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POMACE WINES; THEIR COMPOSITION AND DETECTION.

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John R. Eoff, jr.
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POMACE WINES; THEIR COMPOSITION AND DETECTION.

In 1913-14, the Internal Revenue Bureau desiring some information on the composition of various types of American wines, undertook to collect and analyze a large number of such wines. The Bureau particularly wished to know the composition of the so-called pomace wines, which were at that time being rather extensively manufactured in certain sections of the East, and there was no chemical literature to be found on the subject; the author, therefore, undertook the analysis of these wines in the laboratory of the Bureau. The result of the investigation of the pomace wines has been very gratifying and has enabled us to recognize this product with assurance.

Having received from various sources urgent and repeated requests for the information obtained from this work the author feels this demand sufficient reason for its publication. For the benefit of those who are not acquainted with the manufacture of pomace wines a brief outline of the processes used is included in this paper to aid in interpreting our results.

I. GRAPE POMACE.

Grape pomace may be here defined as the residue of the grape after the juice has been partially or thoroughly removed, before or after fermentation. Pomace may be of two kinds---white or red.

a. White pomace.---This pomace is almost invariably that from the Catawba grape. The grapes are ground and the juice pressed from the skins, seeds and pulp, the juice so obtained being fermented separately. The residue (pomace) can never be pressed entirely free of juice and often contains as much as 8% sugar. Sometimes the pomace is immediately used for pomace wine, but oftener it is packed tight into barrels and allowed to ferment. The length of time the pomace is kept in barrels before use

varies from a few weeks to a year or more.

b. Red pomace.---The principal grape from which this pomace is derived is the Concord. To a lesser extent Concord and Ives mixed furnish this type of pomace, and though in this investigation there is no record of them, the writer has seen used the heavier colored varieties such as Norton and Clinton. The red pomace is obtained in three ways. (1) In making red wines the grapes are ground and the whole mass---juice, skins, pulp and seeds---is allowed to ferment, and at the proper stage the new wine is pressed off and the pomace packed in barrels. (2) Instead of pressing off the wine, the pomace is sometimes allowed to drain and, without pressing, immediately used for pomace wine: this procedure is infrequent. (3) In the manufacture of red grape juice the fruit is crushed, the mass heated to about 150°F., and then pressed.

II. POMACE WINES.

For the purposes of this article, pomace wine may be defined as the product obtained by the alcoholic fermentation of sugar solution upon grape pomace, accompanied by the usual cellar treatment. The Commissioner of Internal Revenue¹ has held that the manufacture of pomace wine is prohibited by section 3282, U. S. Revised Statutes, "except in building or on premises of a distillery duly authorized according to law."

General Method of Manufacture.---A quantity of pomace ranging from 650 to 1500 pounds, according to quality of pomace and product desired, is placed in open fermenting-vats of sufficient capacity, and upon this is run 700 to 800 gallons of "sugar water," the mash being yeasted or not as conditions require. The "sugar water" is prepared from cane or corn sugar and contains in the neighborhood of 20% sugar. Ammonium chloride is often added to the mash to facilitate fermentation, especially when old, dry pomace is used. The time allowed for the fermentation to -----

¹ Treasury Decision 1949, 2/16/14.

