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OF

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NEW HAVEN, CONN.

ON

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NEW HAVEN, CONN.

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BEING THE

Twenty-Second Report

ON

Food Products

AND

Tenth Report on Drug Products

By JOHN PHILLIPS STREET

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Twenty-Second Report on Food Products and Tenth Report on Drug Products, 1917.

By John Phillips Street.*

As the prevalence of food adulteration decreases, the food work done by the Station on its own initiative has less to do with that feature. During recent years we have paid more attention to the nutritive value of foods, especially those which are either new to this state or the analyses of which have not yet appeared in our published reports. Eventually these reports will contain the analyses of practically all foods sold in Connecticut under distinctive brand names.

Aside from investigations of this kind, during the past year the Station has devoted considerable time to a study of bread. This has dealt with the influence of certain "yeast foods" or "bread improvers," as well as a study of variations in the weights of loaves of bread due to inequalities in the working of the molding machines and scaling operations at the bakeries, and also of variations due to the drying out of the loaves between the time of baking and their purchase by the consumer. The methods of fat determination in bread have also been reviewed, and losses in fat heretofore attributed to losses during the baking process have been shown to be due almost entirely to failure of the official method to extract the fat.

The laboratory also has studied in some detail the method of drying vegetables by means of a current of unheated air from an electric fan, and analyses of 18 dried vegetables are given in this report.

* The analytical work herein reported was done mainly by the writer's assistants, E. M. Bailey, C. B. Morison and C. E. Shepard. Especial credit is due to Mr. Morison for his painstaking work in connection with the difficult analysis of the drugs from physicians' stocks.

Unfortunately the laboratory's work on the composition of proprietary medicines has been interrupted this year. However, the chief chemist has prepared a book entitled "The Composition of Certain Patent and Proprietary Medicines," which has been published by the American Medical Association. This compilation gives the analyses of 2800 brands of these medicines, and should prove of use to physicians, pharmacists, inspection officials and to the general public.

In addition to 536 samples collected by our own agent, 678 samples collected by the Dairy and Food Commission were examined. These were chiefly milk, vinegar, Hamburg steak, sausage, physicians' drugs and toilet preparations. Of the 678 samples, 334 were found to be adulterated or below standard, 118 of these, however, being milks which were deficient only in solids-not-fat.

One hundred and forty samples sent by private individuals were tested, 44 of these samples being adulterated or below standard.

During the past year much of the time of the chief chemist has been occupied with work in connection with food and drug control in other allied organizations. He has served as a member of the Joint Committee on Food Definitions and Standards, Associate Editor of the Journal of the Association of Official Agricultural Chemists, expert on diabetic foods for the Council of the American Medical Association, Vice Chairman of the Section of Food and Drugs, Chairman of the Committee on Nostrums, and Director of the American Public Health Association, Secretary of the New England Association of Food Inspection Officials, and Chairman of the Committee of the American Association of Dairy, Food and Drug Officials on Co-operation with the Hoover Food Administration.

CANNED BEANS.

Sixty-two samples of canned beans were analyzed, including 5 of red kidney, 23 of lima and 34 of string and wax beans. The brand names of these samples are given below:

Red Kidney Beans.

7995. Sunbeam Pure Food Kidney Beans, Austin, Nichols and Co., Dist., New York.

8099. Oak Orchard Brand Red Kidney Beans, Batavia Canning Co., Batavia, New York.

8010. Burt Olney's Red Kidney Beans, The Burt Olney Canning Co., Oneida, N. Y.

8084. Oneida Chief Brand Red Kidney Beans, The Burt Olney Canning Co., Oneida, N. Y.

8105. Van Camp's Red Kidney Beans, The Van Camp Packing Co., Indianapolis, Ind.

Lima Beans.

8034. Medium Lima Beans, Acker, Merrall and Condit Co., New York.

8090. Valley Field Fresh Lima Beans, Austin, Nichols and Co., New York.

8022. Gold Rock Brand Small Tender Lima Beans, A. F. Beckman and Co., New York.

8049. Early Autumn Brand Lima Beans, Est. A. Brakeley, Bordentown, N. J.

7999. Luxury Lima Beans, Joseph Brakeley, Freehold, N. J.

8071. B. and M. Lima Beans (prepared by cooking dried lima beans), Burnham and Morrill, Portland, Me.

8042. Essie Brand Fancy Quality Lima Beans, James Butler, New York.

8104. Lima Beans, Curtice Brothers Co., Rochester, N. Y.

8080. Davisco Brand Lima Beans, F. H. Davis and Co., New London, Conn.

8095. Harrison Brand Lima Beans Standard Quality, Lewis De Groff and Son, New York.

8082. Aurora Brand Fancy Medium Green Lima Beans, Geneva Preserving Co., Geneva, N. Y.

8075. Gold Leaf Green Lima Beans, Granger and Co., Buffalo, N. Y.

8001. Royal Seal Brand Soaked Lima Beans, Granger and Co., Buffalo, N. Y.

8096. Green Mountain Brand Lima Beans (prepared from dried lima beans), Green Mountain Packing Co., Portland, Me.

8009. Webster's Best Brand Lima Beans, The Lord-Webster Co., Baltimore, Md.

8094. Country Club Brand Lima Beans (prepared from dried lima beans), quality unsurpassed, Portland Packing Co., Portland, Me.

8086. Hart Brand Little Quaker Lima Beans, W. R. Roach and Co., Hart, Mich.

8100. Monroe Brand Lima Beans (equal in quality to any so-called Extra Standards), Rochester Preserving Co., Rochester, N. Y.

8103. Portia Brand Lima Beans, Seeman Bros., New York.

8031. White Rose Brand Small Lima Beans, Seeman Bros., New York.

8077. The Famous Royal Scarlet Brand Small Lima Beans, R. C. Williams and Co., New York.

8011. Brownie Brand Lima Beans (prepared from dried lima beans), D. E. Winebrenner Co., Hanover, Pa.

8047. Empire Brand Green Lima Beans, First Quality, Winters and Prophet Canning Co., Mount Morris, N. Y.

String and Wax Beans.

8033. Noreca Brand Extra Standard Quality String Beans, Acker, Merrall and Condit Co., New York.
8091. Meadow Brook Brand Cut Golden Wax Beans, The Burt Olney Canning Co., Oneida, N. Y.
8069. Oneida Chief Brand Cut Golden Wax Beans, The Burt Olney Canning Co., Oneida, N. Y.
8068. Oneida Chief Brand Refugee Beans, The Burt Olney Canning Co., Oneida, N. Y.
8043. Essie Brand Fancy Quality Stringless Beans, James Butler, New York.
8093. Health Brand Cut Wax Beans, Lewis De Groff and Son, New York.
8079. Shield Brand String Beans, J. S. Farren and Co., Baltimore, Md.
8007. Eagle Brand Refugee Beans, Fort Stanwix Canning Co., Rome, N. Y.
8076. Waldorf Brand Tiny Golden Wax Beans, Fort Stanwix Canning Co., Rome, N. Y.
7996. Fredonia Beauty Brand Fancy Refugee Beans, Fredonia Preserving Co., Fredonia, N. Y.
8074. Royal Seal Brand Cut Golden Wax Beans, Granger and Co., Buffalo, N. Y.
7994. Royal Seal Brand Cut Golden Wax Beans, Granger and Co., Buffalo, N. Y.
8081. Royal Seal Brand Cut String Beans, Granger and Co., Buffalo, N. Y.
8087. Iona Brand String Beans, The Great Atlantic and Pacific Tea Co., Jersey City, N. J.
7997. Sultana Brand String Beans, The Great Atlantic and Pacific Tea Co., Jersey City, N. J.
8050. Green Mountain Brand Cranberry Stringless Beans, Green Mountain Packing Co., Portland, Me.
8097. Helmet Brand Golden Wax Beans, The E. S. Kibbe Co., Hartford, Conn.
8098. Our Choice Cut Golden Wax Beans, Medina Canning Co., Medina, N. Y.
8101. Forest King Brand Cut Refugee Beans, W. H. Osborn Co., Honeoye Falls, N. Y.
7993. Silver Key Brand Golden Wax Beans, Standard Quality, Oswego Preserving Co., Oswego, N. Y.
8085. Hart Brand Little Dot String Beans Extra Quality, W. R. Roach and Co., Hart, Mich.
8045. Bridal Brand Cut Wax Beans, Thos. Roberts and Co., Philadelphia, Pa.

8014. Golden Wedding Cut Refugee Beans, Fine Quality, Rochester Preserving Co., Rochester, N. Y.
8032. White Rose Brand String Beans, Seeman Bros., New York.
8102. White Rose Yellow Wax Beans, Seeman Bros., New York.
8000. Extra Standard Stringless Beans, B. F. Shriver Co., Union Mills, Md.
8023. Epicure Cut Stringless Beans, Extra Quality, John S. Sills and Sons, New York.
8089. Hermitage Brand Extra Stringless Refugee Beans, Our Finest Quality, Stoddard, Gilbert and Co., New Haven.
8083. Hatchet Brand Extra Fine Refugee Beans, The Twitchell-Champlin Co., Portland, Me.
8106. Economy Brand Refugee String Beans, R. C. Williams and Co., New York.
8016. The Famous Royal Scarlet Brand Stringless Refugee Beans, R. C. Williams and Co., New York.
8070. Lusitania Brand String Beans, R. C. Williams and Co., New York.
8012. Conewago Brand Cut Refugee String Beans, D. E. Winebrenner Co., Hanover, Pa.
8046. Empire Brand Golden Wax Beans First Quality, Winters and Prophet Canning Co., Mount Morris, N. Y.

Tables I and II give the results of the physical examination of these samples, while Tables III and IV show the composition of both the drained beans and the separated liquor.

Physical Examination.

Proportion of Beans and Liquor. After weighing the sealed cans, they were opened and the liquor separated from the beans by draining through a colander.

The weight of drained beans in the red kidney beans ranged from 413 to 430 gms ; and that of the liquor from 178 to 205 gms. The liquor made up from 29.7 to 33.1 per cent. of the total weight of the can contents.

In the lima beans the variations in amounts of beans and liquor were much greater, the beans ranging from 297 to 413 gms.; and the liquor from 184 to 284 gms. The liquor made up from 31.3 to 48.9 per cent. of the total weight of the can contents, 9 of the 23 samples containing 40 per cent. or more of liquor.

The variations with the wax and string beans were likewise large. The weight of drained beans ranged from 240 to 376 gms., and that of the liquor from 203 to 323 gms. The liquor made up from 37.7 to 57.4 per cent. of the total net weight, 14 of the 34 samples containing 45 per cent. or more of liquor.

TABLE I.—RED KIDNEY AND LIMA BEANS.

Station No.	Brand.	Weight of Can and contents.	Weight of Beans and liquor.	Weight of Drained beans.	Weight of Liquor.	Weight of Per cent. liquor.	Weight of Contents. Claimed.	Weight of Contents. Found.	Cost per can.	Cost per lb. drained beans.	Size of beans.	Top of can above level of contents.
	Red Kidney Beans.	gms.	gms.	gms.	gms.		oz.	oz.	cts.	cts.		in.
7995	Sunbeam	728	619	414	205	33.1	20	21.9	10	10.9	...	1/4
*8099	Oak Orchard	699	591	413	178	30.1	19	20.9	10	10.9	...	3/8
8010	Bert Olney	718	615	427	188	30.6	20	21.7	10	10.7	...	9/16
8084	Oneida Chief	715	612	430	182	29.7	20	21.6	15	15.8	...	5/8
*8105	VanCamp	719	613	428	185	30.2	20	21.7	15	15.9	...	3/8
	Lima Beans.											
8034	Acker, Merrall & Condit	694	597	369	228	38.2	19	21.1	13	16.0	small	7/16
8090	Austin, Nichols & Co.	701	601	391	210	34.9	19	21.2	10	11.6	med.	7/16
*8022	Beckmann	697	577	345	232	40.2	19	20.4	15	19.7	"	1/4
8049	A. Brakeley	700	603	374	229	38.0	19	21.3	12	14.5	"	1/2
7999	J. Brakeley	697	598	413	185	31.3	19	21.1	12	13.2	"	7/16
8071	Burnham & Morrill	697	598	386	212	35.5	20	21.1	13	15.3	large	9/16
8042	Butler	688	588	338	250	42.5	19	20.8	15	20.2	small	9/16
8104	Curtice Bros.	679	578	363	215	37.3	20	20.3	12	15.0	med.	11/16
8080	Davis	694	595	384	211	35.5	20	21.0	15	17.7	small	7/16
*8095	De Groff	683	581	297	284	48.9	..	20.5	10	15.2	med.	1/4
8082	Geneva Pres. Co.	696	596	366	230	38.6	20	21.1	15	18.6	"	7/16
8075	Granger (Golf Leaf)	707	611	360	251	41.1	20	21.6	15	18.9	"	1/2
*8001	Granger (Royal Seal)	708	596	345	251	42.1	20	21.1	10	13.1	large	5/16
*8096	Green Mountain	711	607	399	208	34.3	20	21.4	13	14.7	"	1/4
8009	Webster's	689	598	355	243	40.6	20	21.1	12	15.4	med.	9/16
8094	Portland Pack. Co.	690	587	397	190	32.4	20	20.7	10	11.4	"	11/16
8086	Roach	715	615	369	246	40.0	20	21.7	17	20.9	small	3/8
8100	Rochester Pres. Co.	706	604	383	221	36.6	20	21.3	15	17.8	med.	1/2
8103	Seeman Bros. (Portia)	690	596	371	225	37.7	19	21.0	13	15.8	"	1/2
8031	Seeman Bros. (White Rose)	697	598	351	247	41.3	20	21.1	15	19.4	small	7/16
8077	Williams	688	592	391	201	34.0	20	20.9	15	17.4	"	9/16
8011	Winebrenner	686	590	347	243	41.1	20	20.8	10	13.1	large	1/2
*8047	Winters & Prophet	667	559	375	184	32.9	20	19.7	15	18.2	small	1/2

* In sanitary can.

