83	Magnesium sulphate	0.88
Calcium sulphate	27.30	Calcium sulphate	33.06
Sodium sulphate	4.60	Aluminum sulphate	9.07
Sodium nitrate	0.17	Organic matter	trace
Ferric oxid and alumina	0.04	Iron bicarbonate	0.30
Calcium silicate	0.37	Silica chlorid	1.87
Silica	1.83	Baryta bicarbonate	1.75
Calcium phosphate, heavy	trace	Phosphoric acid	trace
Sodium nitrite	trace	Iodin	trace
Total	43.81	Total	98.36

It must be confessed that these analyses show a wide variation. Quantitatively, the excess in the older analysis is represented chiefly by the calcium salts, aluminum, lithium and sodium chlorid. The qualitative determinations likewise present a wide divergence. The minute amount of lithium shown in the government analysis would exclude the water from the lithia group. In reply to a letter the writer is informed by the proprietors that the Bureau of Chemistry analysis having been made from samples bought in the open market, it is possible that the examiners were imposed on with adulterated or fraudulent water. Court records show that Buffalo Lithia bottles have frequently been filled with spurious water. The proprietors state that they have relied implicitly on Profesor Tonry's analysis and have had no intention to deceive the profession. An entirely new analysis made at the springs would appear desirable.

GENEVA LITHIA WATER, GENEVA, N. Y.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. A. Auchie Cunningham, F. C. S. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace		
Sodium chlorid	19.16	Sodium chlorid	24.54
Potassium chlorid	0.44	Potassium chlorid	13.40
Lithium chlorid	0.03	Lithium bicarbonate	10.03
Potassium iodid	trace	Lithium sulphate	4.10
Sodium sulphate	0.16	Sodium sulphate	17.64
Magnesium sulphate	33.36	Magnesium sulphate	83.13
Calcium sulphate	87.01	Calcium sulphate	18.75
Calcium bicarbonate	18.89	Calcium carbonate	35.84
Sodium metaborate	trace	Magnesium carbonate	16.00
Sodium nitrate	trace		
Sodium nitrite	trace	Phosphoric acid	trace
Ferric oxid and alumina	0.05	Iron carbonate	2.15
Silica	0.82	Aluminum sulphate	8.75
Calcium phosphate	trace		
Total	159.82	Total	234.33

These determinations present wide variations in the most important ingredients, viz., in the sulphates of sodium and magnesium, the carbonate of magnesium, the salts of lithium, and in iron. The Bureau of Chemistry analysis verifies that of Professor Cunningham so far as to show that Geneva is a very useful water of the sulphated-saline-calcic class, but it should no longer be denominated or prescribed as a "lithia" water.

LONDONDERRY LITHIA WATER, LONDONDERRY, N. H.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. H. Halvorson. One U. S. gallon contains: Solids.	grs.
Sodium chlorid	0.03	Sodium chlorid	0.83
Lithium chlorid	trace	Lithium bicarbonate	7.29
Potassium chlorid	0.26	Potassium sulphate	0.30
Sodium sulphate	0.65	Calcium sulphate	25.13
Ammonium chlorid	trace	Aluminum sulphate	5.05
Sodium nitrate	0.23		
Sodium nitrite	trace	Organic matter	0.00
Sodium bicarbonate	0.42	Potassium carbonate	18.33
Magnesium bicarbonate	0.41	Magnesium carbonate	7.53
Calcium bicarbonate	2.14	Calcium bicarbonate	7.29
Ferric oxid and alumina	0.02	Iron carbonate	1.85
Calcium silicate	0.07		
Silica	0.95	Silica	1.25
Total	5.18	Total	74.85

These tables are totally irreconcilable. The Bureau of Chemistry analysis shows a smaller mineral content than is found in many ordinary drinking waters. In a recent letter to the writer the present proprietors of the spring state that they have accepted and used in good faith the analyses of Professors H. Halvorson and R. Ogden Doremus made under a former management. Recently, however, they had had reason to suspect the inaccuracy of these analyses and have not used them in their advertising. The water is now recommended and sold simply on its merits as a natural water as it flows from the spring. Londonderry may be recommended as a safe and pleasant beverage, but no physician can correctly prescribe it as a "lithia" water.