WHITE POMACE WINES

Laboratory Number	Collector's Number	Date Taken	Date Analyzed	Wine Cellar	Kind of Sugar	Amount Sugar Solution gals	Balling Sugar Solution	Temperature °F	Amount Pomace Pounds	Condition of Pomace	Days Pomace	Amount NH ₄ Cl oz	Kind of Pomace
61869	3	10/28/13	1/5/14	1	Ceresose	800	19.4	92	1021	fresh	6	none	Catawba
61870	4	10/28/13	1/5/14	1	"	1600	19.3	91	2010	"	6	"	"
61871	5	11/1/13	1/5/14	1	"	1600	19.0	92	2134	"	4	"	"
61872	6	11/6/13	1/5/14	1	"	800	19.2	86	920	"	5	"	"
61877	11	11/12/13	1/5/14	1	"	1600	19.4	70	1896	"	5	"	"
61880	14	11/22/13	1/5/14	1	Cane	800	18.7	90	951	"	7	"	"
61884	18	12/3/13	1/4/14	1	"	800	18.9	86	953	"	7	"	"
61873	7	11/3/13	1/5/14	2	"	700	19.3	65	693	old, dry, pale	12	About 30	"
61875	9	11/12/13	1/5/14	2	"	700	19.3	65	693	" " "	12	" "	"
61876	10	11/13/13	1/5/14	2	"	800	19.4	70	1056	" " "	14	" "	"
61879	13	11/22/13	1/5/14	2	"	700	19.5	70	781	" " "	14	" "	"
61883	17	12/1/13	1/4/14	2	"	700	19.2	70	700	" " "	14	" "	"
61885	19	12/3/13	1/4/14	2	"	700	19.2	70	700	" " "	14	" "	"
61887	21	12/8/13	1/4/14	2	"	700	19.3	75	728	fresh; poor color	16	28	"
63032	32	12/17/13	2/20/14	2	"	800	19.2	70	874	fair	13	32	"
63035	35	12/27/13	2/20/14	2	"	800	19.2	70	1052	old, dry, pale	15	32	"
63039	39	1/8/14	2/20/14	2	"	700	19.2	73	843	old, dry, poor	13	28	"
61882	16	11/29/13	1/4/14	3	Ceresose	800	19.0	72	641	Moist, fair	8	24	"
61890	24	12/8/13	1/4/14	3	"	800	24.2	72	938	" "	14	24	"
61894	28	12/12/13	1/4/14	3	"	800	19.2	70	665	" "	8	24	"
63031	31	12/13/13	2/20/14	3	"	700	19.2	70	1270	" "	5	24	"
63034	34	12/22/13	2/20/14	3	"	800	19.0	70	705	" "	10	24	"
63038	38	1/6/14	2/20/14	3	"	800	24.6	70	691	" "	13	24	"

RED POMACE WINES

61886	20	12/8/13	1/4/14	1	Cane	800	18.8	90	1490	good	6	none	Concord Grape Juice
61896	30	12/13/13	1/4/14	1	"	800	18.7	80	1508	"	5	"	"
63033	33	12/22/13	2/20/14	1	"	800	18.7	82	1528	"	5	"	"
61874	8	11/8/13	1/5/14	2	"	675	20.0	70	1078	dry; poor color	12	About 30	Concord + Ives
61878	12	11/19/13	1/5/14	2	"	800	19.4	70	1440	" " "	14	" "	Concord
61891	25	12/9/13	1/4/14	2	"	700	19.2	70	886	fresh; poor color	14	28	"
61895	29	12/13/13	1/4/14	2	"	700	19.5	70	904	New, dry, poor color	14	28	Concord + Ives
63037	37	12/30/13	2/20/14	2	"	800	19.3	70	1201	dry; poor color	13	32	Concord + Ives
63036	36	12/29/13	2/20/14	3	Ceresose	800	19.2	70	1023	fair; part wet, part dry	11	24	Concord + Ives

WHITE POMACE WINES
Grams per 100 c.c.