From these data it appears that on the average the canned red kidney beans contain the least free liquor and the wax and string beans the most. The cut wax and string beans contained on the average 40.9 per cent. of free liquor, while the whole beans of this kind averaged 46.8 per cent.

Net Weight of Can Contents. All the samples but one bore a statement of net weight. Only one sample of lima and three of wax and string beans showed slight deficiencies of from 0.2 to 0.8 oz.

TABLE II.—WAX AND STRING BEANS.

Station No.	Brand.	Weight of Can and contents.	Weight of Beans and liquor.	Weight of Drained beans.	Weight of Liquor.	Weight of Per cent. liquor.	Weight of Contents. Claimed.	Weight of Contents. Found.	Cost per can.	Cost per lb. drained beans.	Size of beans.	Whole or cut.	Top of can above level of contents.
		gms.	gms.	gms.	gms.		oz.	oz.	cts.	cts.			in.
*8033	Noreca String	695	589	324	265	45.2	19	20.8	12	16.8	med.	whole	1/16
8091	Meadow Brook Wax	675	576	331	245	41.5	19	20.3	15	20.5	"	cut	7/16
8069	Oneida Chief Wax	683	585	344	241	41.2	18	20.6	15	19.8	"	"	3/8
8068	Oneida Chief Refugee	678	576	319	257	44.6	19	20.4	15	21.2	"	whole	5/8
*8043	Essie Stringless	686	581	337	244	42.0	19	20.5	17	22.9	small	"	1/8
*8093	Health Wax	672	565	331	234	41.4	19	19.9	15	20.5	large	cut	1/4
8079	Shield String	651	555	266	289	52.1	20	19.2	10	17.0	"	whole	9/16
*8007	Eagle Refugee	686	583	333	250	42.9	19	20.6	15	20.5	small	"	3/16
*8076	Waldorf Wax	684	582	280	302	51.9	19	20.5	15	24.3	"	"	3/16
*7996	Fredonia Refugee	680	573	346	227	39.6	20	20.2	15	19.7	"	"	1/4
*8074	Royal Seal Wax	669	568	344	224	39.4	19	20.0	10	13.2	large	cut	1/4
*7994	Royal Seal Wax	691	583	304	279	47.9	19	20.6	10	14.9	"	"	3/16
8081	Royal Seal String	684	577	345	232	40.2	19	20.3	12	15.7	med.	"	1/4
8087	Iona String	667	563	240	323	57.4	19	19.8	10	18.8	large	whole	9/16
*7997	Sultana String	686	577	356	221	38.3	19	20.4	8	10.2	"	cut	3/16
*8050	Green Mountain Stringless	691	594	357	237	40.0	19	21.0	13	16.5	"	"	1/16
*8097	Helmet Wax	699	593	311	282	47.6	19	21.0	15	21.8	small	whole	7/8
*8098	Medina Wax	678	572	341	231	40.4	19	20.3	10	13.3	med.	cut	1/4
*8101	Forest King Refugee	674	568	325	243	42.8	19	20.1	15	21.1	"	"	1/4
*7993	Silver Key Wax	645	539	336	203	37.7	19	18.7	13	17.6	large	whole	1/2
8085	Hart String	666	565	376	289	51.1	19	19.9	20	24.1	small	"	5/16
*8045	Bridal Wax	687	582	345	237	40.7	19	20.5	13	17.0	large	cut	3/16
8014	Golden Wedding Refugee	674	568	328	240	42.3	19	20.1	10	13.8	small	"	7/16
*8032	White Rose String	675	567	305	262	46.2	19	20.0	16	23.9	"	whole	1/4
*8102	White Rose Wax	684	580	334	246	42.4	19	20.4	15	20.3	"	"	1/4
8000	Shriver Stringless	663	561	304	257	45.8	20	19.8	10	15.0	mix.	"	1/2
8023	Epicure Stringless	683	575	351	224	39.0	20	20.3	15	19.4	large	cut	5/16
*8089	Hermitage Stringless	661	555	296	259	46.7	19	19.6	15	22.9	med.	whole	5/16
*8083	Hatchet Refugee	678	579	296	283	48.9	19	20.5	20	30.5	small	"	1/8
*8106	Economy String	668	567	274	293	51.7	19	20.0	12	19.8	large	"	3/16
*8016	Royal Scarlet Stringless	677	564	266	298	52.8	19	19.9	15	25.5	small	"	5/16
*8070	Lusitania String	659	562	287	275	48.9	19	19.8	12	19.0	large	"	5/16
*8012	Conewago String	687	581	360	221	38.0	20	20.5	10	12.6	"	cut	3/16
8046	Empire Wax	686	581	343	238	41.0	19	20.5	15	19.8	small	whole	3/8

* In sanitary can.

Fill of Cans. The distance between the level of the can contents and the top of the can ranged from 1/4 to 9/16 in. in the red kidney beans, from 1/4 to 11/16 in. in the lima beans, and from 1/16 to 5/8 in. in the wax and string beans. Nineteen of the 62 samples showed an air space of 1/2 in. or over.

Cost per Can. The cost of the red kidney beans ranged from 10 to 15 cents, that of the limas from 10 to 17 cents, and that of the wax and string beans from 8 to 20 cents per can.

TABLE III.—ANALYSES OF RED KIDNEY AND LIMA BEANS.

Station No.	Drained Beans. Water.	Total ash.	Protein. (N×6.25.)	Fiber.	Nitrogen-free extract.	Ether extract.	Sodium chlorid.	Bean ash.	Liquor. Water.	Solids.	Total ash.	Sodium chlorid.	Bean ash.	Acidity. cc N/10 NaOH per 100 cc.
Red Kidney.														
7995	70.14	1.42	7.27	1.24	19.38	0.55	0.51	0.91	88.06	11.94	1.78	0.99	0.79	24.0
8099	71.22	1.42	6.38	1.28	19.17	0.53	0.46	0.96	88.61	11.39	1.82	0.99	0.83	24.6
8010	71.16	1.37	7.51	1.28	18.18	0.50	0.44	0.93	86.84	13.16	1.52	0.71	0.81	28.8
8084	71.27	1.39	6.71	1.26	18.84	0.53	0.66	0.73	86.26	13.74	1.56	0.70	0.86	32.6
8105	70.77	1.37	7.52	1.34	18.49	0.51	0.46	0.91	87.69	12.31	1.74	1.01	0.73	22.2
Ave.	**70.91**	**1.40**	**7.08**	**1.28**	**18.81**	**0.52**	**0.51**	**0.89**	**87.49**	**12.51**	**1.68**	**0.88**	**0.80**	**26.4**
Lima.														
8034	77.07	1.35	5.34	1.41	14.45	0.38	0.69	0.66	93.63	6.37	1.79	1.10	0.69	16.6
8090	72.92	1.55	5.87	1.42	17.95	0.29	0.65	0.90	91.53	8.47	2.00	1.05	0.95	22.4
8022	74.84	1.79	5.75	1.46	15.87	0.29	1.17	0.62	92.86	7.14	2.30	1.70	0.60	15.4
8049	74.46	1.43	5.92	1.57	16.30	0.34	0.66	0.77	93.67	6.33	1.73	0.94	0.79	17.2
7999	74.25	1.49	6.25	1.46	16.25	0.30	0.78	0.71	92.82	7.18	1.86	1.01	0.85	23.4
8071	74.45	1.45	5.97	1.61	16.20	0.32	0.63	0.82	88.86	11.14	1.68	0.81	0.87	22.4
8042	77.23	1.45	5.60	1.70	13.64	0.38	0.70	0.75	94.52	5.48	1.72	1.07	0.65	13.4
8104	71.20	1.66	7.86	1.78	17.19	0.31	0.55	1.11	91.43	8.57	1.93	1.09	0.84	18.0
8080	75.63	1.52	5.91	1.46	15.04	0.44	0.77	0.75	92.88	7.12	1.74	1.01	0.73	15.8
8095	75.11	1.01	5.38	1.41	16.80	0.29	0.41	0.60	93.77	6.23	1.25	0.71	0.54	14.6
8082	74.34	1.55	5.88	1.71	16.16	0.36	0.73	0.82	94.11	5.89	1.92	1.09	0.83	19.2
8075	74.11	1.54	6.24	1.64	16.05	0.42	0.66	0.88	91.47	8.53	1.67	1.02	0.65	16.4
8001	72.18	1.43	5.94	1.70	18.32	0.43	0.72	0.71	88.94	11.06	1.74	0.93	0.79	20.6
8096	71.87	1.59	6.14	1.67	18.38	0.35	0.32	1.27	86.61	13.39	1.91	1.14	0.77	23.0
8009	73.30	1.73	6.12	1.50	17.03	0.32	1.07	0.66	92.12	7.88	2.20	1.41	0.79	18.0
8094	72.68	1.37	6.94	1.49	17.01	0.51	0.43	0.94	90.95	9.05	1.57	0.81	0.76	19.0
8086	76.92	1.60	5.61	1.63	13.79	0.45	0.76	0.84	94.43	5.57	1.82	1.21	0.61	10.8
8100	74.99	1.75	6.14	1.33	15.46	0.33	0.86	0.89	91.21	8.79	2.04	1.37	0.67	18.0
8103	72.25	1.53	5.84	1.62	18.36	0.40	0.66	0.87	92.27	7.73	1.89	1.11	0.78	19.4
8031	76.34	1.45	5.39	1.74	14.73	0.35	0.76	0.69	94.60	5.40	1.73	1.04	0.69	16.2
8077	75.61	1.43	5.68	1.45	15.41	0.42	0.64	0.79	91.84	8.16	1.69	0.92	0.77	19.2
8011	72.38	1.52	6.74	1.69	17.27	0.40	0.76	0.76	90.96	9.04	1.90	1.03	0.87	22.0
8047	75.06	1.11	5.28	1.54	16.59	0.42	0.61	0.50	92.95	7.05	1.61	1.02	0.59	14.0
Ave.	**74.31**	**1.49**	**5.99**	**1.57**	**16.27**	**0.37**	**0.69**	**0.80**	**92.11**	**7.89**	**1.81**	**1.07**	**0.74**	**18.0**

Cost per Pound of Drained Beans. The red kidney beans cost from 10.9 to 15.9 cents per pound of drained beans, the limas from 11.6 to 20.9 cents, and the wax and string beans from 10.2 to 30.5 cents. These wide variations in cost are influenced, of course, both by the cost per can and the proportion of drained beans present, and clearly indicate the possibilities of economy in a wise choice of brands. The apparently cheap brands are by no means always the most economical purchase, for very often their low cost is due to the relatively large amount of liquor sold with them.

TABLE IV.—ANALYSES OF WAX AND STRING BEANS.

Station No.	Drained Beans. Water.	Total ash.	Protein. (N×6.25).	Fiber.	Nitrogen-free extract.	Ether extract.	Sodium chlorid.	Bean ash.	Liquor. Water.	Solids.	Total ash.	Sodium chlorid.	Bean ash.	Acidity. cc N/10 NaOH per 100 cc.
8033	92.27	1.76	1.29	0.90	3.68	0.10	1.37	0.39	95.52	4.48	1.72	1.47	0.25	12.0
8091	93.59	1.03	1.16	0.86	3.28	0.08	0.76	0.27	97.05	2.95	1.01	0.83	0.18	6.7
8069	93.88	1.02	1.28	0.81	2.93	0.08	0.53	0.49	97.15	2.85	0.93	0.69	0.24	7.8
8068	93.77	1.25	1.18	0.77	2.94	0.09	0.84	0.41	96.72	3.28	1.15	0.88	0.27	7.4
8043	93.23	1.18	1.50	0.87	3.13	0.09	0.77	0.41	96.35	3.65	1.10	0.83	0.27	11.2
8093	90.42	1.67	1.43	1.26	5.10	0.12	1.30	0.37	96.07	3.93	1.70	1.42	0.28	9.6
8079	91.77	1.47	1.26	0.94	4.41	0.15	1.09	0.38	96.10	3.90	1.35	1.11	0.24	13.2
8007	93.60	1.30	1.25	0.81	2.96	0.08	0.92	0.38	96.53	3.47	1.25	1.00	0.25	10.8
8076	93.51	1.50	1.21	0.80	2.90	0.08	1.12	0.38	96.61	3.39	1.45	1.20	0.25	7.6
7996	93.01	1.29	1.39	0.87	3.35	0.09	0.83	0.46	96.61	3.31	1.14	0.86	0.28	10.0
8074	91.92	0.85	1.05	0.92	5.18	0.08	0.61	0.24	95.74	4.26	0.82	0.55	0.27	8.4
7994	89.76	1.46	2.07	1.00	5.63	0.08	1.13	0.33	94.32	5.68	1.43	1.20	0.23	9.2
8081	93.59	1.41	1.30	0.94	2.66	0.10	0.82	0.59	96.75	3.25	1.11	0.87	0.24	12.0
8087	90.81	1.73	1.55	1.21	4.56	0.14	1.31	0.42	96.41	3.59	1.77	1.48	0.29	7.9
7997	93.43	1.23	1.26	0.86	3.14	0.08	0.85	0.38	96.74	3.26	1.15	0.90	0.25	8.8
8050	91.20	1.48	1.41	1.07	4.73	0.11	1.11	0.37	95.10	4.90	1.47	1.19	0.28	11.4
8097	93.55	1.36	1.51	0.82	2.67	0.09	0.94	0.42	96.74	3.26	1.25	1.01	0.24	7.4
8098	92.37	1.14	1.53	0.97	3.89	0.10	0.75	0.39	96.89	3.11	1.08	0.81	0.27	8.8
8101	94.09	0.74	1.16	0.88	3.05	0.08	0.38	0.36	97.36	2.64	0.65	0.41	0.24	8.8
7993	90.81	1.38	1.96	1.28	4.45	0.12	0.93	0.45	95.86	4.14	1.42	1.05	0.37	16.0
8085	92.87	1.17	1.70	0.91	3.24	0.11	0.71	0.46	96.54	3.46	1.07	0.76	0.31	7.9
8045	91.97	1.14	1.38	1.06	4.37	0.08	0.79	0.35	96.56	3.44	1.10	0.85	0.25	9.0
8014	93.46	1.17	1.16	1.01	3.11	0.09	0.79	0.38	96.91	3.09	1.05	0.83	0.32	9.6
8032	94.54	0.94	1.15	0.75	2.52	0.10	0.58	0.36	97.35	2.65	0.85	0.61	0.24	7.6
8102	93.73	1.15	1.30	0.84	2.90	0.08	0.75	0.40	96.82	3.18	1.07	0.81	0.26	7.3
8000	92.06	1.02	1.31	0.96	4.53	0.12	0.61	0.41	95.95	4.05	0.96	0.67	0.29	10.4
8023	93.64	1.58	1.02	0.81	2.87	0.08	1.25	0.33	96.23	3.77	1.56	1.34	0.22	15.6
8089	93.24	1.29	1.21	0.89	3.26	0.11	0.91	0.38	96.07	3.93	1.29	1.04	0.25	9.8
8083	94.16	1.27	1.17	0.78	2.53	0.09	0.84	0.43	96.93	3.07	1.18	0.99	0.19	8.0
8106	93.40	1.37	1.19	0.80	3.15	0.09	1.04	0.33	96.55	3.45	1.36	1.15	0.21	8.2
8016	94.05	1.10	1.29	0.80	2.67	0.09	0.75	0.35	97.15	2.85	1.02	0.82	0.20	8.8
8070	92.37	1.00	1.40	0.97	4.13	0.13	0.62	0.38	96.98	3.02	0.95	0.70	0.25	9.8
8012	93.76	1.27	1.18	0.88	2.81	0.10	0.95	0.32	96.71	3.29	1.25	1.03	0.22	10.4
8046	93.35	1.02	1.30	0.81	3.44	0.07	0.65	0.38	96.57	3.43	0.99	0.69	0.30	9.8
Ave.	**92.85**	**1.26**	**1.34**	**0.92**	**3.53**	**0.10**	**0.87**	**0.39**	**96.47**	**3.53**	**1.20**	**0.95**	**0.25**	**9.6**

