

of saccharine matter, and the copper test gives but 4.8 per cent., equivalent to 2.4 per cent. of absolute alcohol.

The remarks on No. 17 also apply to this example. The season appears to have affected the Connecticut grapes more unfavorably than it did those of Massachusetts.

No. 19. *Vitis cordifolia*, No. 11 of Weber's list. Near Hartford, Connecticut.

This is a medium-sized grape. One pound of the grapes yields $10\frac{1}{2}$ fluid ounces of juice, and its specific gravity is 1.036; from which the tables indicate 9 per cent. of saccharine matter. The copper test gives but 6.2 per cent. of grape sugar. The grapes could not have been ripe.

No. 20. *Vitis cordifolia*, No. 8 of Weber's list, Connecticut.

Size of the grapes, medium; quantity of juice per pound, $10\frac{1}{2}$ fluid ounces; specific gravity of the juice, 1.036; saccharine matter, by tables, 9 per cent., and copper test, 6.2 per cent. These grapes could not have been ripe.

No. 21. *Vitis cordifolia*, No. 7 Weber's list.

These grapes were of medium size. A pound of them yielded $10\frac{1}{2}$ fluid ounces of juice, which had specific gravity 1.044, and the saccharine contents, by tables, would be 11 per cent.; while the grape-sugar test gave 8.7 per cent., equivalent to 4.35 of absolute alcohol.

No. 22. *Vitis cordifolia*, No. 27 Weber's list.

Small black grapes, in closely-packed bunches. One pound of them yielded $10\frac{1}{2}$ fluid ounces of juice, of specific gravity 1.035; from which, by tables, the saccharine matter would be 9 per cent., but the copper test gives but 4.7 per cent.

No. 23. Scuppernong grapes, from near Wilmington, North Carolina.

These grapes are more remarkable for the high flavor of the wines they make than for the saccharine matter they contain. It has always been necessary to add a portion of brandy or some other spirit to keep the wine from souring; nevertheless, the Scuppernong wine is the best thus far produced in the United States.

The grapes have a very thick, leathery skin, which is of a green color, with a few rusty specks on the surface of them.

The pulp is soft and juicy, and the skins give a peculiar aroma to the wine, which is similar to the Tokay of Hungary. Sometimes I have observed a peculiar bitter taste in the wine, due to the crushed seeds of the grape, and not unfrequently the flavor and odor of whisky indicate the introduction of that liquor into the wine. With proper attention and care, Scuppernong wine may be made so fine as to excel all other wines made on this continent; and I would earnestly advise those interested to attend to the cultivation of this grape, in regions

where the vine will grow, and make use of more skill in the manufacture of the wine.

The grape will grow and ripen its fruit anywhere south of Washington, but has thus far proved more prolific in the soil of North Carolina, especially near Halifax.

The sample of grapes I operated upon was sent to me from the United States Patent Office on the 3d October, 1859.

One pound of the grapes when pressed yielded 8 fluid ounces of juice, which had a specific gravity 1.048, and, by tables, should contain 12 per cent. of saccharine matter, but, by the grape-sugar test, yielded 9.8 per cent., equivalent to 4.9 per cent. of absolute alcohol.

If 4 or 5 per cent. of sugar is added during the fermentation of the juice, the proportion of alcohol will be raised to that of sherry wine, if the fermentation is allowed to become complete. Only the purest white sugar, sugar candy, or refined syrup should be employed.

Another method will give a still richer wine. Distil a portion of the wine, and add the spirit obtained to the wine when it is made and fined. This will keep up the flavor of the Scuppernong grapes, and not vitiate the wine by any foreign flavors, such as are given by brandy and whisky so often put into this wine.

The Scuppernong grape-vines are, as I learn, cultivated on trellises or arbors raised to some height above the ground, as is practised in Ischia and Venetian Lombardy.