Number	Alcohol Vol. %	Extract	Non-Sugar Extract	Reducing Sugar as Invert	Glycerol	Acidity		Total Tartaric Acid	Total Lactic Acid	Total Free Tartaric Acid	Gross Tartaric Acid	Combined with Fruit Matter	Jamun Coloring Matter	Pentosans	Volatile Esters	Ash	P ₂ O ₅		Nitrogen	Chlorine	K ₂ O	Na ₂ O	CaO	MgO	SO ₃	Alkalinity of Ash		Polarization at 100° 200°	% P ₂ O ₅ in Ash	Specific Gravity 15°C	
						Total Tartaric Acid	Total Lactic Acid										Total Soluble	Total Insoluble													
869	9.37	6.56	2.73	3.83	5.17	4.35	0.32	3.94	2.37	0.0	0.12	0.14	0.28	—	2.88	0.014	Trace	0.014	0.045	0.888	0.729	0.584	0.210	0.094	0.268	16.8	6.4	10.4	+14.7	4.0	1.0127
870	8.94	6.67	2.65	4.02	4.91	4.43	0.32	4.02	2.39	0.0	0.13	0.13	0.28	—	2.76	0.096	Trace	0.096	0.034	—	—	0.236	0.094	—	17.2	7.0	10.2	+14.8	3.5	1.0136	
871	8.04	8.40	2.58	5.82	4.65	4.09	0.31	3.70	2.30	0.0	0.14	0.12	0.33	—	2.50	0.080	Trace	0.080	0.045	0.902	0.655	0.585	0.184	0.093	0.154	16.0	7.6	8.4	+19.8	3.2	1.0214
872	8.40	6.80	2.36	4.44	5.28	4.01	0.31	3.62	2.19	0.0	0.16	0.09	0.33	—	2.56	0.078	Trace	0.078	0.039	0.817	—	—	0.126	—	16.4	8.6	7.8	+17.9	3.1	1.0148	
877	8.66	7.58	2.55	5.03	4.01	3.77	0.29	3.41	2.06	0.0	0.18	0.06	0.26	—	2.58	0.076	Trace	0.076	0.028	0.852	0.698	0.584	0.160	0.087	0.171	15.8	9.4	6.4	+19.7	2.9	1.0175
880	8.95	7.13	1.61	5.52	3.69	3.86	0.41	3.35	2.16	0.0	0.17	0.07	0.38	—	1.10	0.076	0.018	0.058	0.050	0.199	0.537	0.040	0.080	0.054	0.032	13.2	8.8	4.4	+17.8	6.9	1.0154
884	9.95	5.97	1.62	4.35	4.38	3.86	0.56	3.15	1.85	0.0	0.11	0.07	0.33	—	1.03	0.060	0.008	0.052	0.039	0.028	0.507	0.039	0.116	0.056	0.178	10.8	6.0	4.8	+17.1	5.8	1.0098
873	12.38	1.39	1.32	0.07	6.00	3.15	0.76	2.20	1.07	0.0	0.13	0.09	0.28	0.36	1.47	0.014	0.022	0.092	0.039	0.170	0.791	0.067	0.076	0.098	0.065	15.0	9.6	5.4	+0.4	7.7	0.9893
875	12.45	1.57	1.51	0.06	6.02	4.24	0.70	3.37	2.78	0.0	0.22	0.09	0.26	0.40	1.60	0.016	0.032	0.084	0.050	0.185	0.887	0.046	0.060	0.104	0.070	17.8	11.8	6.0	+0.3	7.2	0.9900
876	12.30	1.57	1.50	0.07	6.04	3.42	0.83	2.38	1.08	0.0	0.14	0.09	0.31	0.48	1.80	0.076	0.078	0.098	0.056	0.178	1.013	0.038	0.092	0.100	0.034	19.0	12.8	6.2	+0.1	9.8	0.9901
879	11.87	3.07	1.45	1.62	5.60	3.83	0.71	2.94	1.91	0.0	0.17	0.06	0.60	—	1.11	0.026	Trace	0.026	0.011	0.199	0.538	0.058	0.076	0.058	0.031	13.6	9.0	4.6	+1.8	8.3	0.9964
883	12.18	1.70	1.53	0.17	5.22	4.69	0.59	3.95	2.85	0.0	0.24	0.08	0.24	—	1.50	0.022	0.042	0.080	0.056	0.199	0.826	0.032	0.108	0.101	0.025	18.0	12.6	5.4	+0.1	8.1	0.9908
885	10.86	1.47	1.65	0.73	4.74	4.50	1.15	3.06	2.87	0.0	0.17	0.09	0.24	—	2.24	0.046	0.070	0.076	0.043	0.192	0.869	0.388	0.084	0.106	0.031	28.0	22.0	6.0	+2.9	6.5	1.0299
887	11.32	3.26	1.68	1.58	5.87	5.21	1.32	3.56	2.73	0.0	0.20	0.07	0.22	0.58	1.56	0.022	0.022	0.100	0.028	0.234	0.771	0.031	0.098	0.102	0.027	15.2	10.4	4.8	+7.4	8.0	0.9977
032	12.16	1.99	1.46	0.53	5.22	4.31	0.74	3.38	2.22	0.0	0.20	0.07	0.22	0.58	1.50	0.022	0.022	0.100	0.028	0.265	0.690	0.051	0.108	0.109	0.015	16.0	10.4	5.6	+2.5	3.8	0.9919
035	11.35	2.40	1.82	0.58	5.64	6.04	1.60	4.04	2.78	0.0	0.26	0.07	0.33	0.37	1.73	0.076	0.022	0.154	0.025	0.192	0.955	0.051	0.110	0.125	0.094	18.8	13.8	5.0	+2.8	8.9	0.9944
039	11.86	1.76	1.55	0.21	6.04	5.06	1.10	3.68	2.66	0.0	0.20	0.07	0.09	0.40	1.54	0.016	0.008	0.086	0.025	0.185	0.815	0.031	0.094	0.105	0.022	15.4	10.6	4.8	+0.8	8.9	0.9943
882	10.58	3.23	2.45	0.78	5.98	3.60	0.60	2.85	1.29	0.0	0.07	0.08	0.31	0.52	2.42	0.016	0.008	0.098	0.045	0.096	0.355	0.750	0.164	0.108	0.190	10.4	3.6	6.8	+8.5	4.4	0.9984
894	9.75	2.97	2.20	0.77	6.08	3.75	0.37	3.28	1.61	0.0	0.08	0.10	0.55	0.56	2.28	0.098	0.004	0.094	0.036	0.923	0.494	0.676	0.150	0.101	0.146	11.0	4.2	6.8	+9.6	4.3	0.9984
031	10.97	3.10	2.50	0.60	6.37	3.98	0.79	2.99	1.55	0.0	0.08	0.09	0.45	0.44	2.45	0.010	0.003	0.098	0.034	0.944	0.506	0.668	0.150	0.105	0.154	11.6	4.2	7.4	+7.1	4.1	0.9985
034	11.46	3.26	2.50	0.76	6.15	4.24	0.56	3.54	1.95	0.0	0.09	0.11	0.29	0.56	2.42	0.098	0.004	0.094	0.028	0.888	0.593	0.590	0.162	0.080	0.167	12.2	5.0	7.2	+8.4	4.0	0.9975
038	14.11	4.44	3.00	1.44	7.75	4.50	0.55	3.81	2.25	0.0	0.11	0.11	0.43	0.72	2.81	0.168	0.010	0.158	0.034	0.973	0.662	0.750	0.152	0.104	0.166	13.0	5.6	7.4	+11.5	6.0	0.9993
890	13.08	4.37	3.20	1.17	7.82	4.69	0.72	3.79	1.98	0.0	0.12	0.12	0.62	0.68	3.09	0.144	Trace	0.144	0.056	1.136	0.836	0.693	0.170	0.109	0.232	12.2	4.2	8.0	+11.3	4.6	1.0001
037	10.81	1.37	2.01	—	5.5	4.22	0.67	3.37	2.13	0.0	0.09	0.09	0.35	0.31	1.98	0.106	—	—	0.037	0.471	0.674	0.303	0.127	0.094	0.102	—	9.1	6.1	—	5.6	1.0025