CHEMICAL COMPOSITION.

Inasmuch as the liquor accompanying the beans is usually thrown away, the composition of the beans themselves is of chief interest.

The following tabulation shows the maximum, minimum and average amounts of food ingredients contained in the different classes of beans:

	Red Kidney.			*Lima.*			*Wax and String.*		
In drained beans:	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.
Water	71.27	70.14	70.91	77.23	71.20	74.31	94.54	89.76	92.85
Protein	7.52	6.38	7.08	7.86	5.28	5.99	2.07	1.02	1.34
Fiber	1.34	1.24	1.28	1.78	1.33	1.57	1.28	0.75	0.92
Nitrogen-free extract	19.38	18.18	18.81	18.38	13.64	16.27	5.63	2.52	3.53
Ether extract	0.55	0.50	0.52	0.51	0.29	0.37	0.15	0.07	0.10
Ash, salt-free	0.96	0.73	0.89	1.27	0.50	0.80	0.59	0.24	0.39
Sodium chlorid	0.66	0.44	0.51	1.17	0.32	0.69	1.37	0.38	0.87
In liquor:									
Water	88.61	86.26	87.49	94.60	86.61	92.11	97.36	94.32	96.47
Ash, salt-free	0.86	0.73	0.80	0.93	0.54	0.74	0.37	0.18	0.25
Sodium chlorid	1.01	0.70	0.88	1.70	0.71	1.07	1.48	0.41	0.95

The brands of red kidney beans showed a remarkably uniform composition. On the average they contained about 29 per cent. of solids, one-fourth of which was protein, and the remaining three-fourths chiefly carbohydrates. The proportion of ether extract (fat) is almost negligible.

The lima beans on the average contained somewhat less solids than the red kidney beans, but the relative proportions of protein and carbohydrates were about the same. Five brands labeled "soaked beans" contained on the average about 2 per cent. more solids than the other brands, three-fourths of which was carbohydrates and one-fourth protein. Consequently these soaked beans contained somewhat more nutriment than the unsoaked varieties, but of course with less tenderness and flavor. On the other hand the soaked beans were considerably cheaper, costing on the average 11.2 cents per can and 13.5 cents per pound of drained beans, against 13.7 and 17.0 cents per pound, respectively, in the other brands.

The wax and string beans supply much less nutriment than either red kidney or lima beans, containing only about one-fourth as much solids, or 7.15 per cent. Furthermore, these beans generally contained more added salt than the other varieties, so so that the actual bean solids present averaged only 6.28 per cent.

The relative nutritive value of the three classes of beans is shown by the fact that on the average the drained solids in red kidney beans yield 108, lima beans 91 and wax and string beans 20 calories per 100 gms.

It is interesting to note that the liquor accompanying the

red kidney and the lima beans contained more nutriment than the drained wax and string beans themselves, and it is obvious that the housekeeper who discards the liquor of the two first-named varieties of beans throws away considerable valuable nutriment. The liquor of wax and string beans, on the other hand, is scarcely worth saving as it contains only 2.5 per cent. of salt-free solids.

Content of Tin.

Tin was determined in the solids and the liquor of all the samples, except in twelve liquors which were discarded by mistake. Table V shows the amounts found, expressed as mgms, per kilo or parts per million.

Table V.—Tin in Canned Beans (Mgms. per Kilo or Parts per Million.)

Number.	Tin. In solids.	Tin. In liquor.	Number.	Tin. In solids.	Tin. In liquor.	Number.	Tin. In solids.	Tin. In liquor.	Number.	Tin. In solids.	Tin. In liquor.
Red Kidney.			*Lima.*			*Wax or String.*			*Wax or String.*		
7995	117	32	8082	116	51	8069	338	62	8101	340	76
8099	204	26	8075	163	41	8068	368	77	7993	246	*
8010	164	35	8001	197	58	8043	382	104	8085	169	44
8084	108	40	8096	148	88	8093	106	32	8045	252	43
8105	210	26	8009	254	73	8079	577	69	8014	362	*
Lima.			8094	105	45	8007	348	*	8032	313	*
8034	157	49	8086	93	32	8076	410	98	8102	256	46
8090	121	73	8100	112	37	7996	430	*	8000	253	*
8022	224	116	8103	127	56	8074	199	52	8023	217	*
8049	123	54	8031	149	38	7994	196	*	8089	353	98
7999	118	70	8077	101	58	8081	381	91	8083	219	59
8071	147	102	8011	150	53	8087	283	54	8106	463	91
8042	163	34	8047	122	34	7997	425	*	8016	391	*
8104	129	35	*Wax or String.*			8050	311	75	8070	316	75
8080	121	48	8033	471	*	8097	630	121	8012	155	*
8095	116	63	8091	240	44	8098	272	54	8046	186	42

* Not determined.

The following is a summary of Table V:

	Red Kidney.			*Lima.*			*Wax and String.*		
	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.
In solids, mgms.	210	108	161	254	93	142	630	106	319
In liquor, mgms.	40	26	32	116	32	56	121	32	69

The above figures are in entire harmony with those reported by other investigators. Canned beans as a rule show relatively large amounts of tin, wax and string beans generally containing much more than either red kidney of lima beans. The degree of toxicity of tin is still a somewhat open question, but at any rate its presence in any considerable quantity in a food is objectionable. The source of this tin is of course, the tin container, the amount contained in the food depending in part on the age of the food and the storage temperature. In the case of beans, and similar slightly acid foods, the tin present in the canned product has been shown to be due in part in some cases to the amino bodies present. It has been erroneously assumed that the tin in canned foods was in solution. Bigelow* (*Research Laboratories, Nat. Canners' Asso., Bull. 2, Aug. 1914), however, has shown that the tin is largely, sometimes chiefly, in some insoluble form. Moreover we are not justified in assuming that all of the tin found in the liquor even is in a soluble form, for it is quite probable that much of this is present as a finely divided "insoluble oxid, hydrated oxid, or basic salt of tin." Furthermore it is possible that much of the tin seemingly in solution is in colloidal form.

The smallness of our samples prevented further investigation along these very interesting lines. Nevertheless the fact remains that a number of these samples contained excessive amounts of tin. If it is possible for one packer of red kidney beans to keep the tin in his product down to 108 mgms., there seems to be no justifiable reason why another's brand should contain 210 mgms. in the drained beans. Similarly with lima beans, one brand showed only 93 mgms., and ten others less than 125 mgms., while two brands contained 224 and 254 mgms. In spite of the fact that wax and string beans as a rule carry more tin than other beans, we find one brand with only 106 mgms. in the drained solids; on the other hand twelve brands contained from 300 to 400 mgms.; six brands from 400 to 600 mgms.; and one brand 630 mgms. If these large amounts of tin are due to storage conditions and the age of the sample, it would seem that the consumer should be provided with some protection against such a situation.

Acidity of Liquor.

It has been suggested that the tin content is measured largely by the acidity of the liquor. Our results, however, indicate that this is not the determining factor, as there is no close connection between the acidity of the bean liquor and the amount of tin present. The sample of red kidney beans showing the highest acidity contained the least tin, while the two brands of lima beans and the brand of string beans containing the most tin were all relatively low in acidity. The average acidity of the red kidney beans was 26.4, that of the lima beans 18.0, and that of the wax and string beans 9.6, while the last-named contained on the average twice as much tin in the solids as either the red kidney or lima beans.

EXPERIMENTS WITH BREAD.

These experiments have taken up the following points:

1. The advantages or disadvantages following the use of "yeast food" or "bread improvers," more particularly *Arkady Yeast Food.*
2. The losses of food nutriments in the baking of bread.
3. The determination of fat in bread.
4. A study of tolerances for the net weight of loaves of bread:
   a. Losses in weight due to drying out of the bread.
   b. Variations in weight of loaves due to bakery manufacturing conditions.

1. The Advantages or Disadvantages Following the Use of Yeast Foods or Bread Improvers.

The chief chemist of this Station has been charged by the Joint Committee on Food Definitions and Standards, with the collection of data relative to the preparation of a definition and the formulation of standards for bread. Incidental to this work it was deemed a matter of great importance to determine the role played in bread manufacture by the various "yeast foods" and "bread improvers," which are being brought more and more to the attention of bakers. These products are of two general classes: the malt preparations (extracts or flours), and the compounds which are alleged to supply to the yeast certain nutrients, which either stimulate the yeast or, by supplying particularly suitable food, increase its activity.

Five malt extracts, four malt flours and five samples of a yeast food were analyzed. These were as follows:

Malt Extracts.

9549. *Diamalt.*, The American Diamalt Co., Cincinnati, O.
9541. *Malt Extract*, Freihofer Baking Co., Philadelphia, Pa.
9546. *O. P. Malt*, Malt-Diastase Co., New York.
10004. *Roloco*, The Corby Co., Washington, D.C.
9453. *Malt Extract* (manufacturer unknown), used in test by S. S. Thompson Co., New Haven.

	9540	9541	9546	10004	9453
Alcohol by volume	3.20	3.20	5.20	*	*
Extract	75.41	75.72	74.42	76.92	76.92
Ash	1.47	1.63	1.85	0.87	1.83
Protein (N x 6.25)	5.63	7.63	6.75	3.44	6.44
Sugar solids+glycerin	68.31	66.46	65.82	72.61	68.65
Direct reducing sugars, as dextrose	41.70	41.02	40.04	*	*
Dextrin	21.05	22.04	20.78	*	*
Glycerin	0.12	0.12	0.12	*	*
Diastatic power (degrees (Lintner)	62.5°	105°	74°	*	*

* Not determined.

These samples are quite similar in composition, although No. **9541** shows a somewhat higher Lintner value than the other two brands tested.

Malt Flours.

9545. *Diasto Dry Malt*, Chas. E. Mechel, Milwaukee, Wis.
9543. *Maltora*, The Cabell Co., Baltimore, Md.
9544. *Malzo*, Advance Malt Products Co., Chicago, Ill.
9542. *Plymco*, Plymouth Milling Co., LeMars, Iowa.

	9545	9543	9544	9542
Water	6.02	7.91	9.94	11.15
Ash	2.21	2.34	1.63	0.36
Protein (N x 6.25)	15.38	14.81	14.06	8.94
Ether extract	2.51	2.62	2.12	0.55
Fiber	2.02	2.17	0.99	0.08
Nitrogen—free extract	71.86	70.15	71.26	78.92
Starch	44.38	46.01	48.60	72.17
Diastatic power	high	high	high	very low

The first three samples are very similar in composition. These three brands likewise all showed high diastatic power, No. **9544** being somewhat higher than the others. No. **9542** is a very

different preparation both as regards composition and diastatic activity, the latter being extremely low.

Yeast Food.

9424, 9514. *Arkady Yeast Food*, Ward Baking Co., New York.

	9424	9514
Water	5.99	5.58
Ash	49.45	48.47
Protein (N x 6.25)	4.75	4.38
Carbohydrates	36.34	38.08
Fat	0.38	0.38
Ammonia	3.09	3.11
Potassium bromate	0.298	*
Calcium oxid	9.64	*
Sulphuric anhydrid	13.31	*
Sodium chlorid	present	present

* Not determined.

Three other samples contained 5.41, 5.37 and 6.52 per cent. of moisture.

The formula of this preparation as given by the manufacturer is as follows:

Calcium sulphate	25.0
Ammonium chlorid	9.7
Potassium bromate	0.3
Sodium chlorid	25.0
Patent wheat flour	40.0

Our two analyses satisfy this formula in all respects.

Baking Tests.

A series of baking tests were conducted to study the effect of *Arkady Yeast Food*, our experiments at this time being limited to this particular preparation for the following reasons: First, it has been specifically attacked both as to the purposes of its use and because of alleged objectionable mineral ingredients it introduces into the bread; second, because it represents a distinct type of these foods (*i.e.* it is largely a mineral food); third, because no question has been raised as to objectionable ingredients being introduced by malt extracts or malt flours; and fourth, because of the time and labor consumed it was necessary to limit our first experiments to a single preparation.