POLAND WATER, SOUTH POLAND, ME.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. F. L. Bartlett, State Assayer and Chemist, 1879. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace		
Lithium chlorid, minute	trace	Lithium	trace
Sodium chlorid	0.26	Sodium chlorid	0.47
Potassium chlorid	0.26		
Sodium sulphate	0.30	Potassium sulphate	0.18
Calcium bicarbonate	2.67	Calcium carbonate	1.36
Magnesium bicarbonate	0.73	Magnesium carbonate	0.31
		Iron carbonate	trace
Sodium nitrate	0.46		
Sodium nitrite	trace	Organic matter	0.28
Sodium bicarbonate	0.25	Sodium carbonate	0.09
Calcium phosphate	trace	Calcium fluorid	trace
Calcium silicate	0.42		
Ferric oxid and alumina	0.03	Alumina	trace
Silica	1.16	Silica	1.07
Total	6.54	Total	3.76

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These two analyses show a difference in total solid contents of 2.78 grains per United States gallon, 1.31 of which may be accounted for by the excess of calcium bicarbonate in the new analysis, the remainder by the minute quantities of other ingredients evidently not looked for by the older analyst. These differences are unessential and are so regarded by the government chemists. Poland remains an excellent table water of the light alkaline-calcic class.

MANITOU WATER, MANITOU, COLO.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. Elwyn Waller. One U. S. gallon contains: Solids.	grs.
Sodium chlorid	17.58	Sodium chlorid	23.94
Ammonium chlorid	trace		
Potassium chlorid	7.89		
Lithium chlorid	0.08	Lithium carbonate	0.71
Sodium bicarbonate	69.20	Sodium carbonate	40.65
Magnesium bicarbonate	27.65	Magnesium carbonate	16.68
Calcium bicarbonate	107.56	Calcium carbonate	69.08
Ferrous bicarbonate	0.33	Iron oxid	0.02
Potassium bromid	faint trace	Potassium sulphate	10.68
Sodium sulphate	18.80	Sodium sulphate	11.14
Sodium metaborate	small amt.		
Mangano-manganic oxid.	0.14	Alumina	0.07
Silica	2.54	Silica	2.49
Total	251.77	Total	175.47

The Bureau of Chemistry analysis evidently is made from a sample of the big Soda Spring at Manitou, and it is with Professor Waller's analysis of that spring that we have made the comparison. The later analysis shows an increase in the iron, calcium, magnesium and sodium bicarbonates, but a small diminution in lithium and sodium chlorids. The new analysis shows a slightly stronger water than does the old, but we may agree with the bureau chemists that the two analyses correspond quite satisfactorily.

DEEP ROCK WATER, OSWEGO, N. Y.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. Silas H. Douglass, University of Michigan. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	0.01	Magnesium chlorid	10.24
Lithium chlorid	trace	Calcium chlorid	18.19
Potassium chlorid	0.40	Potassium chlorid	149.08
Sodium chlorid	112.98	Sodium chlorid	308.18
Sodium sulphate	3.32	Sulphuric acid	trace
Calcium phosphate	trace		
Calcium bicarbonate	3.08		
Magnesium bicarbonate	1.21		
Sodium nitrate	0.70		
Sodium nitrite	trace		
Sodium bicarbonate	12.58		
Ferric oxid and alumina.	0.02	Iron protoxid	trace
Silica	0.61	Silica	71.70
		Loss	1.78
Total	135.00	Total	559.17

The difference between these two analyses is very remarkable, that of the Bureau of Chemistry showing a falling off of more than 75 per cent. This great reduction is represented chiefly by sodium chlorid, 195 grains; silica, 71 grains, and potassium chlorid, 148 grains. This loss is partially compensated by the presence in the government analysis of the more useful ingredients, sodium sulphate, sodium bicarbonate and a minute quantity of lithium. The new analysis transfers the water from the saline-silicious to the more valuable saline-sodic-carbonated class of waters. In a recent letter to the author the manager of the spring states that as the government analysis was made from a sample bought in the open market he cannot vouch for its correctness. He sends an anaylsis of the spring, made in 1899, by George Archbold, A.M., M.D., Ph.D., in which the total solid contents of the water are placed at 201.67 grains per United States gallon. This analysis bears a much closer resemblance to that of the Bureau of Chemistry than to the older one of Professor Douglass.

ALLOUEZ MINERAL WATER, GREEN BAY, WIS.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. W. W. Daniels, Wisconsin State University, 1888. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace		
Lithium chlorid	trace		
Sodium chlorid	1.60	Sodium chlorid	4.26
Magnesium chlorid	0.99		
Magnesium sulphate	4.27	Sodium sulphate	3.46
Calcium phosphate	trace	Calcium sulphate	0.11
Sodium nitrate	2.11	Sodium phosphate	trace
Magnesium bicarbonate	8.41	Magnesium bicarbonate	27.53
Calcium bicarbonate	18.43	Calcium bicarbonate	24.69
Potassium chlorid	0.17	Potassium sulphate	0.12
Ferric oxid and alumina.	0.07	Iron bicarbonate	0.96
Calcium silicate	1.50	Alumina	0.17
Silica	0.45	Silica and insoluble residue	1.97
Total	38.00	Total	62.37

Allouez still may be regarded as an alkaline-saline-calcic water, although the Bureau analysis shows a marked falling off from that of Professor Daniels. The reduction is represented briefly by the bicarbonates of magnesium and calcium. It is partly compensated by the sulphate of magnesium in the new analysis.