RED POMACE WINES

886	9.28	7.63	2.01	5.62	4.52	4.20	0.53	3.54	1.86	0.04	1.0	0.07	0.14	—	1.18	0.105	0.007	0.098	0.095	0.036	0.501	0.043	0.038	0.080	0.255	9.8	5.2	4.6	+1.8	9.0	1.0169																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
896	10.88	3.64	1.81	1.83	4.60	4.50	0.38	4.02	1.88	0.04	0.09	0.07	0.19	—	1.14	0.090	0.024	0.066	0.084	0.036	0.462	0.037	0.124	0.074	0.270	9.6	5.0	4.6	+6.7	8.0	0.9997																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
833	10.66	4.00	1.69	2.31	4.55	4.35	0.40	3.85	1.59	0.05	0.07	0.06	0.107	—	1.05	0.058	0.004	0.054	0.025	0.028	0.470	0.031	0.110	0.109	0.232	7.6	3.6	4.0	+8.8	5.5	1.0044																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
874	12.41	2.71	1.74	0.97	6.50	5.18	0.88	4.08	2.63	0.01	0.23	0.07	0.40	—	1.34	0.050	0.010	0.040	0.039	0.178	0.893	0.027	0.092	0.061	0.021	17.2	12.4	4.8	+4.4	3.7	0.9944																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
878	12.11	2.12	1.76	0.36	6.57	5.36	1.18	3.88	2.79	0.00	0.26	0.07	0.33	0.50	1.66	0.120	0.040	0.080	0.039	0.170	0.992	0.040	0.114	0.072	0.030	19.0	14.0	5.0	+1.0	7.2	0.9924																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
891	11.92	1.86	1.71	0.15	5.28	4.88	1.15	3.44	2.72	0.00	0.26	0.06	0.48	—	1.58	0.082	0.024	0.058	0.042	0.192	0.791	0.049	0.112	0.107	0.026	19.2	13.8	5.4	+1.0	5.2	0.9916																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
895	11.63	3.10	1.71	1.39	5.20	5.29	1.10	3.91	2.81	0.02	0.23	0.08	0.36	0.55	1.58	0.080	0.016	0.064	0.028	0.241	0.822	0.076	0.110	0.080	0.017	17.6	12.4	5.2	+6.3	5.1	0.9968																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
837	12.50	1.99	1.74	0.25	5.72	4.80	0.71	3.91	3.23	0.00	0.30	0.08	0.50	0.53	2.01	0.116	0.028	0.088	0.050	0.270	1.050	0.066	0.116	0.089	0.079	22.8	16.0	6.8	+0.8	5.8	0.9915																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
836	11.15	3.12	2.45	0.67	5.94	3.98	0.80	2.98	1.43	0.01	0.04	0.11	0.41	0.79	0.32	2.37	0.179	0.003	0.176	0.045	0.846	0.502	0.601	0.192	0.116	0.154	9.2	2.0	7.2	+6.9	7.6	0.9974																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
834	11.31	3.37	1.85	—	5.4	4.73	0.79	3.73	2.3	0.02	0.18	0.07	0.5	0.5	1.34	0.08	—	—	0.049	0.222	0.720	0.107	0.121	0.087	0.120	—	9.4	5.3	—	6.3	0.9980																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
PURE CATAWBA WINES															0.246	0.028	0.540	0.051	0.016	0.131	0.067	15.6	8.2	7.4	—	6.5	12.3	0.9973																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</