The method of conducting the tests was as follows: Batches of dough ranging from 78 to 709 lbs. were prepared under strict

supervision, generally either under that of the writer or some other official authority, in one series the baker's regular formula being used; in the other Arkady was introduced, the amount of sugar, salt, yeast and generally flour being reduced. The weighing of all the ingredients was supervised, as well as that of the dough during its various stages, and that of the finished bread. Samples of the various ingredients and the baked breads were taken for analysis, either in triplicate or quadruplicate. Every precaution was taken to avoid mechanical loss during the tests, the loaves being molded by hand and a record being kept of the weight of dusting flour used. A complete baking record was kept for each test.

Disinterested parties supervised the weighings and various operations in all the tests but four (the latter being conducted independently by the baker although the writer analyzed the materials and the breads). Similarly the materials and the breads were always analyzed by three, and sometimes by four, laboratories, in every case, except the tests referred to above, at least two official laboratories taking part in the analysis. The following tabulation shows the extent of official supervision in each test.

Test.	*Bakery.*	*Supervisors.*
1	Ward Bakery, New York	3 Government chemists and writer.
2	" " "	" " " " "
3	" " "	Writer.
4–7	" " "	No official supervision.
8	Thompson Bakery, New Haven,	Writer and his assistant.
9	" " "	Writer's assistant.
10	Washington Barracks, D.C.	U. S. Army officers.
11–12	Taggart's Bakery, Indianapolis	State chemist.

In each of the twelve tests samples of the baking materials and the breads were sent to the writer for analysis. Likewise all the analytical data obtained by the various analysts has been submitted to the writer, and while these will of course be presented to the Standards Committee, only the results of our own laboratory will be discussed here.

Table VI shows the composition of the various baking materials' and Tables VII to IX that of the breads, as determined in this laboratory. The analyses of the ingredients require no comment, except to call attention to the fact that actual analyses were made in all cases, except the oil and lard used. These were assumed

to be entirely fat, and even were this assumption not strictly correct, no error is introduced as in every comparative Non-Arkady and Arkady test equal amounts of these shortening materials were used.

TABLE VI. ANALYSES OF BAKING MATERIALS.

Material.	Baking test.	Water.	Ash.	Protein.	Carbohydrates.	Fat.
Flour, No. 1	1 & 2	12.49	0.50	10.72[1]	75.00	1.29
" No. 2	1 & 2	13.29	0.38	10.66[1]	74.56	1.11
" No. 3	3	12.89	0.46	11.00[1]	74.36	1.29
" "	4	13.20	0.40	10.66[1]	74.45	1.29
" "	5	13.29	0.40	10.94[1]	74.08	1.29
" "	6	13.40	0.45	10.89[1]	74.04	1.22
" "	7	13.03	0.49	11.00[1]	74.21	1.27
" No. 4	8	12.91	0.42	10.83[1]	74.74	1.10
" "	9	12.64	0.44	10.94[1]	74.86	1.12
" No. 5	10	12.82	0.53	11.69[1]	73.40	1.56
" No. 6	11	13.12	0.39	10.09[1]	75.31	1.09
" "	12	13.15	0.37	10.37[1]	74.98	1.13
Skim milk, condensed	1 & 2	30.97	1.97	8.29[2]	54.70	4.07
" " "	3–7	35.23	2.03	8.60[2]	49.79	4.35
" " "	11	32.14	2.03	8.93[2]	53.20	3.70
" " "	12	29.79	2.14	9.12[2]	54.82	4.13
Skim milk	8 & 9	91.68	0.69	2.81[2]	4.40	0.42
Yeast, Corby's	1–7	73.81	2.42	14.88[3]	8.60	0.29
" "	10	72.50	2.54	15.62[3]	9.03	0.31
" "	11	70.93	2.41	14.75[3]	11.44	0.47
" "	12	75.70	2.41	14.56[3]	6.87	0.46
Arkady Yeast Food	1 & 2	5.99	49.45	4.75[4]	36.34	0.38
" " "	3–7	5.41	...	...	...	..
" " "	8 & 9	5.37	...	...	...	...
" " "	10	5.58	48.47	4.38[5]	38.08	0.38
" " "	11 & 12	6.52	...	...	...	0.41
Roloco, Corby's	11 & 12	23.08	0.87	3.44[3]	72.61	0.00
Malt extract	8	23.08	1.83	6.44[3]	68.52	0.13
Sugar	all	0.03	...	...	...	...
Salt	all	0.11	99.89	...	...	...
Cotton seed oil (assumed)	...	...	...	...	...	100.00
Lard (assumed)	8 & 9	...	...	...	...	100.00

[1] N x 5.7.
[2] N x 6.38.
[3] N x 6.25.
[4] N x 6.25 (plus 3.09% ammonia as chlorid.
[5] N x 6.25 (plus 3.11% ammonia as chlorid.)

TABLE VII.—ANALYSES OF BREADS (1 *hr. after baking*).

Bread.	Baking test.	Water.	Ash.	Protein (N×5.7).	Carbohydrates.	Fat.
Non-Arkady	1	37.11	1.36	7.58	51.77	2.18
"	2	36.35	1.45	7.81	52.34	2.05
"	3	36.18	1.41	7.28	52.85	2.28
"	4	36.51	1.36	7.58	52.25	2.30
"	5	36.23	1.46	7.57	52.61	2.13
"	6	37.67	1.47	7.49	51.20	2.17
"	7	35.38	1.43	7.88	53.32	1.99
"	8	31.84	1.74	8.61	55.98	1.83
"	9	34.59	1.52	8.01	53.90	1.98
"	10	38.32	1.53	7.86	51.36	0.93
"	11	39.48	1.24	6.90	50.63	1.75
"	12	36.09	1.26	7.42	53.42	1.81
Average (omitting tests 8 and 11)*		**36.44**	**1.43**	**7.65**	**52.50**	**1.98**
Arkady	1	36.60	1.49	7.87	52.03	2.01
"	2	35.27	1.53	7.92	53.13	2.15
"	3	35.95	1.45	7.69	52.57	2.34
"	4	35.33	1.40	7.84	53.08	2.35
"	5	35.59	1.47	7.85	52.89	2.20
"	6	37.16	1.47	7.64	51.47	2.26
"	7	36.06	1.49	7.75	52.66	2.04
"	8	34.61	1.73	8.19	53.70	1.77
"	9	35.74	1.54	7.88	53.04	1.80
"	10	37.85	1.55	8.10	51.47	1.03
"	11	37.72	1.13	7.08	52.27	1.80
"	12	34.91	1.24	7.53	54.49	1.83
Average (omitting tests 8 and 11)*		**36.05**	**1.46**	**7.81**	**52.68**	**2.00**

* See page 119 for reasons for ommission.

TABLE VIII.—LIME, SULPHATES AND AMMONIA IN BREADS.
(*In Original Substance*).

Bread.	Sulphuric anhydrid. Method 1.*	Sulphuric anhydrid. Method 2.**	Lime (CaO).	Ammonia (NH_3).	Bread.	Sulphuric anhydrid. Method 1.*	Sulphuric anhydrid. Method 2.**	Lime (CaO).	Ammonia (NH_3).
	%	%	%	%		%	%	%	%
Non-Arkady 1	.089	.015	.022	.0008	Arkady 1	.097	.060	.051	.0019
" 2	.056	.016	.015	.0007	" 2	.074	.055	.042	.0053
" 3	.043	.011	.020	.0008	" 3	.058	.055	.049	.0053
" 4	.040	.015	.023	.0008	" 4	.075	.059	.041	.0041
" 5	.056	.014	.017	.0027	" 5	.106	.052	.055	.0036
" 6	.027	.009	.017	.0011	" 6	.070	.045	.050	.0052
" 7	.050	.019	.018	.0017	" 7	.067	.059	.039	.0062
" 8	.063	.024	.031	.0019	" 8	.075	.077	.050	.0071
" 9	.077	.020	.023	.0009	" 9	.102	.071	.047	.0037
" 10	.085	..	.009	.0017	" 10	.114	..	.044	.0087
" 11	.068	.015	.021	.0017	" 11	.083	.056	.041	.0062
" 12	.050	.020	.024	.0019	" 12	.093	.061	.036	.0069
Average	**.059**	**.016**	**.020**	**.0014**	**Average**	**.085**	**.059**	**.046**	**.0051**

* Bread ashed, then treated with HCl.
** Bread treated with HCl. direct without ashing.

TABLE IX.—BROMIN IN BREADS.
(*Parts of Br. per* 100,000 *parts of air-dry bread.*)

Non-Arkady.		*Arkady.*	
1	0.25	1	0.50
2	0.25	2	0.50
3	0.25	3	0.50
4	0.25	4	0.50
5	0.425	5	0.75
6	0.425	6	0.75
7	0.25	7	0.50
8	0.30	8	0.625
9	0.25	9	0.50
10	0.25	10	0.50
11	0.30	11	0.625
12	0.30	12	0.688
Average	**0.29**	**Average**	**0.58**

On the following pages will be found the formulas used, the baking record, and the dry matter found in the materials and the breads of each test. Test 8, made at the Thompson Bakery, New Haven, has been omitted throughout, as a mixing of the loaves of the baked bread after sampling, in this test gave absurd and impossible results. Similarly the results of test 11 are also omitted as during the shipment of the breads from Indianapolis, the package became broken and possibly some bread was lost.

TABLE X.—BAKING FORMULAS.

Material.	Tests 1–2. Non-Arkady.	Tests 1–2. Arkady.	Tests 3–7. Non-Arkady.	Tests 3–7. Arkady.	Test 9. Non-Arkady.	Test 9. Arkady.	Test 10. Non-Arkady.	Test 10. Arkady.	Tests 11–12. Non-Arkady.	Tests 11–12. Arkady.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Flour	425*	419*	215*	212*	218*	218*	50*	49*	208*	208*
Water	240	240	120	120	93	94½	26	26	115	118
Sugar	11	9	5½	4½	5	4	⅞	¾	...	...
Salt	7	6½	3½	3¼	4	3¾	⅞	¾	2 81/100	2 56/100
Cotton seed oil	10	10	5	5	..	..	..	..	2 1/100	2 81/100
Lard	..	..	..	..	4	4	..	..	...	...
Condensed skimmed milk	11	11	5½	5½	..	..	..	..	10	10
Skimmed milk	..	..	..	..	32	32	..	..	...	...
Yeast	5	2½	2½	1¼	2	1	½	¼	3	1½
Arkady	..	2⅛	..	2 1/16	..	1	..	..	...	...
Roloco	..	..	..	..	..	..	...	..	8	7

* Dusting flour was added in each test as follows:
Non-Arkady: 1, 3.75 lbs., 2, 2.5 lbs., 3, 1.75 lbs., 4, 3.25 lbs., 5, 1.75 lbs., 6, 2.25 lbs., 7, 2.25 lbs., 9, 3 lbs., 10, 0.5 lb., 11, 2.25 lbs., 12, 2.81 lbs.
Arkady: 1, 5.5 lbs., 2, 4.25 lbs., 3, 2.75 lbs., 4, 2.25 lbs., 5, 2.5 lbs. 6, 2.5 lbs., 7. 2.75 lbs., 9, 3.5 lbs., 10, 0.5 lb., 11, 2.25 lbs., 12, 2.38 lbs.

Baking Formulas.

No attempt was made to dictate the baking formula used, this representing in all cases for the Non-Arkady bread the regular formula used at the bakery where the test was being conducted. Accordingly we have formulas representing the practice in a large wholesale bakery, in two smaller high-class bakeries and in a Government barracks bakery. In every case modifications of the regular formula were made necessary in the Arkady dough because of the use of that ingredient. The following decreased amounts were used in the Arkady doughs:

Tests 1-2. 6 lbs. flour, 2 lbs. sugar, 0.5 lb. salt, 2.5 lbs. yeast.
Tests 3-7. 3 lbs. flour, 1 lb. sugar, 0.25 lb. salt, 1.25 lb. yeast.
Test 9. 1 lb. sugar, 0.25 lb. salt, 1 lb. yeast.
Test 10. 1 lb. flour, 0.125 lb. sugar, 0.125 lb. salt, 0.25 lb. yeast.
Tests 11-12. 1 lb. Roloco, 0.25 lb. salt, 1.5 lbs. yeast.

Loss of Dry Matter in Baking Bread.

Table XI shows the amounts of dry matter introduced into the doughs by the ingredients used and the actual amounts recovered in the baked breads.

The results in Table XI may be summarized as follows:

Losses of Dry Matter.

	Pounds.		Per cent.		Less percentage loss shown by Arkady breads
	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	
1	21.006	13.155	5.12	3.25	1.87
2	15.474	5.253	3.79	1.30	2.49
3	6.947	4.233	3.36	2.07	1.29
4	6.231	3.456	3.00	1.70	1.30
5	4.962	2.353	2.41	1.16	1.25
6	5.181	3.881	2.51	1.91	0.60
7	5.702	1.080	2.75	0.53	2.22
9	6.994	2.698	3.34	1.29	2.05
10	1.340	0.675	2.93	1.51	1.42
12	6.089	2.998	3.01	1.49	1.52
Average	.....	.....	**3.22**	**1.62**	**1.60**

In every test the Non-Arkady breads showed the greater loss in dry matter. This ranged from 1.340 to 21.006 lbs.; the Arkady breads showed losses of from 0.675 to 13.155 lbs.; in both cases the losses varying to a considerable extent with the amount of flour used. The percentage loss of dry matter in the Non-Arkady

BAKING RECORD.

