

Tucker. (W. G.)

REPORT

OF

WILLIS G. TUCKER. M. D., PH. D.,

ANALYST OF DRUGS.



Compliments of

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To WOOLSEY JOHNSON, M. D., *Chairman of the Sanitary Committee of the State Board of Health of New York:*

SIR— At a conference of the analysts, with the members of the Sanitary Committee, held in Rochester, July 30, 1885, the examination of drugs and medicinal substances generally, but more particularly of the officinal drugs and preparations of the United States Pharmacopœia, exclusive of the vegetable alkaloids and those preparations into which they enter, was assigned to me. The collection and examination of samples was begun September 1st, and I transmit herewith a report on the work done from that date to the present time. It was agreed that the analysts should engage their own collectors and, with the exception of a few samples purchased by myself, the articles examined by me have been collected under my direction by my assistant, Mr. A. G. Losee. The total number of samples collected and examined was 194, and the average cost of these samples, including collector's *per diem* and expenses, was a fraction over twenty-two cents.

In the selection of articles for examination, rarely used and unimportant drugs were excluded, and regard was had to the results previously obtained by analysts in this and other States, those articles most likely to be purposely adulterated, of inferior quality or impaired by age, being selected, that no time might be wasted in the examination of articles seldom prescribed or almost invariably pure. Preference was given to such articles as have a definite standard of purity assigned to them in the United States Pharmacopœia, since that work is particularly recognized in the Food and Drug Adulteration Law of 1881, and the pharmacopœial tests and analytical processes were commonly followed. Exhaustive analyses were not generally made, since they would have consumed much time to little profit, and limited the number of samples examined, but in the majority of instances at least one quantitative determination was necessarily made. All samples examined have been bottled and fully labeled, and the portion remaining upon the completion of the analysis has been preserved and full records of the same kept. Reports have been made to the Secretary of the Board, at the close of each month, upon the work done during the preceding month, and these have been accompanied with separate reports upon each sample examined.

Of the 194 samples examined 120 were of officinal drugs and preparations, and 74 of vinegar, which, although it has been dismissed from the United States Pharmacopœia at the last revision (1880), is still retained in those of most other countries. Vinegar, therefore, although generally classed with foods, may yet be considered a drug, and it having moreover been agreed that the analysts should not necessarily be restricted to the fields assigned them, and it being deemed advisable, for various reasons, to begin an investigation as to the quality of the vinegar sold in this part of the State, a number of samples were collected and examined, and it is proposed to continue this investigation by the collection of further samples in other localities.

I. DRUGS.

Of the 120 samples of drugs examined, 50 were procured in Albany, 27 in Troy, 20 in Hudson, 12 in Schenectady, and 11 in Amsterdam. With the exception of 12 samples of cream of tartar purchased at groceries they were all obtained at drug stores. Of the total number there were rated as of

Good quality.....	59 or 49.2 per cent.
Fair quality.....	35 or 29.2 per cent.
Inferior quality.....	23 or 19.1 per cent.
Sold by error.....	3 or 2.5 per cent.

Those classed as of "good quality" practically conformed to the requirements of the United States Pharmacopœia; those of "fair quality" fell not far below those requirements, while those rated as "inferior" were entirely fictitious (as in the case of some of the cream of tartars) or of very poor quality. In three cases the article sold did not consist of the substance called for.

The following were the articles examined:

Citric Acid. (*Acidum Citricum*, U. S. P.)

Three samples examined. Nos. 1, 4 and 11. Percentage purity respectively 99.73, 99.76, and 97.91. All of fair quality, containing traces only of metallic impurities.

Tartaric Acid. (*Acidum Tartaricum*, U. S. P.)

Four samples. Nos. 2, 10 and 59 of fair quality, containing traces of metallic impurities. Percentage purity respectively 97.82, 99.67 and 98.00. No. 3 consisted of *cream of tartar* of good quality, doubtless sold by mistake.

Iodide of Potassium. (*Potassii Iodidum*, U. S. P.)

Three samples, of which Nos. 5 and 8 were of fair, and No. 65 of good quality.

Bromide of Potassium. (*Potassii Bromidum*, U. S. P.)

Three samples, of which Nos. 6 and 7 were of fair, and No. 66 of good quality.

Santonin. (*Santoninum*, U. S. P.)

One sample, No. 9, which was of good quality.

Cream of Tartar. (*Potassii Bitartras*, U. S. P.)