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proceed on the pomace varies from 4 to 16 days, after which the wine is drawn off and, if the fermentation is not complete, allowed to finish in closed casks. The wine is then almost immediately clarified and placed on the market, often blended with other wines, or it is aged in cellars for varying periods. The red pomace wines are often artificially colored, placing malvae flowers in the fermenting-vats being a common method of coloring.

III. COLLECTION OF SAMPLES.

In order that the investigation might deal with a product identical with that found upon the market, an officer of the Internal Revenue Bureau was detailed to collect samples of pomace wines from three wine cellars engaged in the commercial manufacture of this article. He was instructed to personally observe the various steps in the manufacture and to make full records of them. This he has done most painstakingly and thoroughly and through the courtesy of the wine makers has collected many details. For the purposes of this Bureau it was of especial importance that the wine should be collected at the time it was drawn from the pomace, so most of the samples were secured at that stage. In case of fermentation's not having been completed, the samples were to be sterilized directly after bottling. For wines of this character the conclusions drawn from the following analyses will hold for older wines of the same type.

IV. HISTORY AND ANALYSES OF POMACE WINES.

In table I is included a brief history of the pomace wines collected. The analyses of them appear in table II. For comparative purposes the latter table also contains the analyses of two pure Catawba wines made in the fall of 1913.

(Insert tables I and II.)

V. DEDUCTIONS.

In the following discussion it is presumed that an analyst desiring to establish pomace origin in a wine is sufficiently familiar with wines and wine analysis to enable him to recognize to what general type his sample belongs, and the characteristics of this type, for without such knowledge it were a hopeless undertaking to attempt to arrive at an intelligent conclusion. To illustrate this, unfortified pure dry wines will rarely, if ever, contain less than .3 gram total tartaric acid in 100 c. c., and in any wine which contains a less amount of total tartaric acid and which belongs to this group one may be suspicious of pomace origin. There is another class of dry, or practically dry wines whose tartaric acid content is normally about .1 gram in 100 c.c., or less---the dry sherries. A novice might confuse the two; one with experience, never.

Nitrogen.---Should the analysis show a figure for this element below 10 milligrams per 100 c.c. there is strong indication of pomace origin, and should the figure fall to 5 or below it is almost a foregone conclusion that one is dealing with a pomace wine. Nitrogen in the form of ammonia or nitrate has never been observed in any wine analyzed by the author.