	Test 3.		Test 4.		Test 5.		Test 6.		Test 7.	
	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.
Temperature of flour	80.0	80.0	82.4	82.4	83.5	83.5	84.1	84.1	82.7	82.7
" water	50.0	50.0	49.0	49.0	49.0	49.0	46.0	46.0	49.0	49.0
" room	80.0	80.0	88.0	88.0	84.1	84.1	86.4	96.4	80.2	80.2
Started mixing	8.10	8.48	7.50	8.30	7.57	8.30	8.04	8.44	7.44	8.25
Finished mixing	8.25	9.02	8.01	8.45	8.07	8.42	8.17	8.56	7.57	8.36
Temperature of dough when mixed	81.2	81.0	81.0	81.6	80.9	80.8	81.0	81.9	80.9	80.4
Weight of dough when mixed, lbs.	355.5	352.0	354.75	350.5	354.0	350.25	354.5	349.75	355.5	351.75
First turn	10.55	11.32	10.31	11.15	10.37	11.12	10.47	11.26	10.27	11.06
Temperature at first turn	82.5	81.6	82.3	82.6	81.4	81.8	81.9	82.6	81.7	81.1
Second turn	12.25	1.02	11.46	12.30	11.52	12.27	12.02	12.41	11.42	12.21
Temperature at second turn	83.3	82.1	82.6	82.7	82.1	82.4	83.2	82.6	81.8	80.7
Dough ready for scaling	12.55	1.32	12.31	1.15	12.37	1.12	12.47	1.26	12.27	1.06
Weight of dough when scaled, lbs.	352.5	350.25	353.25	348.24	351.25	349.0	..	..	353.25	350.0
Dough in proof box	1.35	2.10	1.15	2.00	1.27	2.05	1.15	1.57	1.03	1.48
Number of loaves	211	205	212	208	204	206	210	208	207	207
Dough going to oven	2.32	3.04	2.18	3.15	2.34	3.10	2.32	3.04	2.12	3.09
Bread baked	3.14	3.48	2.43	3.50	3.03	3.40	2.54	3.29	3.05	3.41
Weight of bread 1 hr. old	313.5	313.0	317.25	309.5	315.5	312.5	322.75	317.5	311.75	318.0

BAKING RECORD.

	Test 1.		Test 2.		Test 9.		Test 10.		Test 11.		Test 12.	
	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.
Temperature of flour	61.7	61.7	66.5	66.5	76.8	76.8	74.0	74.0	73.7	73.7	75.0	75.0
" " water	51.0	51.0	52.0	52.0	78.0	77.0	86.0	86.0	50.0	50.0	60.0	60.0
" " room	79.0	81.0	80.0	80.0	80.0	80.0	80.0	80.0	78.0	78.0	76.0	76.0
Started mixing	10.55	12.24	9.36	10.35	7.39	8.10	8.07	8.10	7.49	8.48	6.46	7.37
Finished mixing	11.08	12.38	9.50	10.50	7.47	8.18	8.30	8.33	8.20	9.08	7.07	8.03
Temperature of dough when mixed	81.9	81. 6	81.0	81.0	81.0	81.0	84.0	84.0	77.1	78.0	80.5	80.2
Weight of dough when mixed	704.19	695.94	704.24	699.25	357.5	358.0	78.75	77.5	340.5	344.25	343.75	344.75
First turn	1.35	2.54	12.20	1.20	10.32	11.03	10.59	11.01	11.00	11.38	9.42	10.35
Temperature at first turn	83.2	82.9	82.0	82.0	82.4	82.2	87.0	86.5	77.9	79.0	81.3	80.8
Second turn	2.35	3.54	1.20	2.20	11.32	12.03	11.59	12.01	12.30	1.08	10.42	11.35
Temperature at second turn	84.1	83.6	82.5	83.0	83.1	82.2	..	..	80.3	80.3	81.2	81.3
Third turn	3.20	4.39	2.05	3.05	..	..	..	..	..	..	..	..
Temperature at third turn	85.2	82.6	83.0	82.5	..	..	..	..	..	..	..	..
Dough ready for scaling	3.40	5.00	2.30	3.25	12.40	1.11	1.04	1.12	1.15	1.45	11.27	12.15
Weight of dough when scaled	698.	691.5	696.75	692.50	354.25	355.5	78.0	77.0	339.	343.	341.25	343.25
Dough in proof box	4.36	5.48	3.23	4.15	1.02	1.45	1.10	1.13	1.39	2.05	12.05	12.35
Number of loaves	410	413	410	415	312	315	35	35	..	..	..	..
Dough going to oven	5.30	6.45	4.21	5.15	2.05	3.05	2.25	2.33	2.28	3.05	12.54	1.36
Bread baked	6.00	7.15	4.52	5.46	2.25	3.35	3.55	4.03	3.02	3.45	1.29	2.10
Weight of bread 1 hr. old	618.75	618.50	616.75	614.75	309.25	321.25	72	71	303	306.75	307.5	305.5

Baking Record.

The baking record is given herewith in full, but the details will not be discussed here.

TABLE XI.—DRY MATTER IN MATERIALS AND BREAD.

	Test 1.		Test 2.		Test 3.		Test 4.		Test 5.	
	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.
Flour	370.218	364.990	370.218	364.990	187.287	184.673	186.620	184.016	186.427	183.825
Sugar	10.997	8.997	10.997	8.997	5.499	4.499	5.499	4.499	5.499	4.499
Salt	6.992	6.493	6.992	6.493	3.496	3.247	3.496	3.247	3.496	3.247
Cotton seed oil	10.000	10.000	10.000	10.000	5.000	5.000	5.000	5.000	5.000	5.000
Condensed skim milk	7.593	7.593	7.593	7.593	3.562	3.562	3.562	3.562	3.562	3.562
Yeast	1.310	0.655	1.310	0.655	0.655	0.328	0.655	0.328	0.655	0.328
Arkady	....	1.998	....	1.998	...	1.005	...	1.005	...	1.005
Dusting flour	3.280	4.810	2.187	3.717	1.524	2.396	2.821	1.953	1.517	2.168
Total	410.138*	405.284*	408.035**	403.181**	207.023	204.710	207.653	203.610	206.156	203.634
Bread	389.132	392.129	392.561	397.928	200.076	200.477	201.422	200.154	201.194	201.281
Loss	21.006	13.155	15.474	5.253	6.947	4.233	6.231	3.456	4.962	2.353
Per cent. loss	5.12	3.25	3.79	1.30	3.36	2.07	3.00	1.70	2.41	1.16

* 0.252 lb. deducted for dough removed for fermentation test.

** 1.262 lb. deducted for dough removed for fermentation test.

TABLE XI.—DRY MATTER IN MATERIALS AND IN BREAD.—*Concluded.*

	Test 6.		Test 7.		Test 9.		Test 10.		Test 12.	
	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.	Non-Arkady.	Arkady.
Flour	186.190	183.592	186.986	184.376	190.445	190.445	43.590	42.718	180.648	180.648
Sugar	5.499	4.499	5.499	4.499	5.000	4.000	0.875	0.750	6.154†	5.384†
Salt	3.496	3.247	3.497	3.247	3.996	3.746	0.875	0.750	2.810	2.560
Cotton Seed Oil	5.000	5.000	5.000	5.000	4.000‡	4.000‡	..	..	2.810	2.810
Condensed Skim Milk	3.562	3.562	3.562	3.462	2.662	2.662	..	..	7.021	7.021
Yeast	0.655	0.328	0.655	0.328	0.550	0.275	0.13	80.069	0.729	0.365
Arkady	....	1.005	....	1.005	....	0.946	..	0.236	....	0.993
Dusting Flour	1.949	2.165	1.957	2.392	2.621	3.058	0.273	0.273	2.440	2.067
Total	206.351	203.398	207.155	204.409	209.274	209.132	45.751	44.796	202.612	201.848
Bread	201.170	199.517	201.453	203.329	202.280	206.435	44.411	44.121	196.523	198.850
Loss	5.181	3.881	5.702	1.080	6.994	2.698	1.340	0.675	6.089	2.998
Per cent loss	2.51	1.91	2.75	0.53	3.34	1.29	2.93	1.51	3.01	1.49

‡ Lard.
† Roloco.

breads ranged from 2.41 to 5.12 and in the Arkady breads from 0.53 to 3.25. Although there are considerable variations in the decreased losses of dry matter where Arkady was used, it is a striking fact that in every test the Arkady bread showed a lower loss, ranging from 0.60 to 2.49, average, 1.60 per cent.

In the first two tests the loaves of bread after baking were weighed on a Fairbanks scale. Although the accuracy of this scale and its weights were tested at the time of our test, it was realized later that an error might have been introduced, the scale not being sensitive to less than one-quarter of a pound. Any such error in weighing would probably be compensative and would have no serious effect on the results where losses as high as from 5 to 20 lbs. were shown. In the subsequent tests all the baked breads were weighed on a torsion balance sensitive to one gram. The uniformity of the results of all the tests indicates that the scale used in no way vitiated the conclusions from the first two tests.

The effect of the use of Arkady in conserving the dry matter of the dough is shown in the following summary where it is seen that not only does Arkady uniformly decrease the losses in dry matter attendant upon fermentation, but that an actual saving of original ingredients is also secured without in any way decreasing the food value of the bread (as will be shown on a later page).

SAVING IN DOUGH INGREDIENTS.

Test.	Arkady used.	Flour.	Sugar.	Salt.	Yeast.	Roloco.	Total.	Net saving in ingredients.	Saving in dry matter of dough.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	2.125	4.25	2.00	0.50	2.50	....	9.25	7.125	7.85
2	2.125	4.25	2.00	0.50	2.50	....	9.25	7.125	10.22
3	1.063	2.00	1.00	0.25	1.25	....	4.50	3.437	2.71
4	1.063	4.00	1.00	0.25	1.25	....	6.50	5.437	2.78
5	1.063	2.25	1.00	0.25	1.25	....	4.75	3.687	2.61
6	1.063	2.75	1.00	0.25	1.25	....	5.25	4.187	1.30
7	1.063	2.50	1.00	0.25	1.25	....	5.00	3.937	4.62
9	1.000	0.50	1.00	0.25	1.00	....	1.75	0.750	4.30
10	0.250	1.00	0.125	0.125	0.25	....	1.50	1.25	0.67
12	1.063	0.43	....	0.25	1.50	1.00	3.18	2.117	3.09
Totals	11.878	22.93	10.125	2.875	14.00	1.00	50.93	39.052	40.15

In other words in making 2,414 loaves of bread weighing 3,505 lbs.; the use of 11.878 lbs. of Arkady allowed the saving of 22.93 lbs. of flour, 10.125 lbs. of sugar, 2.875 lbs. of salt, 14.00 lbs. of yeast and 1.00 lb. of Roloco malt extract, or a total net saving in raw materials of 39.052 lbs. At the same time 40.15 lbs. of the dry matter of the dough was saved from unnecessary destruction by the yeast ferments. Calculating these results to the basis of 1,000 1.5 lb. loaves of bread, the saving in ingredients following the use of Arkady were as follows:

Saved.	*Used in Addition.*
9.50 lbs. flour	4.92 lbs. Arkady =
4.19 " sugar	1.23 " calcium sulphate
1.19 " salt	0.48 " ammonium chlorid
5.80 " yeast	0.01 " potassium bromate
0.41 " Roloco	1.23 " sodium chlorid (salt)
	1.97 " flour

In addition to the above, 16.63 lbs. of the dry matter of the dough was saved per thousand 1.5 lb. loaves. When one considers the millions of loaves of bread made annually such a conservation as is shown by these tests is well worthy of careful attention. Other questions, however, arise in this connection, viz.: is this conservation effected at a sacrifice of quality in the bread, and does the use of Arkady introduce into the bread any objectionable ingredients? These questions will now be discussed.

Composition of the Breads.

The criticism has been made that the use of Arkady enables the baker to use a lower grade of flour, and that in reality the main role played by its mineral salts, particularly the potassium bromate, is that of bleaching agents. The results of certain baking experiments submitted to us throw light on this point, and indicate quite clearly that the potassium bromate improves the baking qualities of flours in general. Three flours were tested, a high patent hard spring wheat flour, a low grade clear hard spring wheat flour, and a high patent soft winter wheat. The experiments showed that, while the bromate was effective for all the flours, the higher the grade of the flour used the greater was its effect. A loaf of finer texture and color followed the use of bromate, but such a result obviously is one of the main purposes of leavening bread. Ammonium chlorid gave similar results;

that is, the effect of that salt was less when low grade flours (containing a relatively high ash) were used than when the flour was a high patent, indicating that the ash ingredients of the lower grade flours provided sufficient mineral food for the yeast, and that the use of Arkady with a flour of this class was not advantageous.

The experiments quoted above also showed that the fineness of texture and the color of the crumb depended to a considerable extent on the amount of yeast used. While the bread made with Arcady was better in texture, color and general appearance than one made with the same amount of yeast but without Arkady, it was not of as good appearance or of as great volume as one where double the amount of yeast was used without Arkady. In other words the yeast itself appeared to have what might be considered a decided bleaching effect.

The quality of the breads obtained from the different doughs is clearly shown in Table VII. It has been claimed that Arkady increases the water-holding power of the dough and that a more moist bread results, in other words that its use permits the baker to market excess water as bread. Our tests show the contrary to be the case. Omitting test 8 for reasons already given, in only two of the ten tests did the Arkady bread contain more moisture than the other. The average moisture content of the Non-Arkady breads was slightly higher, 0.39 per cent., than in those where Arkady was used. Not only did the Arkady breads contain less water, but they also contained slightly more of each of the food nutrients. Moreover, unpublished experiments of Winslow and Falk of the Yale Medical School show that this slightly increased food value was not secured at the sacrifice of digestibility. Quoting these authorities: "If the results of this experiment, taken as a whole, indicate any effect of Arkady salts upon the digestibility of bread, the effect is a favorable rather than an inhibitory one. * * * We may safely conclude that the digestibility of Arkady bread is not effected by the yeast food used in its manufacture."

It is apparent, therefore, that the use of Arkady does not increase the moisture content of the bread, that it slightly increases its food value, and that it in no way decreases the bread's digestibility.

The Role of the Mineral Salts in Arkady.

There are, however, two other important points to be considered, namely, what is the fate of the mineral salts in the bread, and what effect, if any, do they have on its wholesomeness.