Twenty-two samples, of which 10 were purchased at drug stores and 12 at groceries. Of the former *all* were real cream of tartar, 9 being of good, and 1 of fair quality. The percentage purity of these samples was as follows:

No. 12	87.19
No. 13	97.70
No. 14	94.92
No. 15	97.43
No. 16	97.80
No. 17	97.78
No. 48	97.67
No. 49	95.63
No. 50	98.73
No. 69	97.58

Average purity, 96.24 per cent.

Some of the commercial cream of tartar now sold is of an extraordinary degree of purity, there having been a great improvement in this respect during the last few years.

Of the 12 samples purchased at grocery stores, 2 were of good, 1 of fair, and 1 of inferior quality, while 8 were grossly adulterated or entirely fictitious. The percentage purity of the four first named was as follows:

No. 19	92.26
No. 20	81.47
No. 54	96.87
No. 56	79.31

Average of these four samples of real cream of tartar, 87.48 per cent, being much below that of the preceding samples obtained from drug stores. The remaining eight were made up as follows: Nos. 18, 21, 22 and 51 consisted chiefly of acid phosphate of lime and starch; No. 23 of sulphate of lime, starch and some cream of tartar, the acidity corresponding to 13.24 per cent; Nos. 52 and 53 consisted chiefly of sulphate of lime, starch and tartaric acid, the acidity of these samples corresponding to 31.57 and 30.56 per cent of cream of tartar, and No. 55, which was mainly sulphate of lime with some tartaric acid, with an acidity corresponding to 19.20 per cent.

The number of samples examined is too small and the territory in which they were collected too limited to base conclusions of much value upon the results obtained, though it would appear that a pure article is much more likely to be sold by the druggist than the grocer, whose so-called cream of tartar is often a mere imitation, and a very poor one at that.

Alcohol. (*Alcohol*, U. S. P.)

Six samples, Nos. 24, 25, 26, 27, 28 and 29; all were of good quality. The U. S. P. requires "91 per cent by weight of ethyl-alcohol." The percentage in these samples was respectively 91.14, 90.12, 90.16, 90.37, 90.30 and 90.87. Average, 90.49 per cent.

Stronger Ether. (*Aether Fortior*, U. S. P.)

Twelve samples, of which Nos. 31 and 32 were deficient in strength; Nos. 30, 104 and 117 were of inferior strength and quality; Nos. 111 and 114 were of fair quality, and Nos. 57, 99, 102, 106 and 120 were of good quality. No. 99 was labeled "Nitrous Ether" by mistake. Stronger ether, being largely used as an anæsthetic, ought to be of good quality, but these results show that an article of a quality inferior to that required by the pharmacopœia, is frequently offered for sale. The U. S. P. requires a specific gravity "not higher than 0.725 at 15 deg. C. (59 deg. F.)." The specific gravities of the twelve samples examined were as follows:

No. 30	0.737
No. 31	0.752
No. 32	0.739
No. 57	0.726
No. 99	0.724
No. 102	0.725
No. 104	0.744
No. 106	0.726
No. 111	0.724
No. 114	0.724
No. 117	0.747
No. 120	0.724

Purified Chloroform. (*Chloroformum Purificatum*, U. S. P.)

Twelve samples, of which Nos. 33 and 35 were of inferior quality and strength; No. 113 of fair quality, and Nos. 34, 58, 98, 101, 103, 105, 110, 116 and 119 were of good quality. The U. S. P. requires a specific gravity of 1.485-1.490 at 15 deg. C. (59 deg. F.) The specific gravities of the twelve samples examined were as follows:

No. 33	1.456
No. 34	1.488
No. 35	1.450
No. 58	1.493
No. 98	1.490
No. 101	1.489
No. 103	1.488
No. 105	1.488
No. 110	1.488

No. 113.....	1.487
No. 116.....	1.488
No. 119.....	1.489

Carbonate of Ammonium. (*Ammonii Carbonas*, U. S. P.)

Ten samples; of which Nos. 36, 115 and 118 were of good quality; No. 112 of fair quality, and Nos. 37, 38, 100, 107, 108 and 109 were of inferior quality, having undergone partial decomposition. In order to preserve this important medicinal agent in good condition it should be kept in well-stopped bottles and in a cool place. The results of the analyses made show that it is often carelessly kept and partly decomposed in consequence when offered for sale. The percentage purity of the ten samples was as follows:

No. 36	92.66
No. 37	66.44
No. 38	83.03
No. 100	65.91
No. 107	69.44
No. 108	67.87
No. 109	67.59
No. 112	79.68
No. 115	95.10
No. 118	96.95

Average of the ten samples, 78.46 per cent.