Thus far the vineyards are wholly domestic institutions in North Carolina; but I think the cultivation of this grape will amply repay any one who will devote his entire energies to planting vineyards of this vine, and in manufacturing the wine on a large scale.

No. 24. Hartford L. J. J. list, No. 31 of Weber's list. Connecticut.

Small black grapes. A pound of them yields $10\frac{1}{2}$ fluid ounces of juice, which has specific gravity of 1.056, and, by the tables, should contain 14 per cent. of saccharine matter.

By the grape-sugar test, the yield is 13.8 per cent. grape sugar, or 6.9 per cent. of absolute alcohol.

On searching for the acids, I found tartaric was the chief acid, and it is in part combined with potash as a bi-tartrate, and with lime as a tartrate. Malic acid, in minute proportion, is also present, but there is not more than 1 grain in 1 fluid ounce of the juice of the grapes.

This is a well-known and good wine grape, and was evidently ripe at the time I received the sample.

No. 25. *Vitis labrusca*, No. 6 of Weber's list. From near Hartford, Connecticut.

This grape yields in one pound 11 fluid ounces of juice, having the specific gravity 1.038, and, by the tables, should contain 10 per cent. of saccharine matter.

By the grape-sugar test, the proportion was 8.2 per cent., and the alcohol it will produce is 4.05 per cent.

No. 26. A small black, hard, and sour grape, No. 28 of Weber's list. Connecticut.

This grape yields in one pound $6\frac{1}{2}$ fluid ounces of juice, which has specific gravity 1.032, which indicates, by tables, 8 per cent. of saccharine matter, while by the copper test we obtained but 5.5 per cent. of grape sugar, equal to 2.7 per cent. alcohol.

No. 27. A large red grape, No. 29 Weber's list.

A pound of these grapes yield $10\frac{1}{2}$ fluid ounces of juice, which has specific gravity of 1.035, and, by tables, contains 9 per cent. of saccharine matter, while by grape-sugar test the proportion is only 6.16 per cent., which will give 3.8 per cent. of absolute alcohol in the wine.

No. 28. Large white grapes, No. 30 Weber's list.

A pound of these grapes yields $10\frac{1}{2}$ fluid ounces of juice, which has a density of 1.036, and, by tables, should contain 9 per cent. of saccharine matter, while by the grape-sugar test it is 5.38 and the alcohol 2.69 per cent. in the wine.

No. 29. Black grapes, medium size, *vitis cordifolia*. No. 32 of Weber's list.

A pound of these grapes yields 7 fluid ounces of juice, which has a specific gravity of 1.047, and, by the tables, $11\frac{1}{2}$ per cent. of saccharine matter.

By the grape-sugar test, it contains 7.84 per cent., or 3.92 per cent. of alcohol.

No. 30. Large red grapes, *vitis labrusca*. No. 33 of Weber's list.

One pound of the grapes yields 10 fluid ounces of juice, which has the density of 1.051, and by the tables contains 13 per cent. of saccharine matter, and by grape-sugar test, 13.3 per cent., while the alcohol will be 6.6 per cent.

This is a good wine grape, and was thoroughly ripe.

No. 32. *Vitis sinuata*, No. 35 of Weber's list.

These are very small black grapes, not much larger than ordinary cherries. The bunches are closely packed, well shouldered, and heavy.

A pound of these grapes yields 8 fluid ounces of juice, which has a density of 1.061, from which we estimate, by the tables, 15 per cent. of saccharine matter, while by the grape-sugar test the proportion found was 11.5 per cent., which represents in the wine 5.7 per cent. of absolute alcohol.

This grape will make a good wine.

No. 33. Dark-red grapes, *vitis labrusca*. No 36 of Weber's list.

A pound of these grapes yields 10 fluid ounces of juice, and the density of the juice is 1.042, whence the tables indicate $10\frac{1}{2}$ per cent. of

saccharine matter, while the copper test gives 14.3 per cent., from which the alcohol computed will be 7.15 per cent. This is a good wine grape.