In reply to a letter addressed to the spring company inquiring as to the possible causes of the discrepancy of the two analyses, the manager states that dishonest middlemen refilled Allouez bottles all over the country. This procedure is easily effected by replacing the crown cap after refilling the bottle. They are endeavoring to safeguard the water by covering the cap with strips. It is possible that the government chemists examined a diluted or adulterated sample.

GREAT BEAR WATER, FULTON, N. Y.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Dr. William Manlius Smith, 1890. One U. S. gallon contains: Solids.	grs.
Magnesium chlorid	0.73	Magnesium chlorid	0.47
Lithium chlorid	trace		
Potassium chlorid	0.18		
Sodium chlorid	1.01		
Ammonium chlorid	trace		
Magnesium sulphate	0.89	Calcium sulphate	0.72
Sodium nitrate	0.70	Sod. and Potass. carb.	trace
Sodium nitrite	trace		
Magnesium bicarbonate	1.61	Magnesium carbonate	1.25
Calcium bicarbonate	7.25	Calcium carbonate	3.50
Ferrous bicarbonate	0.06		
Silica	0.56		
Total	12.99	Total	5.94

This is one of the few instances in which the Bureau analysis presents a larger solid content than does that used in advertising the water. Great Bear, however, is recommended simply as a table water. It loses no caste as a result of the government examination. It may, in fact, be regarded as somewhat improved.

CROCKETT ARSENIC-LITHIA WATER, SHAWSVILLE, VA.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Prof. Henry Froehling. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	trace	Ammonium nitrate	trace
Potassium chlorid	0.60	Sodium chlorid	1.23
Lithium chlorid	trace	Lithium carbonate	0.07
Magnesium bicarbonate	1.74	Magnesium carbonate	1.18
Calcium bicarbonate	13.46	Calcium carbonate	5.90
Sodium metaborate	small amt.	Barium carbonate	trace
		Strontium carbonate	0.09
		Copper carbonate	trace
		Lead carbonate	trace
		Zinc carbonate	trace
		Manganese carbonate	trace
Potassium sulphate	0.17	Potassium sulphate	1.25
Sodium sulphate	3.09	Sodium sulphate	1.86
Magnesium sulphate	4.59	Magnesium sulphate	3.04
Di sodium arseniate	0.19	Sodium arsenlate	0.02
Calcium silicate	0.52	Calcium sulphate	2.25
Ferric oxid and alumina.	0.06	Iron sulphate	0.04
Potassium iodid	trace	Sodium iodid	trace
Sodium nitrate	0.02	Sodium bromid	0.01
Sodium nitrite	heavy trace	Aluminum phosphate	trace
		Aluminum silicate	0.12
Silica	2.53	Silic acid	1.29
Total	26.97	Total	18.35

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The government analysis is a little stronger, quantitatively, but not so rich in a qualitative sense as that of Professor Froehling. The slight increase in lime salts in the new analysis covers the quantitative differences. On the whole, the two tables agree as well as could be expected. The Crockett water suffers no deterioration from the re-examination. The water may properly be termed a light sulphated-saline-arsenical water, but the designation of "lithia" ought to be dropped, as it would require at least 75 gallons of the water to yield one moderate dose of that drug.

BLUE LICK WATER, BLUE LICK SPRINGS, KY.

New Analysis. Bureau of Chemistry. One U. S. gallon contains: Solids.	grs.	Old Analysis. Dr. Robert Peter. One U. S. gallon contains: Solids.	grs.
Ammonium chlorid	0.13		
Potassium chlorid	7.72	Potassium chlorid	1.39
Magnesium chlorid	40.55	Magnesium chlorid	32.39
Sodium chlorid	400.43	Sodium chlorid	512.85
Calcium chlorid	10.12		
Potassium bromid	1.97	Magnesium bromid	0.24
Potassium iodid	0.01	Magnesium iodid	0.05
Calcium sulphate	27.00	Calcium sulphate	33.99
Lithium chlorid	0.43	Potassium sulphate	8.93
Sodium metaborate	small amt.	Magnesium carbonate	1.36
Calcium bicarbonate	31.61	Calcium carbonate	23.65
Sodium nitrate	0.16		
Sodium nitrite	faint trace		
Calcium phosphate	faint trace		
Mangano-manganic oxid	0.21		
Ferric oxid and alumina	0.08	Silicic acid	1.10
		Alum, lime phosphate, iron oxid	0.36
Silica	1.05	Loss	17.72
Total	522.34	Total	634.03