Chlorate of Potassium. (*Potassii Chloras*, U. S. P.)

Five samples, Nos. 39, 40, 41, 60-and 61, all of good quality.

Reduced Iron. (*Ferrum Reductum*, U. S. P.)

Six samples were examined, none of which came up to the pharmacopœial standard, which requires 80 per cent of metallic iron, but with the exception of No. 42 which consisted of *dried sulphate of iron*, sold through ignorance; the remaining samples, Nos. 43, 44, 62, 63 and 64 were considered of fair quality.

Gallic Acid. (*Acidum Gallicum*, U. S. P.)

Four samples, Nos. 45, 46, 47 and 68, all of good quality.

Dried Sulphate of Iron. (*Ferri Sulphas Exsiccatus*, U. S. P.)

One sample, No. 67, which was of good quality.

Water of Ammonia. (*Aqua Ammoniac*, U. S. P.)

Five samples; Nos. 72 and 73 were of fair, and Nos. 70, 71 and 91 of good quality, though most of them contained slight traces of metallic impurities, sulphates, etc. The U. S. P. requires

"ten per cent by weight of the gas." The percentage in the five samples examined was as follows:

No. 70	10.81
No. 71	15.50
No. 72	8.35
No. 73	7.89
No. 91	11.08

Benzoic Acid. (*Acidum Benzoicum*, U. S. P.)

Three samples, of which Nos. 74 and 95 were of good, and No. 75 of fair quality.

Oxalate of Cerium. (*Cerii Oxalas*, U. S. P.)

Four samples, Nos. 76, 77, 90 and 97, all of a fair degree of purity, though none of them corresponded precisely with the requirements of the U. S. P.

Magnesia. (*Magnesia*, U. S. P.)

Four samples, of which No. 92 was of good quality, Nos. 78, 79 and 80 only fair. This article is generally carelessly kept, and therefore partially carbonated by exposure to the air. It should be kept in well-closed vessels.

Washed Sulphur. (*Sulphur Lotum*, U. S. P.)

Four samples; Nos. 81 and 93 were of good quality, No. 82 consisted of *precipitated sulphur* sold by error, and No. 83 was *sublimed sulphur* or common "flowers of sulphur." The pharmacopœial requirements are plain, and there is no excuse for the sale of an unpurified article or other preparation of sulphur.

Oxide of Zinc. (*Zinci Oxidum*, U. S. P.)

Four samples, Nos. 84, 85, 86 and 94, all of fair quality.

Iodoform. (*Iodoformum*, U. S. P.)

Four samples, Nos. 87, 88, 89 and 96, all of good quality.

II. VINEGAR.

The seventy-four samples examined were all purchased at grocery stores, cider vinegar being called for in each instance. At a meeting of the Board held January 16, 1883, a standard was adopted for cider vinegar under and pursuant to section 4 of chapter 407 of the Laws of 1881, which standard was "not less than five (5) per cent of pure acetic acid" and "not less than one and one-half per cent of solid matters" on evaporation and drying at 212 deg. F. The Massachusetts Law of 1882 required the same percentages in the case of *all* vinegars, but in 1885 was amended and now requires "not less than four and one-half per cent by weight of absolute

acetic acid" in *all* vinegars and "not less than two (2) per cent of cider vinegar solids" in *cider* vinegar, and it prohibits the sale not only of adulterated or weak vinegar, but of any vinegar for cider vinegar which is not made exclusively from apple cider, and likewise the use of any artificial coloring matter. This is a good law, for while vinegar made from spirits or otherwise may be equally wholesome, it ought not to be sold for cider vinegar, as is very frequently the case.

An article so largely used in the preparation of food as vinegar ought to be both free from adulteration and of good strength as well, but the results of the examinations so far made show that here as elsewhere wide differences in quality exist. The addition of mineral acids is very uncommon, but much vinegar is sold which has been plentifully watered, and the greater part of that sold as cider vinegar is a so-called white wine vinegar colored by caramel with perhaps some cider vinegar added to give it flavor.

Of the seventy-four samples of vinegar examined, thirty-five were purchased in Albany, nineteen in Troy, six in West Troy, four in Green Island and ten in Cohoes. Of the total number, eleven or 14.8 per cent, were found to contain five per cent or over of absolute acetic acid, and sixty-three, or 85.2 per cent, contained less than five per cent and therefore fell below the legal requirement; eighteen, or 24.3 per cent, contained 4 1-2 per cent or over, and 56, or 75.7 per cent contained less than 4 1-2 per cent. The highest percentage of absolute acetic acid was 6.2 per cent and the lowest 1.8 per cent, the average being 4 per cent.