The Arkady process was developed from observations that breads made at different bakeries by the same process and using the same formulas and baking ingredients showed marked variations in flavor, texture and quality. Extensive investigations pointed to the different waters used as the source of the difference and that the varying amounts of inorganic salts contained in the different waters were the determining factor. The effect of the composition of the waters used has long been known in the brewing industry, the superiority of the waters of the Trent having given Burton ales a recognized high place among such products. Likewise it is an established fact that yeast needs certain mineral salts for its proper development and growth. While carbohydrates and nitrogenous matters are of course needed for the yeast's growth, the mineral salts are perhaps even more necessary. Experiments by Kohman and Hoffman* (**Jour. Ind. Eng. Chem.* 1916, 8, 781–789; *do.* 1917 9, 148–159), who developed the Arkady process, have shown that small amounts of calcium sulphate, ammonium chlorid and a trace of potassium bromate gave the most satisfactory results, and that a combination of these salts in the proper proportions worked better than any one of the salts by itself. The experiments of these authorities seem to establish that the calcium sulphate stimulates fermentation and increases the gas production, that the ammonium chlorid is used directly as a food by the yeast and that practically none is found as such in the baked bread, and that the potassium bromate has a marked effect in maturing the gluten, thereby conserving flour and sugar and effecting a considerable saving in the amount of yeast required. Experiments of Winslow and Falk show that the potassium bromate, in the dilutions in which this salt is introduced into bread by the Arkady process, has a pronounced effect in accelerating proteolytic ferments, an action similar to that observed in the dough.

Calcium Sulphate.

Lime and sulphates were determined in all the samples of bread. As was to be expected, in every instance, the Arkady breads contained slightly more of these two mineral ingredients. The Non-Arkady bread contained on the average 0.020 and the Arkady 0.046 per cent. lime (CaO), with 0.059 and 0.085 per cent. of sulphate (as SO_3), respectively. (Direct treatment of the bread without ashing gave much lower percentages of sulphate in all the breads.) In other words, the Non-Arkady breads contained on the average 0.079 and the Arkady 0.135 per cent. of calcium sulphate. The amount of lime even in the Arkady breads is still only about one-tenth of the amount recognized as necessary in our daily diet. Many of our common foods are deficient in lime, and while the slightly increased content of lime in the Arkady breads probably has little practical significance, its effect, if any, would be beneficial rather than injurious. Forbes has told us (address Washington Academy of Sciences, July, 1916) of calcium that "Physiologically it is the great mineral stabilizer. Practically, it is much more frequently lacking in the food of men and animals than in any other mineral nutrient." The claim that Arkady is used in bread for the purpose of a make-weight is obviously false and absurd.

Ammonium Chlorid.

The claim is made by the manufacturer that the ammonium chlorid introduced by Arkady is completely utilized by the yeast and that, therefore, no increased amount should appear in the bread. Our determination of this salt by distillation with magnesia as shown in Table VIII, indicate that while most of the added ammonium chlorid does not appear as such in the finished bread, still the Arkady breads contain slightly more than where Arkady was not used, the average percentage being 0.0051 as compared with 0.0014. This small increase, however, is entirely without significance and can have no possible deleterious effect on the wholesomeness of the bread. In fact, many of our well-known foods contain ammonia in far greater amounts than does Arkady bread, for instance, Allenburys' Milk Food 0.0105, Honor Dry Milk 0.0178, Mammala 0.0182, Horlick's Malted Milk 0.0185, Nestle's Food 0.0061, Eskay's Food 0.0076, Imperial Granum 0.0071, Camembert cheese 0.1239, canned lobster 0.0874, ham 0.0365, buttermilk 0.0337, Swiss cheese 0.0090 and American cheese 0.0056 per cent. (Hoffman and Kohman's results).

Potassium Bromate.

The claim is made that the potassium bromate of Arkady is broken up by the fermentative processes of the yeast, and in the baking process and that whatever bromin is left in the bread is in the form of potassium bromid. Our experiments, not entirely completed, seem to sustain this claim. The amounts of bromin found in the breads were extremely small, the average content of the Non-Arkady bread being 0.29 and of the Arkady bread 0.58 part of bromin per 100,000 parts of air-dry bread. Calculated to the basis of the original breads, these values would be about 0.10 and 0.20 part per 100,000, respectively. Such extremely small amounts of bromin as bromid would be without physiological effect. Moreover the fact has been recently brought out that bromin is much more widely distributed in nature than has usually been supposed, and that many of our common foods contain it in appreciable amounts.

We have determined bromin in a number of foods, by the same method as was used for the breads, with the following results:

Parts of Bromin per 100,000 *parts of Air-dry Substance*

Table salt	6.27	Post Tavern Special	0.35
Fresh codfish	3.00	Gluten Bread	0.30
Salted codfish	1.50	Borden's Malted Milk	0.25
Celery	0.75	Brown Rice	0.25
Parsnips	0.75	Corn Meal	0.25
Haddock	0.50	Canned Lima Beans	0.25
Cabbage	0.50	Canned Kidney Beans	0.25
White Potatoes	0.40	Beets	0.25
Gluten Biscuit	0.35		

All of the above results as well as those secured in the breads, are doubtless slightly low owing to the difficulties of the method, but the results are at least comparative.

2. The Losses of Food Nutrients in the Baking of Bread.

In bread-making the action of the yeast causes a loss of carbohydrates, due to their fermentation and the formation of alcohol and carbonic acid gas, which are largely lost in the fermentation troughs or the oven.

The claim has been made that the use of Arkady not only requires less yeast but also that because of this smaller amount of yeast and because of the nutrient salts contained in Arkady less

Table XII: Losses of Food Nutrients.

Test.	Kind of Dough.	Total Weight of Bread.	Losses of				
			Water.	Ash.	Protein (N x 5.7).	Carbohydrates.	Fat.
1	Non-Arkady..	618.75	72.40	0.79	0.55	17.71	2.11
1	Arkady.....	618.50	72.87	0.47	+1.95	12.17	3.12
2	Non-Arkady..	616.75	75.62	0.24	+0.97	14.75	2.91
2	Arkady.....	614.75	78.81	0.25	+2.22	8.30	2.29
3	Non-Arkady..	313.50	38.09	0.24	1.85	4.19	0.88
3	Arkady.....	313.00	37.87	0.36	0.24	3.16	0.68
4	Non-Arkady..	317.25	36.56	0.22	0.04	5.42	0.75
4	Arkady.....	309.50	41.65	0.44	+0.73	3.24	0.73
5	Non-Arkady..	315.50	38.08	+0.07	0.65	3.28	1.31
5	Arkady.....	312.50	40.00	0.18	+0.38	1.64	1.13
6	Non-Arkady..	322.75	31.14	+0.10	0.34	4.49	0.89
6	Arkady.....	317.50	33.44	0.21	+0.24	3.23	0.67
7	Non-Arkady..	311.75	41.59	0.27	0.16	3.70	1.79
7	Arkady.....	318.00	36.03	0.23	+0.33	+0.08	1.48
9	Non-Arkady..	309.25	44.75	0.54	0.62	5.35	0.49
9	Arkady.....	321.25	37.80	0.51	0.02	1.33	0.84
10	Non-Arkady..	72.00	5.22	0.05	0.30	0.87	0.12
10	Arkady.....	71.00	5.64	0.04	0.06	0.53	0.04
11	Non-Arkady..	303.00	30.11	0.21	1.92	16.40	0.18
11	Arkady.....	306.75	35.80	0.73	0.90	9.18	+0.04
12	Non-Arkady..	307.50	38.84	0.07	0.67	5.30	0.05
12	Arkady.....	305.50	44.82	0.38	0.24	2.36	0.02

of the carbohydrates of the flour and the added sugar are destroyed during the fermentation process. The very complete analyses we have made of these breads prepared under carefully controlled conditions affords an opportunity to test the accuracy of these claims.

We determined water, ash, protein, fat and (by difference) carbohydrates in all the ingredients used in the doughs and in the breads themselves. Knowing the formulas used we can determine the exact amounts of each of these ingredients introduced into the dough and the amounts recovered in the bread.

Table XII gives the net losses for each type of bread sustained by the doughs during the fermentation and baking periods. While some of the losses are so small that they might be accounted for by experimental error, certain facts stand out very clearly. The study of the losses of dry matter reported on an earlier page

TABLE XIII: SUMMARY OF LOSSES OF FOOD NUTRIENTS.

Test.	Kind of Dough.	Average total weight of bread.	Losses in total bake.					Losses per 100 pounds of Bread.				
			Water.	Ash.	Protein (N x 5.7).	Carbohydrates.	Fat.	Water.	Ash.	Protein (N x 5.7).	Carbohydrates.	Fat.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1–2	Non-Arkady	617.75	74.01	0.52	+0.21	16.23	2.51	11.98	0.08	+0.03	2.63	0.4
1–2	Arkady....	616.63	75.84	0.36	+2.09	10.24	2.71	12.14	0.06	+0.34	1.66	0.4
3–9, 11, 12	Non-Arkady	312.94	37.40	0.17	0.78	6.02	0.79	11.96	0.05	0.25	1.92	0.2
3–9, 11, 12	Arkady....	313.00	38.43	0.38	+0.04	3.01	0.69	12.28	0.12	+0.01	0.96	0.2
10	Non-Arkady	72.00	5.22	0.05	0.30	0.87	0.12	7.25	0.07	0.42	1.21	0.1
10	Arkady....	71.00	5.64	0.04	0.06	0.53	0.04	7.94	0.06	0.08	0.75	0.0
Ave.	Non-Arkady	.....	.....	....	.....	.....	....	10.40	0.07	0.21	1.92	0.2
Ave.	Arkady....	.....	.....	....	.....	.....	....	10.79	0.08	+0.09	1.12	0.2

showed that the losses in the Arkady breads were uniformly less than in the Non-Arkady breads. That these losses, regardless of whether or not Arkady was used, fell chiefly on the carbohydrates Table XII shows very clearly. There were slight losses of ash and fat, but the main loss was in carbohydrates. In seven of the twenty-two tests, however, there was an actual gain in protein and in only two tests was there a decided loss. That all but one of these protein gains were shown by Arkady breads and that the two decided pretein losses were shown by Non-Arkady breads is at least suggestive. Although in each Non-Arkady dough there was twice as much yeast used as in the corresponding Arkady dough, it would appear that the smaller amount of yeast in the presence of the Arkady mineral salts was actually able to construct protein from the ammonia of the ammonium chlorid in an amount more than sufficient to compensate for any losses sustained by the protein of the flour during the manufacturing process.

Table XIII shows the losses on a more comparable basis. Our doughs, based on weight of ingredients, fall into three well-defined classes, yielding either 600, 300 or 72 lbs. of bread. Calculated to the basis of losses per 100 lbs. of bread we find both kinds of dough lost about the same amounts of ash and fat, and that the Arkady dough lost 0.39 lb. more water, with 0.30 lb. less loss of protein and 0.80 lb. less loss of carbohydrates. It would appear, therefore, that in these tests the use of Arkady requires not only

half the normal amount of yeast, but that by using this smaller amount of yeast less carbohydrates were destroyed, and that the presence of the Arkady salts, more particularly ammonium chlorid, stimulated yeast production with an actual increase of protein in appreciable amounts. Moreover, as has been shown on a earlier page, this saving of food ingredients was secured without any sacrifice in the quality or nutritive value of the bread.

3. THE DETERMINATION OF FAT IN BREAD.

It has been frequently suggested that the official method used for determining fat in cattle feeds by means of ether extraction does not remove all the fat from bread or other baked products. The following method has been suggested by the Bureau of Chemistry to obviate this difficulty:

Method: Treat 5 gms. of material in a loosely stoppered 200 cc Erlenmeyer flask with a mixture of 10 cc alcohol (95%), 2 cc concentrated ammonia and 3 cc of water, heating 2 minutes at the boiling point. Cool, add three successive portions of 25 cc of ethyl ether, mixing thoroughly, and tamping the material each time with a glass rod flattened at the end, pouring off the extracts into a 200 cc beaker. The combined ether extracts are evaporated to dryness on the steam bath. The crude fat is extracted by washing out with several portions of anhydrous ether or preferably petroleum ether, collected in a tared flask, evaporating and drying for periods of 30 minutes at 100° C. until constant weight is obtained.

TABLE XIV: PERCENTAGE AMOUNT OF FAT IN BREAD.

Official method.	Modified method.	Official method.	Modified method.		Official method.	Modified method.
0.51	2.01	0.56	2.30		0.73	1.75
0.70	2.18	0.68	2.35		0.64	1.80
0.68	2.15	0.62	2.13		0.70	1.81
0.63	2.05	0.61	2.20		0.70	1.83
0.65	2.28	0.17	0.93	**Ave.**	**0.59**	**1.95**
0.69	2.34	0.21	1.03			

In sixteen of the samples of bread we determined fat both by the official method and the one outlined above. The results show conclusively the inapplicability of the official method to such products as bread, and indicate that practically all of the published analyses of bread are inaccurate as regards the amount of fat present. The average result secured by the official method was 0.59 per cent. and that by the Bureau method 1.95 per cent.

SAMPLES IN CLOSET.

	A			B			C			D		
	First.	Last.	Loss.	First.	Last.	Loss.	First.	Last.	Loss.	First.	Last.	Loss.
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
	19.19	19.05	0.14	15.52	15.49	0.03	26.17	25.71	0.46	16.90	16.75	0.1
	19.29	19.22	0.07	16.08	16.01	0.07	25.22	25.08	0.14	16.90	16.86	0.0
	19.01	18.94	0.07	15.65	15.52	0.11	24.34	24.00	0.34	16.23	16.12	0.1
	19.19	18.98	0.21	16.05	15.87	0.18	24.06	23.70	0.36	16.12	16.05	0.0
	19.26	19.22	0.04	17.11	17.04	0.07	25.26	25.01	0.25	16.16	16.19	+0.0
	19.61	19.44	0.17	16.72	16.51	0.21	24.73	24.41	0.32	16.61	16.51	0.1
	19.51	19.40	0.11	16.51	16.40	0.11	25.33	25.01	0.32	17.14	17.00	0.1
	18.84	18.77	0.07	15.77	15.63	0.14	24.13	24.00	0.13	16.58	16.51	0.0
	19.33	19.26	0.07	15.77	15.52	0.25	24.62	24.30	0.32	16.97	16.86	0.1
Ave.	**19.25**	**19.14**	**0.11**	**16.13**	**16.00**	**0.13**	**24.87**	**24.58**	**0.29**	**16.62**	**16.54**	**0.0**

SAMPLES ON SHELF.