Chlorine.---This constituent is of peculiar interest. Its determination not only aids in detecting spurious wines, but often furnishes evidence of their manner of manufacture. Natural wines are invariably low in chlorine content, the great majority containing less than 5 milligrams in 100 c.c. Some California wines have been known to exceed double this amount, but as a general rule any chlorine content above 10 milligrams may be viewed with suspicion. The excess chlorine may be due to either of two causes, or to both: (1) the use of ammonium chloride as a fermentation accelerator; (2) the use of corn sugar solution in the manufacture of the wine. Since it is rarely the custom to add ammonium

chloride to a normal wine fermentation, its presence not being necessary, one is justified in concluding that it is added in case of poor fermentation, such as is the case with sugar solution over old, dry pomace. In this event the chlorine will be close to 20-30 milligrams per 100 c.c. When the chlorine figure approaches 100 milligrams per 100 c.c., with a corresponding increase in the content of soda, one has practical proof that corn sugar has been used in the preparation of the wine, and, with the aid of other determinations, that it is pomace wine. Polarization at 87° C. after inversion is useful in substantiating the presence of corn sugar or corn sugar residue. The practice of using corn sugar for sweetening or gallizing wines, once considerably in vogue, has greatly decreased and it may often be disregarded.

Soda.---The ranges and interpretation of this figure are similar to those for chlorine.

Total Tartaric Acid.---Pomace wines are low in total tartaric acid as compared with wines with which they are likely to become confused. A figure of 30 centigrams per 100 c.c. or under is suspicious, and any unfortified wine falling below 10 centigrams of this constituent may usually be deemed spurious. The author has been informed of one supposedly pure unfortified European wine whose tartaric acid content is below 10 centigrams per 100 c.c., but the history of the wine has proved incomplete.

Fixed Acid as Tartaric.---Any figure below 50 centigrams per 100c.c. is ground for suspecting pomace origin.

Ash.---For white dry wines an ash of 20 centigrams per 100 c.c. or over indicates pomace. For red wines this figure is of but general value.

Alkalinity of Ash.---The alkalinity of the water-soluble ash of pomace wines often falls as low as 8 c.c. N/10 HCl per 100 c.c. wine or under, which is very unusual for natural wines. When the alkalinity of

the water-insoluble ash exceeds the alkalinity of the water-soluble ash the fact is very characteristic of pomace wines.

Nonsugar Extract.---Any figure below 1.5 grams per 100 c.c. for white wines and 2.0 grams per 100 c.c. for red wines, suspicious.

Pentosans.---For white wines, any figure below 50 milligrams per 100 c.c., and for red wines, below 100 milligrams per 100 c.c., suspicious.

Per Cent. P_2O_5 in Ash.---Having this figure below 10 is almost a constant property of pomace wines.

Neutralization Test.---This test, which is communicated by D. B. G. Hartmann, of the Bureau of Chemistry, has been found very valuable as an aid in the detection of white pomace wines: "Straight wines or gallized wines, when neutralized with sodium hydroxide, darken slightly and acquire a brownish-pink tint; pomace wines acquire a brownish color and very often contain a sediment after standing."

Adjustment of Ash and Nonsugar Extract.---In cases where corn sugar is indicated in the manufacture of the suspected wine it is advisable to adjust the figures for ash and nonsugar extract to those of true grape material; i. e., make allowance for the effect of corn sugar residue on these constituents. The corrections to be made can be determined by referring to the analyses of pomace wines given above. Necessarily these corrections will be more or less arbitrary but the results obtained will be of value in differentiating between pomace wines and wines gallized with corn sugar.

The following determinations are of secondary importance in judging pomace origin, but they are of value in sustaining interpretations of the cardinal determinations given above;

Free Tartaric Acid.---Pomace wines contain little or no ^{free} tartaric acid.

Cream of Tartar.---Below 5 milligrams per 100 c.c., suspicious.

Sulfuric Acid (SO_3).---Below 15 centigrams per 100 c.c., suspicious.

Magnesia.---For white wines, any striking variation from 10 milligrams per 100 .c. c., suspicious.

In searching for pomace origin in wines the determination of any single constituent never closes the problem, and it is equally true that few, if any, pomace wines will show all the peculiarities of this product.

The organoleptic examination is of great aid in making the final decision. The color of the wine is often helpful.

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In conclusion the author wishes to express his sincere appreciation to Mr. D. W. Campbell, of Sandusky, O., for the untiring interest shown in the collection of the wines represented in the above analyses. Thankful acknowledgment is also extended to several colleagues in the Internal Revenue Laboratory for timely aid in the analysis of the wines: to Mr. W. V. Linder for determining nitrogen, volatile acids and pentosans in samples 61882-96; Mr. J. M. Doran, total acid and tannin, samples 61882-96, and lime and magnesia, samples 61869-80; Mr. P. Valaer, specific gravity and tannin, samples 63031-42.

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