No. 34. Catawba grapes, grown at East Cambridge, Massachusetts.

These grapes, which ripened November 21, were among the last of the season, and it was a matter of some interest to know what they would produce.

A pound of them yielded $11\frac{1}{2}$ fluid ounces of juice, which had a density of 1.063, and, by the tables, should yield 15 per cent. of saccharine matter. By the grape-sugar test, the yield was 16.9 per cent. of grape sugar, equivalent to 8.45 absolute alcohol.

It appears, then, that this grape will make a good wine as far north as Massachusetts. It is, however, very late in ripening here.

No. 35. Adelia, or Petit Noir.

A small black grape, raised in Orange county, New Jersey. It is a native American, though named in its synonym in French.

The sample was sent to me from the United States Patent Office, October 13, 1859.

This grape yields in one pound $10\frac{1}{2}$ fluid ounces of juice, which has the density of 1.061, and by the table its saccharine matter would amount to $14\frac{1}{2}$ per cent., while by the grape-sugar test it is 15.33 per cent., representing 7.66 per cent. of alcohol in the wine. It is a good grape, as proved by trial.

No. 36. Bartlett grape.

This grape was discovered in Lexington woods, by the late Elias Phinney, and is a large white grape, with one side light-red, which is that exposed to sunshine.

The sample was furnished to me by F. Alger, of South Boston.

A pound of these grapes yielded $11\frac{1}{2}$ fluid ounces of juice, and its specific gravity was 1.0680. By the tables, the saccharine matter would be 17 per cent., while by the copper test the sugar was 12.87 per cent., representing 6.44 per cent. of alcohol.

No. 37. Clinton grapes, East Cambridge, furnished by Mr. Brackett October 29, 1859.

These grapes are of a very dark-purple, and are of medium size. A pound of them produced 11 fluid ounces of juice, which had the density of 1.088, which, by tables, indicates 22 per cent. of saccharine matter, while the grape-sugar test gives 20.5 per cent., equivalent to 10.25 per cent. of absolute alcohol.

This is an excellent wine grape and needs no more sugar to make a good light-red wine.

No. 38. Last year I had occasion to make an analysis of some of the wild grapes of Connecticut, used in Boston for making wine, and since

the season was more favorable than the past I add this analysis to do the Connecticut grapes more justice than they have done themselves generally this year.

Vitis labrusca. Medium-size purple grapes. Sample furnished by E. Paige, of Boston, in 1858.

A pound of the grapes yielded 10 fluid ounces of juice, which had the density of 1.052 and, by tables, should contain 13 per cent. saccharine matter. By the grape-sugar test the proportion was found to be 17.8 per cent., and the alcohol 8.9 per cent.

This I believe will be the average in good seasons. The past summer and the autumn especially has been unusually cold in the New England States.

I have given a tabular *resumé* of the principal facts discovered by the foregoing analysis, which will present to the eye a ready means of comparison of the products of the different grapes, so far as their wine-making properties are concerned.

CHARLES T. JACKSON, M. D.

BOSTON, December 24, 1859.

Tabular statement of results of analysis of grapes of the United States, by Charles T. Jackson, M. D.