	20.21	20.04	0.17	16.01	15.77	0.24	24.76	24.44	0.32	16.61	16.44	0.1
	19.33	19.19	0.14	16.54	16.33	0.21	24.51	24.23	0.28	17.28	17.07	0.2
	18.94	18.77	0.17	16.26	16.12	0.14	24.41	24.09	0.32	17.00	16.86	0.1
Ave.	**19.49**	**19.33**	**0.16**	**16.27**	**16.07**	**0.20**	**24.56**	**24.25**	**0.31**	**16.96**	**16.79**	**0.1**
Ave. of all	**19.31**			**16.17**			**24.79**			**16.71**		

4. EXPERIMENTS ON WEIGHTS AND LOSSES IN WEIGHT OF BREAD.

The bakeries of S. S. Thompson and the L. L. Gilbert Baking Corporation were visited on May 28 and samples of bread taken. In all cases the bread was wrapped and was slightly warm; with the Thompson samples the time since baking was 1½ hrs. with the Gilbert samples ¾ hr. The bread was weighed at the bakery, then taken to the laboratory, nine loaves of each series were piled three by three in a glass-front closet, each pile being kept separate from the others. The other three loaves of each sample were placed on an open shelf in the laboratory, each loaf being separated from its fellows. The bread was reweighed at 9 A M. on May 29, May 30, May 31 and June 1, or at intervals of 16, 40, 64 and 88 hrs. Inasmuch as the losses in weight were very trivial, the following tabulations give only the initial weight at the bakery and the final weight.

The breads were as follows:

A. S. S. Thompson Co. Health Bread. Claimed 18 oz., price 10 cts.

B. S. S. Thompson Co. Better-Yet Bread. Claimed 9 oz. or more, price 10 cts.

C. L. L. Gilbert Baking Corp. Holsum Bread. No weight claimed, price 15 cts.

D. L. L. Gilbert Baking Corp. Butter-Krust. Claimed 14 oz., price 10 cts.

The experiment has three aspects:

1. Losses in weight before consumption.
2. Variations in weight of the loaves.
3. Ability of baker to meet reasonably any claimed weight.

1. *Losses in Weight before Consumption.*

The losses in weight after 88 hours were as follows:

In Closet.

A. 0.04 to 0.21, ave. 0.11 oz.
B. 0.03 to 0.25, ave. 0.13 "
C. 0.13 to 0.46, ave. 0.29 "
D. +0.03 to 0.15, ave. 0.08 "

On Shelf.

A. 0.14 to 0.17, ave. 0.16 oz.
B. 0.14 to 0.24, ave. 0.20 "
C. 0.28 to 0.32, ave. 0.31 "
D. 0.14 to 0.21, ave. 0.17 "

Even after a period of nearly four days the losses in weight were in general trivial, the larger loaves, C, showing somewhat larger losses. Likewise the samples kept on the open shelves lost somewhat more than those kept in the closet. There were practically no losses in the wrapped loaves up to 40 hours. The first two days of the experiment were rainy or cloudy, the last two bright and clear.

The temperature in the room in which the loaves were kept showed the following variations from day to day:
55 to 62°, 56 to 61°, 59.5 to 66°, and 64 to 70° Fahr.

2. *Variations in Weight of the Loaves.*

A. From 18.84 to 20.21, average 19.31 oz.
7 varied less than 0.25 oz. from average
11 varied less than 0.50 oz. from average
1 varied more than 0.50 oz. from average

B. From 15.52 to 17.11, average 16.17 oz.
4 varied less than 0.25 oz. from average
9 varied less than 0.50 oz. from average
3 varied more than 0.50 oz. from average

C. From 24.06 to 26.17, average 24.79 oz.
3 varied less than 0.25 oz. from average
8 varied less than 0.50 oz. from average
4 varied more than 0.50 oz. from average

D. From 16.12 to 17.28, average 16.71 oz.
6 varied less than 0.25 oz. from average
9 varied less than 0.50 oz. from average
3 varied more than 0.50 oz. from average

Summary. 20 varied less than 0.25 oz. from average
37 varied less than 0.50 oz. from average
11 varied more than 0.50 oz. from average

Judging simply from the variations in weight above or below the average the above figures show that the bakers have difficulty in scaling their loaves to a uniform weight. This fact, however, does not prevent them from making a claim for weight which they can live up to if a little more tolerance is permitted for overweight than under-weight, as the following consideration will show:

3. *Ability of Baker to Meet any Claimed Weight.*

The present tolerance allowed for bread is 0.50 oz. on what was formerly the five-cent, but is now the ten-cent loaf.

We will disregard the weights actually claimed, as for C no claim was made, and in the other cases the claim is too much below the actual weights found. Each lot consisted of twelve loaves.

A. If 19 oz. had been claimed three loaves would have varied more than 0.50 oz. (+.051, +0.61 and +1.21).

B. If 16 oz. had been claimed four would have varied more than 0.50 oz. (+1.11, +0.72, +0.51 and +0.54).

C. If 24.5 oz. had been claimed four would have varied more than 0.50 oz. (+1.67, +0.72, +0.76 and +0.83).

D. If 16.5 oz. had been claimed two would have varied more than 0.50 oz. (+0.64 and +0.78).

From the above it appears that the baker in order to meet his claim with certainty must provide a considerable overrun. It does not seem fair, therefore, to hold him as strictly accountable for excessive weight as for a deficiency. The recommendation is made, therefore, that the tolerance for bread both for the 10 cent and the 15 cent loaves should be not more than 0.50 oz. below or more than 1 oz. above the claimed weight. Applying these tolerances, of the 48 loaves only three would have exceeded the suggested claim by more than 1 oz. and none would have been deficient more than 0.50 oz.

Test of Variations in Weight of Loaves.

Certain bakers have protested against the tolerances in net weight of loaves of bread recognized by our regulations, claiming that unavoidably large variations necessarily followed the use of machines in moulding their bread. To test the accuracy of this claim we weighed a large number of loaves at two bakeries, 150 loaves in the one case, and 67 in the other. The bread was barely warm at the time of weighing, which was about three-quarters of an hour after removal from the ovens. It is unnecessary to give the detailed weighings, but the following is a summary of our results.

Bakery 1.

No. of loaves weighed	150
Lightest loaf	15.4 oz.
Heaviest loaf	17.1 oz.
Average loaf	16.3 oz.
1 loaf weighed	15.4 oz.
30 loaves weighed from	15.5—16.0 oz.
85 loaves weighed from	16.1—16.5 oz.
34 loaves weighed from	16.6—17.1 oz.

With a claim of 16 oz., only 1 loaf would have been more than 0.5 oz. below the claim, and 63 would have been more than 0.5 oz. above the claim; none would have been more than 1 oz. above the claim. The tolerances suggested on a previous page would have amply covered the unavoidable variations at this bakery.

Bakery 2.

No. of loaves weighed	67
Lightest loaf	15.7 oz.
Heaviest loaf	18.6 oz.
Average loaf	17.4 oz.
1 loaf weighed	15.7 oz.
4 loaves weighed from	16.1—16.5 oz.
9 loaves weighed from	16.6—17.0 oz.
29 loaves weighed from	17.1—17.5 oz.
24 loaves weighed from	17.6—18.6 oz.

With a claim of 16 oz., none would be more than 0.5 oz. below the claim, 62 would be more than 0.5 oz. above the claim, and 53 would be more than 1 oz. above the claim.

With a claim of 17 oz., 4 would be more than 0.5 oz. below the claim, 24 more than 0.5 oz. above the claim, and 13 more than 1 oz. above the claim.

It is apparent that the first bakery is much more accurate in its scaling than the second. No set of tolerances, which are justifiable, can be established to cover careless and wasteful methods of manufacture. The second bakery, with a claimed weight of 16 oz., apparently is giving the consumer much more bread than the latter has a right to expect from the weight guaranteed. The variations shown in this bakery are no argument against our tolerances. While overweight is no fraud against the consumer, the law requires a relatively accurate statement of net weight on the wrapper, and wide variations from this weight, even though in the consumer's favor, are not in harmony with the spirit of the net weight law. As before suggested, a tolerance of 0.50 oz. below and 1 oz. above the claimed weight seems to be ample for any baker who is willing to take ordinary precautions in scaling his loaves.

BREAKFAST FOODS.

Thirty samples were analyzed, the results of the analyses having been already published in Bulletin 197 of this Station. Below will be found a list of the brands, together with their claimed and actual net weight per package, and their cost.

Brand.	Cost per package, cts.	Net weight. Claimed. oz.	Found. oz.
Albers Wheat Flakes Mush	15	24	24.1
Bestovotes	15	..	19.7
Bran-eat Biscuits, Toasted	15	10	11.4
Bufceco Rolled Oats	10	20	21.1
Capitol Health Bran	15	28	24.1
Cerag	15	10	11.2
Cinnamon Rusks (Peterson)	18	14	12.9
Fruit Nut Cereal	15	11	11.7
Hecker's Cream Hominy	18	24	23.8
Hecker's Cream Oatmeal	10	20	19.9
Jersey Corn Flakes	10	9	10.8
Keen and Robinson's Granulated Scotch Oatmeal	40	32	32.6

Brand.	Cost per package, cts.	Net weight. Claimed. oz.	Found. oz.
Kellogg's Krumbles	10	..	11.5
Malabar Manoca (Bennett, Simpson and Co.).	20	16	16.3
McCann's Irish Oat Meal	35	32	32.9
Mother's Wheat Hearts	15	29	29.7
Pillsbury's Vitos	15	28	30.3
Post Tavern Porridge	18	28	31.9
Purina Sterilized Bran Zos	15	20	21.2
Purity Brand Rolled Oats	10	20	20.7
Quaker Brand Corn Puffs	9	6	7.3
Quaker (FS) Farina	10	14.5	14.9
Quaker Puffed Wheat	15	4	4.3
Ralston Wheat Food	22	24	24.6
Robinson's Patent Groats (in Powder)	50	16	16.3
Scott's Porage Oats	25	32	33.3
Sea Moss Farine	30	4	4.6
Sunbeam Pure Food Pearl Hominy	43	74	73.5
Washington Corn Crisps	10	10	13.7
Zim	15	9	9.2

The only two brands showing any material shortage in weight were *Capitol Health Bran* and *Peterson's Cinnamon Rusks*, which failed to satisfy their claims by 3.9 and 1.1 oz.; respectively.

BROSIA MEALS.

Brosia Meals are made by steam-cooking beans, pease or lentils, freeing them from the hulls and then grinding into meals. They are offered as substitutes for meat and from the standpoint of protein content compare favorably with that food.

Four brands of this product, sold by the Calumet Tea and Coffee Co., Chicago, were analyzed:

9464. *Lentil Brosia Meal*, Cost 25 cts. per lb.
9465. *Pease Brosia Meal*, Scotch, Cost 18 cts. per lb.
9466. *Pease Brosia Meal*, Cost 15 cts. per lb.
9467. *White Bean Brosia Meal*, Cost 18 cts. per lb.

	9464	9465	9466	9467
Water	7.86	8.16	7.16	8.91
Protein (N x 6.25)	29.75	27.00	29.13	24.56
Fat	1.32	1.84	2.63	1.78
Fiber	2.44	1.74	7.63	1.45
Ash	2.80	2.88	3.01	3.61
Nitrogen-free extract	55.83	58.38	50.44	59.69
Starch	41.23	41.85	20.08	35.66
Calories per 100 gms	354	358	342	353

The manufacturer tells us that "Diabetic patients will find lentil or pease or bean meal bread a happy change from gluten bread. Brosia breads contain but a small amount of the starch forbidden to such sufferers." It is true that these four meals contain much less starch than wheat flour and even many so-called gluten flours, but a satisfactory bread cannot be made from them alone, the manufacturer's formula suggesting a substitution of only one-fourth the usual quantity of flour. Breads made by such a formula would still be high in starch, much too high for any diabetic who did not have a very high starch tolerance.

BUTTER.

Of the 14 samples sent by the Dairy Commissioner, 11 were genuine, 2 were oleomargarine and 1 was renovated butter.

CHOCOLATE AND COCOA.

Five samples of these products were analyzed and will be reported in a forth coming Bulletin of this Station. The names of these brands are given below, together with their claimed and actual net weight, and their cost.

	Cost per package, cts.	Net Weight. Claimed.	Found.
Alkethrepta	25	8	8.5
Ghiradelli's Sweet Ground Chocolate and Cocoa	25	8	8.2
Hub Milk Chocolate Sweetened	48	16	16.2
Cocoatina, Anti-Dyspeptic Cocoa	45	8	8.1
Michaelis' Acorn-Cocoa	50	..	7.9

A sample of cocoa sent by the Dairy Commissioner contained no adulteration.

CONDENSED COFFEE.

The analysis of a sample of *Borden's Condensed Coffee Eagle Brand* will be reported shortly in a Bulletin. The net weight of the sample was 15.5 oz., and the cost 35 cents.

COFFEE SUBSTITUTES.

Six brands were tested as follows:

7977. *Drinket*, Kellogg Toasted Corn Flake Co., Battle Creek, Mich. Cost 22 cents for 4 oz.

8112. *Old Grist Mill*, a Substitute for Coffee, Potter and Wrightington, Boston, Mass. "A compound of whole wheat, vegetables, and a small amount of coffee for flavor." Cost 18 cents per 16.6 oz.

9576. *Jaffee*, Beech-Nut Packing Co., Canajoharie, N. Y.; "Made wholly of fruits and grains. Contains no coffee, caffeine or other stimulant." Cost 25 cents per 20.5 oz.

9574. *Postum Cereal*, Postum Cereal Co., Battle Creek, Mich. Cost 25 cents per 16.6 oz.