It is not stated by the government chemists whether their samples were taken from the Upper or Lower Blue Lick Springs. The Blue Lick waters are all of the same class, but, as the bureau analysis resembles rather more closely the advertised analysis of the Lower springs, we have selected that for comparison. An examination was made of this water many years ago by Dr. Robert Peter, the state geologist. A careful comparison of the two tables shows a reasonably close agreement. The quantitative discrepancy of the analyses is covered by the loss in sodium chlorid in the government determinations. The Blue Lick water remains an excellent example of the sulphated-saline class.

It is now well known that mineral waters possess no mysterious or occult virtues in the treatment of disease. No mineral water will be accepted by the medical profession for alleged medicinal properties supported only by testimonials from bucolic statesmen and romantic old ladies. In these days of twentieth century exactness, it might almost be said that the most important thing about a mineral water is a trustworthy analysis. It is only by this that the practitioner is able to decide as to its merits and to prescribe it intelligently. It is, therefore, a matter of keen disappointment to learn by these new analyses how much mistaken we have been in regard to the chemical constitution of some of our best known waters. Let us not, however, be too hard on the spring proprietors. There is very little evidence pointing to intentional fraud; it can not be doubted that the present owners themselves have, in more than one instance, been deceived by analyses handed down from their predecessors. In forming conclusions in reference to the extremely unsatisfactory state of affairs developed by the Bureau of Chemistry investigations certain facts come up for consideration:

1. A great majority of the advertised analyses of our mineral waters were made many years since when methods were not so exact as they are at the present day.

2. Some mineral springs are sensibly influenced by the wetness or dryness of the season, both in strength and in volume; the greater the volume of the water the weaker it is in mineral ingredients; examinations of such springs at different stages would undoubtedly yield dissimilar results.

3. While many springs are of deep origin and show no apparent fluctuations in their rate of flow, we have no positive proof that even these have not become more or less modified in character during the long period since the old analyses were made. The subterranean aqueous current, which constitutes a spring when it reaches the surface, can not be counted on continuously to come in contact with earth strata which yield a uniform product to its solvent power. Underground streams, as well as those on the surface, are liable to change their course, and, while losing certain of their former contents, may acquire new ones.

4. The fact must not be overlooked that the government analyses were made in each case from samples purchased in the open market. It is, therefore, possible that some of the waters examined by the bureau chemists were spurious or adulterated.

5. The chemical ingredients set forth in the tables of contents of mineral springs represent hypothetical combinations only. No chemist maintains that the salts he sets down in his analysis exist in exactly that form in the water. He ascertains by his tests the various acid and basic ions existing in the water, and, as nearly as possible, in what amounts. He then reasons that they unite to form the salts which go to make up his hypothetical table of contents, which is presented as the analysis. It is hardly conceivable that any two chemists separately examining a specimen of spring water taken from its source, even at the same moment, would reach exactly the same result in stating the theoretical combinations. How much greater discrepancy might reasonably be expected in the case of analyses separated by periods of 30 or 40 years!

With all due allowance for the above considerations, however, it must be confessed that we are in a state of inexcusable ignorance regarding the chemical constitution of many of these agents. Mineral water therapeutics must remain in a backward and unsatisfactory state until this is remedied. All of our medicinal springs should be submitted to analysis at least once in ten years until we are able to arrive at a correct estimate of their potency, and whether they are gaining or losing in strength. No enterprising mineral spring proprietor, animated by a desire to put forth a reliable product, can object to the expense, repeated at intervals so widely separated. The decennial revisions of our works on materia medica and pharmacy should present a brief account of the mineral waters conforming to ethical rules, so that the medical practitioner may be in possession of as authentic and authoritative a source of information regarding these as he has in case of other therapeutic agents.

46 West Eighty-fourth Street.

Bier's Hyperemia in Bone Tuberculosis.—S. H. Westman, in *Dominion Medical Monthly*, states that this method of treatment of tuberculosis of bones and joints does not take the place of radical methods, where these are indicated, but it does lessen the frequency of severe surgical measures. In the great majority of cases it is pleasant for the patient, it relieves pain, it allows him use of the limb, it is easily applied and can be used by the physician himself, and, lastly, it affords a complete cure, with the best functional result.

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