No.	Name and locality of grapes, and from whom received.	Color, &c	Juice, per pound. fluid ozs.	Specific gravity	Saccharine, per cent., according to Evans's tables.	Grape sugar, indicated by copper test.	Absolute alcohol, com- puted from grape sugar.
1	Henshaw grape, Martinsburg, Va.; Patent Office	Dark-purple, medium size	8	1.0700	17	15.52	7.76
2	Traminer grapes, Dorchester, Mass.; No. 18 of Weber	Pale mahogany-red, medium size	7	1.0485	12	11	5.5
3	Catawba, D. C.; Patent Office	Pale-red, medium size	11	1.0751	17.5	21.3	10.65
4	Fairfax county, Va.	Large red	10	1.0410	10	10.9	5.45
5	Mahogany-colored grapes, Malden, Mass.; No. 17 of Weber	Large red	10½	1.0500	12	10.7	5.35
6	Sweet-Water, Boston, Mass.; No. 19 of Weber	White, medium size	12	1.0525	13	9.53	4.76
7	<i>Vitis labrusca</i> , No. 22 of Weber; Concord, Mass.	Purple, medium size	10½	1.0510	13	15	7.5
8	<i>Vitis labrusca</i> , No. 20 of Weber; Concord, Mass.	Dark-red, large size	12	1.0570	14	11.7	5.85
9	Concord seedling No. 1; No. 24 of Weber	Purple, medium size	12	1.0550	13½	11.8	5.9
10	Concord seedling No. 2; No. 23 of Weber	Purple, medium size	11½	1.0550	13	11.8	5.9
11	Sage grape, R. W. Emerson's, Concord, Mass.; No. 25 of Weber	Pale-red, very large	11½	1.0465	11½	11	5.5
12	<i>Vitis rotundifolia</i> , No. 21 of Weber; Bedford, Mass.	Light-red, medium size	11½	1.0530	13	8.97	4.48
13	Amber grape, No. 26 of Weber; Dracut, Mass.	Light-red, translucent, fragrant	11	1.0580	14	10.97	5.48
14	Isabella grape, Mifflin county, Penn.; Patent Office	Light-red, translucent, medium size	11	1.0550	14	13.6	6.8
15	Sugar grape, Plymouth, Mass.; T. O. Jackson	Purple, medium size	10½	1.0640	16	14.7	7.03
16	<i>Vitis labrusca</i> , No. 10 of Weber; Hartford, Conn.	White grape, round, rather large size	10	1.0400	10	10.33	5.16
17	Large white grape, Conn.; No. 5 of Weber	Medium size	10	1.0360	9	5.73	2.86
18	<i>Vitis cordifolia</i> , No. 11 of Weber; Conn.	Medium size	10	1.0360	7½	4.80	2.4
19	<i>Vitis cordifolia</i> , No. 8 of Weber; Conn.	Medium size	10	1.0360	9	6.2	3.1
20	<i>Vitis cordifolia</i> , No. 7 of Weber; Conn.	Medium size	10	1.0440	11	8.7	4.35
21	<i>Vitis cordifolia</i> , No. 27 of Weber; Conn.	Black, small size	10½	1.0350	9	4.7	2.35
22	Scuppernong grapes, Wilmington, N. C.; Patent Office	White grapes, thick tough skins, medium size	8	1.0480	12	9.8	4.9
23	Hartford Prolific, No. 31 of Weber; Conn.	Small black grapes	10½	1.0560	14	13.8	6.9

TABULAR STATEMENT—Continued.