Number.	Per cent Acetic Acid.	Number.	Per cent Acetic Acid.
121.....	4.1	142.....	2.9
122.....	6.2	143.....	4.4
123.....	4.0	144.....	4.6
124.....	4.1	145.....	4.3
125.....	4.8	146.....	3.3
126.....	3.5	147.....	3.2
127.....	3.4	148.....	4.0
128.....	5.2	149.....	3.9
129.....	4.1	150.....	5.2
130.....	3.3	151.....	4.3
131.....	5.5	152.....	5.0
132.....	4.3	153.....	4.4
133.....	3.5	154.....	4.2
134.....	3.8	155.....	3.0
135.....	2.3	156.....	3.8
136.....	4.2	157.....	2.9
137.....	4.7	158.....	5.0
138.....	4.9	159.....	4.2
139.....	5.0	160.....	4.2
140.....	3.8	161.....	5.0
141.....	3.6	162.....	4.3

Number.	Per cent Acetic Acid.	Number.	Per cent Acetic Acid.
163.....	3.6	179.....	3.4
164.....	3.6	180.....	4.3
165.....	3.9	181.....	4.5
166.....	5.4	182.....	4.1
167.....	4.2	183.....	2.7
168.....	3.7	184.....	3.5
169.....	3.9	185.....	3.8
170.....	4.3	186.....	5.5
171.....	5.0	187.....	3.4
172.....	4.9	188.....	2.8
173.....	4.4	189.....	3.2
174.....	2.4	190.....	3.3
175.....	2.5	191.....	3.5
176.....	3.5	192.....	3.6
177.....	3.7	193.....	4.5
178.....	1.8	194.....	4.4

Other analyses made for the Board have been as follows :

WATER.

Four samples. One of these was from a city well, and furnished so striking an example of drinking water contaminated by excrementitious matter, probably serving as the medium of disease transmission, that the report made at the time is appended.

ALBANY, *September 10, 1885.*

Dr. A. L. CARROLL, *Secretary State Board of Health, Albany, N. Y.:*

DEAR SIR — I have made an analysis of a sample of well water from premises No. 308 Third street, Albany, sent to me September 5, 1885, by Dr. B. U. Steenberg of Albany, by request of Mr. Carman. The results point to gross contamination of the water. A death from diphtheria occurred in this house very recently and three other deaths from the same disease are known to have occurred in the immediate vicinity within a short time. I visited the premises on the 5th inst., with Dr. Steenberg and found the well, said to be thirteen feet deep, dug in a sandy soil and situated directly in the rear of the house. A privy with van't said to be eight feet deep and full to the surface of the ground, was situated about seventy feet from the well. A drain pipe from the second story of the next house on the east discharged within a few feet of the well upon the surface of the ground, the slop water, etc., from the same flowing back upon the lot and soaking into the ground. The condition of things described as existing upon these premises is essentially the same in all others in this neighborhood. There is no drain in the street, as I am informed, west of Thornton street and no water mains laid. Foul privies abound on all sides, and the water supply is drawn

from shallow wells dug in sand, in some cases within a *few feet* of the privies. Much drainage is discharged upon the surface of the ground, and as there are no pavements in this immediate locality it soaks into the sandy soil. Such a condition of things is in the highest degree insanitary, and it is certainly not surprising if diphtheria, typhoid fever and other infectious diseases are of frequent occurrence, as is said to be the case.

Analysis.

Color and appearance	Clear, Colorless.
Odor at 100 degrees F.	None.
Chlorine, grains per U. S. gallon	13.42
Free ammonia, parts per million.....	6.400
Albuminoid ammonia, parts per million.....	0.340
Total solids, grains per U. S. gallon	88.72
Loss on ignition, grains per U. S. gallon	43.78
Mineral matter, grains per U. S. gallon	44.94

Very respectfully yours,

WILLIS G. TUCKER.

Samples of water from Kingston (city water supply) and from Oneida lake (two analyses) were also analyzed. The former were reported October 9, and the latter November 10, 1885.

KEROSENE.

Six samples have been submitted for examination with the following results:

Flashing point.	Degrees F.
No. 8686.....	100
No. 8687.....	100
No. 8688.....	100
No. 8689.....	100
No. 8690.....	99
No. 8691.....	100

All of which is respectfully submitted.

WILLIS G. TUCKER,

Analyst.

CHEMICAL LABORATORY, ALBANY MEDICAL COLLEGE, ALBANY, N. Y., February 22, 1886.