No.	Name and locality of grapes, and from whom received.	Color, &c.	Juice, per pound.	Specific gravity.	Saccharine, per cent., according to Evans's tables.	Grape sugar, indicated by copper test.	Absolute alcohol, computed from grape sugar.
25	Vitis labrusca, No. 6 of Weber; Hartford, Conn.	Purple, medium size.....	fluid ozs. 11	1.0380	10	8.1	4.05
26	No. 28 of Weber. (See his report.)	Small black, hard, sour.....	6½	1.0320	8	5.5	2.7
27	No. 29 of Weber. (See his report.)	Large red.....	10½	1.0350	9	6.16	3.8
28	No. 30 of Weber. (See his report.)	Large white grapes.....	10½	1.0360	9	5.38	2.69
29	Vitis cordifolia; No. 32 of Weber.	Black, medium size.....	7	1.0470	11½	7.84	3.92
30	Vitis labrusca; No. 33 of Weber.	Large red grapes.....	10	1.0510	13	13.3	6.6
31	Vitis cordifolia; No. 34 of Weber.	Black, medium size.....	10	1.0540	13½	10.93	5
32	Vitis sinuata; No. 35 of Weber.	Very small black grapes, in close clusters.	8	1.0610	15	11.5	5.7
33	Vitis labrusca; No. 36 of Weber.	Dark-red.....	10	1.0420	10½	14.3	7.15
34	Catawba grape, from near Boston, Mass.	Pale-red, medium size.....	11½	1.0630	15	16.9	8.45
35	Adelia or Petit Noir, Orange county, N. J.; Patent Office.	Small, black.....	10½	1.0610	14½	15.33	7.66
36	Bartlett Grape, origin Lexington, Mass.; F. Alger, South Boston.	Large, pale-red and green.....	11½	1.0680	17	12.87	6.44
37	Clinton, East Cambridge; Mr. Brackett.	Dark-purple, medium size.....	11	1.0880	22	20.5	10.25
38	Vitis labrusca, of Conn.; in more favorable year, 1858, sample from E. Paige.	Purple, medium size.....	10	1.0520	13	17.8	8.9

Boston, December 24, 1859

CHARLES T. JACKSON, M. D.

REPORT ON AMERICAN GRAPES.

DETERMINATION OF THE PROPORTIONS OF ACIDS IN NATIVE AMERICAN GRAPE WINES MADE FROM THE PURE JUICE OF THE GRAPES.

BY CHARLES T. JACKSON, M. D.

In this examination I employed graduated solution of pure caustic soda, in distilled water, and prepared it so that every degree of the acidimeter corresponded to one tenth of a grain of pure tartaric acid. This test gives results sufficiently exact, though a little of the acid in the wines is malic acid, as I had previously ascertained.

In applying this test, any acetic acid which had formed in the wine during the process of fermentation was first removed by evaporating the wine until it was all volatilized, the acetic acid passing off in vapor, while all the tartaric and malic acid remained. One thousand grains of each of the wines was operated upon in determining their acidity. In the tabular *resumé* the results will be stated in per centages, as the other ingredients have been.

It may be observed that pure grape juice, merely fermented and not diluted with any water, has been the subject of these experiments. In making wines from American grapes, it is customary to add a certain proportion of water and of sugar to the grape juice, to overcome the acids, and to make the wines more agreeable. As the sugar is converted into alcohol, it gradually precipitates a portion of the tartaric acid as bi-tartrate of potassa, or cream of tartar, thus relieving the wine of part of its acidity.

No. 1. The juice of the Henshaw grapes, from Martinsburg, Virginia, yielded, in 1,000 grains, 11.4 of tartaric acid, or 1.14 per cent.

No. 3. The Catawba grape juice, Washington, D. C., yielded, in 1,000 grains, 10 grains of tartaric acid, or 1 per cent.

No. 6. Sweet-water grape, Harding's, tartaric acid in 1,000 grains, 6 grains, or 0.6 per cent.

No. 7. Vitis labrusca, No. 20 of Weber's list, from Concord, Massachusetts, yielded, in 1,000 grains of the fermented juice, 14.2 grains, or 1.42 per cent.

No. 9. Concord seedling, Bull's, Concord Massachusetts, No. 24 of Weber's list, yielded, in 1,000 grains of the fermented juice, 6 grains of tartaric acid, or 0.6 per cent.

No. 11. Sage grape, of Concord, Massachusetts, No. 25 of Weber, yielded, in 1,000 grains of the fermented juice, 11 grains of tartaric acid, or 1.1 per cent.

No. 12. Vitis æstivalis, from Bedford, Massachusetts, No. 21 Weber, yielded 14.6 grains of tartaric acid per 1,000 grains of the wine, or 1.46 per cent.

No. 13. Amber grape, of Dracut, Asa Clements, yielded, in 1,000 grains of the wine, 15 grains of tartaric acid, or 1.5 per cent.