9463. *Calumet Cereal*, Calumet Tea and Coffee Co., Chicago, Ill.

9462. *Barley Coffee, Whole*, Calumet Tea and Coffee Co., Chicago, Ill.

	7977	8112	9576	9574	9463	9462
Water	8.04	9.64	9.91	9.11	9.11	6.20
Protein (N x 6.25)	5.69	15.13	11.00	12.38	13.06	10.81
Fat	0.03	3.87	1.66	3.30	4.44	2.73
Fiber	0.04	9.21	9.80	8.64	6.64	5.15
Ash	4.35	3.24	3.91	6.86	3.69	2.99
Nitrogen-free extract	81.85	58.91	63.72	59.71	63.06	72.12
Starch	*	30.38	16.40	19.20	37.97	42.80
Caffein	none	0.17	none	none	0.08	none

* Not determined.

These brands were free from coffee, except Nos. **8112** and **9463**, which contained 0.17 and 0.08 per cent. of caffeine respectively. These amounts, however, are practically negligible, being only one-seventh and one-fifteenth the quantities found in normal coffee.

CREAM.

A sample sent by the Dairy Commissioner contained 36 per cent. of butter fat.

Seven samples of cream were also studied as a basis for identifying homogenized creams, five being straight creams and the other two homogenized. Microscopic examination alone failed to differentiate these with accuracy. The variation in size of the fat globules in our experience did not appear to be as marked as the work of other investigators would indicate.

By allowing 10 cc of the cream, diluted to 100 cc with water, to stand 12 hours in a cylinder, the homogenized samples were

differentiated from the others very strikingly in this series of tests. How reliable the method is, however, can be judged only by further trials.

DIABETIC FOODS.

The following brands were analyzed:

9710. *Ayos, the Improved Soya Bean Flour*, Waukesha Health Products Co., Waukesha, Wis.

9483. *Lister's Diabetic Flour*, self Rising and Strictly Non-Carbohydrate, Lister Bros., New York.

9481. *Longuets de Lausanne*, Manuel Freres.

8768. *Genteel Flour* (manufacturer unknown).

9482. *Cocoa Factory Residue.*

9761. *Spinach Bread.*

	9710	9483	9481	8768	9482	9761
Water	8.75	11.62	10.78	11.41	8.46	.....
Ash	4.13	2.77	3.04	0.92	7.26	.....
Protein (N x 6.25)	41.44	67.38	14.19	17.13	14.44	.....
Fat	16.87	0.86	5.53	1.96	13.66	.....
Fiber	3.82	0.17	0.44	0.25	12.26	.....
Nitrogen-free extract	24.99	17.20	66.02	68.33	43.92	.....
Starch	0.56	none	49.16	60.52	3.57	44.41

Longuets de Lausanne contain altogether too much starch for a satisfactory diabetic food. *Genteel Flour* is a very inferior gluten flour. The other samples require no special comment.

Two other samples sent by a diabetic were also tested for starch. The first sample was rice that had been boiled three times, the supernatant water being discarded each time; the second was oatmeal porridge which had been washed well, squeezed twice and then boiled. The rice as received contained 83.78 per cent. water and 8.87 per cent. of starch; the oatmeal 82.83 and 3.40 per cent., respectively, indicating a starch reduction in the former of about 34 per cent., and in the latter of about 70 per cent.

FLAVORING EXTRACTS.

Nine samples were examined. These were all of the *Ariston Brand*, made by the Calumet Tea and Coffee Co., Chicago, Ill. The analyses indicate that the extracts are of excellent quality.

Flavor.	Spec. gr. @ 15.6° C.	Alcohol by vol.	Oil by vol.	Color.
Almond	0.8253	92.52	1.16	Normal
Celery	0.8226	92.35	0.73	Normal
Clove	0.8286	89.56	2.95	Normal
Lemon	0.8444	83.17	5.40	Normal
Orange	0.8424	87.45	4.96	Normal
Peppermint	0.8232	91.05	3.20	Normal
Wintergreen	0.8339	88.87	2.94	Normal

The sample of *ginger extract* had a spec. grav. of 0.8238, and contained 89.50 per cent. of alcohol by volume, 0.99 per cent. of solids, 0.93 per cent. of solids soluble in 95 per cent. alcohol, and 0.09 per cent. of solids soluble in cold water.

The sample of *vanilla extract* had a spec. grav. of 0.9750 and contained 39.75 per cent. of alcohol by volume, and 0.20 per cent. of vanillin; the lead number was 0.57, the color was normal and no coumarin was present.

PREPARED FLOURS.

Six samples of this class of food were examined, as follows:

9588. *D. and C. Self-Rising Flour*, The D. and C. Co., New York. "Soft winter wheat flour, grape cream of tartar, phosphate, soda and salt."

9577. *Grandma's Pancake Flour Mixture*, Hecker Cereal Co., New York. "Rice, wheat, corn and leavening materials."

9573. *Presto Self-Raising Flour*, The H-O Co., Buffalo, N. Y. "Leavening and seasoning agents are cream of tartar, bicarbonate of soda, phosphate and salt."

9589. *Reliable Self-Raising Prepared Flour*, Reliable Flour Co., Boston, Mass. "Wheat flour, grape cream of tartar, bicarbonate of soda and salt."

9572. *Swans Down Prepared Cake Flour*, Igleheart Bros., Evansville, Ind. "Not Self Rising."

9578. *Teco, Self-Rising Pancake Flour*, The Ekenberg Co., Cortland, N. Y. "A mixture of wheat and corn flour with malted buttermilk, salt, soda and acid phosphate."

	9588	9577	9573	9589	9572	9578
Water	12.60	11.56	12.50	12.02	12.66	11.37
Protein (N x 6.25)	9.06	8.50	8.13	9.00	8.50	10.38
Fat	0.91	0.91	0.90	0.68	0.82	1.73
Fiber	0.17	0.27	0.13	0.13	0.13	0.50

	9588	9577	9573	9589	9572	9578
Ash	3.77	4.56	3.56	3.53	0.49	7.21
Nitrogen-free extract	73.49	74.20	74.78	74.64	77.40	68.81
Sodium oxide	1.63	1.54	1.29	1.05	0.13	2.50
Potassium oxid	0.21	0.21	0.36	1.00	0.16	0.42
Phosphoric anhydrid	1.32	1.50	0.88	0.13	0.19	2.29
Sulphuric anhydrid	0.03	0.04	0.10	0.08	0.01	0.11
Chlorin	0.76	0.93	0.82	0.45	trace	0.68
Calcium oxid	trace	0.44	0.30	trace	trace	0.75
Tartrates	(?) none	present	(?) none	present	present	none
Weight claimed, oz.	18	18	20	24	36	16
Weight found, oz.	18.2	18.0	19.2	23.8	43.5	16.0
Cost per package, cts.	14	16	15	20	45	15
Cost per lb., cts.	12.3	14.2	12.5	13.5	16.6	15.0

The claims made for these flours seem to be substantiated by our analyses, except that we were unable to detect cream of tartar in Nos. **9588** and **9573.**

FRUIT JUICES.

Five brands of fruit juices were examined as follows:

9587. *Dole's Pure Hawaiian Pineapple Juice,* Hawaiian Pineapple Products Co., Honolulu, Haw. Cost 10 cents per 4.8 fl. oz.

9581. *Du Belle Grape Juice,* Du Belle Grape Juice Co., Rochester, N. Y. "About 2% granulated sugar." Cost 20 cents per 16 fl. oz.

9580. *Hay's Five Fruit,* H. H. Hay Sons, Portland Me. "Strawberries, raspberries, pineapples, oranges, lemons." "1/10 of 1 per cent. sodium benzoate, artificially colored." Cost 40 cents per 16.3 fl. oz.

5582. *Phez,* Pheasant Brand Loganberry Juice, with Sugar, Pheasant Fruit Juice Co., Salem, Ore.

9582. *Tim Pine,* J. Tim Co., New York. "Pineapple juice with sugar added." Cost 25 cents per 15.8 fl. oz.

	9587	9581	9580	5582	9582
Alcohol by volume	0.36	0.26	0.15	0.08	0.12
Solids	13.27	17.87	62.80	34.13	13.54
Ash	0.37	0.38	0.22	.....	0.52
Sucrose	0.16	0.08	1.62	13.48	3.32
Invert sugar	12.95	15.68	59.76	17.87	9.65
Saccharin	none	none	none	none	none

* Sodium benzoate 0.08%.

None of the samples contained saccharine or salicylic acid. **9580** contained amaranth color and 0.08 per cent. of sodium benzoate.

HAMBURG STEAK.

Thirty-four samples sent by the Dairy Commissioner were examined for preservatives. None contained boric acid, and five no sulphurous acid. Fifteen samples contained less than 25 mgms. of sulphurous acid per kilogram, while 13 contained this acid in considerable amount as follows:

No.	Sulphurous Acid mgms. per kilo.	No.	Sulphurous Acid mgms. per kilo.
11637	876.8	11704	368.0
11640	736.0	11706	1740.8
11641	806.4	11707	1875.2
11646	492.8	11710	3513.6
11647	124.8	11712	531.2
11649	2422.4	11721	1628.8
11701	761.6		

These amounts of sulphurous acid are very excessive, and indicate a widespread use of this preservative in comminuted meats that is not without danger to the public health.

No. **11713** had a decided putrid odor when received by us, and was totally unfit for human food.

CORDIALS.

Twenty-seven samples of cordials, brandies and liqueurs have been examined and the results are given in Table XV.

Products of this type have been examined in this laboratory on previous occasions, notably in 1901 and 1914, and their substance and quality need no extended discussion at this time. The solid matter in them consists almost wholly of cane sugar or its derivative, invert sugar, or mixtures of the two sugars. Five samples by their considerable plus polarization at 87° are shown to contain glucose or starch sugar. The coal-tar colors used are of the permitted group except in one case, No. 8155, which contained the unpermitted color magenta. The use of permitted colors does not, however, relieve the manufacturer of the obligation to state the fact of their presence when used. Delinquency in this respect is shown in a number of instances; but in some of these the goods

	9588	9577	9573	9589	9572	9578
Ash	3.77	4.56	3.56	3.53	0.49	7.21
Nitrogen-free extract	73.49	74.20	74.78	74.64	77.40	68.81
Sodium oxide	1.63	1.54	1.29	1.05	0.13	2.50
Potassium oxid	0.21	0.21	0.36	1.00	0.16	0.42
Phosphoric anhydrid	1.32	1.50	0.88	0.13	0.19	2.29
Sulphuric anhydrid	0.03	0.04	0.10	0.08	0.01	0.11
Chlorin	0.76	0.93	0.82	0.45	trace	0.68
Calcium oxid	trace	0.44	0.30	trace	trace	0.75
Tartrates	none	present	none (?)	present	present	none
Weight claimed, oz.	18	18	20	24	36	16
Weight found, oz.	18.2	18.0	19.2	23.8	43.5	16.0
Cost per package, cts.	14	16	15	20	45	15
Cost per lb., cts.	12.3	14.2	12.5	13.5	16.6	15.0

The claims made for these flours seem to be substantiated by our analyses, except that we were unable to detect cream of tartar in Nos. **9588** and **9573.**

FRUIT JUICES.

Five brands of fruit juices were examined as follows:

9587. *Dole's Pure Hawaiian Pineapple Juice,* Hawaiian Pineapple Products Co., Honolulu, Haw. Cost 10 cents per 4.8 fl. oz.

9581. *Du Belle Grape Juice,* Du Belle Grape Juice Co., Rochester, N. Y. "About 2% granulated sugar." Cost 20 cents per 16 fl. oz.

9580. *Hay's Five Fruit,* H. H. Hay Sons, Portland Me. "Strawberries, raspberries, pineapples, oranges, lemons." "1/10 of 1 per cent. sodium benzoate, artificially colored." Cost 40 cents per 16.3 fl. oz.

5582. *Phez,* Pheasant Brand Loganberry Juice, with Sugar, Pheasant Fruit Juice Co., Salem, Ore.

9582. *Tim Pine,* J. Tim Co., New York. "Pineapple juice with sugar added." Cost 25 cents per 15.8 fl. oz.

	9587	9581	9580	5582	9582
Alcohol by volume	0.36	0.26	0.15	0.08	0.12
Solids	13.27	17.87	62.80	34.13	13.54
Ash	0.37	0.38	0.22	.....	0.52
Sucrose	0.16	0.08	1.62	13.48	3.32
Invert sugar	12.95	15.68	59.76	17.87	9.65
Saccharin	none	none	none	none	none

* Sodium benzoate 0.08%.

None of the samples contained saccharine or salicylic acid. **9580** contained amaranth color and 0.08 per cent. of sodium benzoate.

HAMBURG STEAK.

Thirty-four samples sent by the Dairy Commissioner were examined for preservatives. None contained boric acid, and five no sulphurous acid. Fifteen samples contained less than 25 mgms. of sulphurous acid per kilogram, while 13 contained this acid in considerable amount as follows:

No.	Sulphurous Acid mgms. per kilo.	No.	Sulphurous Acid mgms. per kilo.
11637	876.8	11704	368.0
11640	736.0	11706	1740.8
11641	806.4	11707	1875.2
11646	492.8	11710	3513.6
11647	124.8	11712	531.2
11649	2422.4	11721	1628.8
11701	761.6		

These amounts of sulphurous acid are very excessive, and indicate a widespread use of this preservative in comminuted meats that is not without danger to the public health.

No. **11713** had a decided putrid odor when received by us, and was totally unfit for human food.

CORDIALS.

Twenty-seven samples of cordials, brandies and liqueurs have been examined and the results are given in Table XV.

Products of this type have been examined in this laboratory on previous occasions, notably in 1901 and 1914, and their substance and quality need no extended discussion at this time. The solid matter in them consists almost wholly of cane sugar or its derivative, invert sugar, or mixtures of the two sugars. Five samples by their considerable plus polarization at 87° are shown to contain glucose or starch sugar. The coal-tar colors used are of the permitted group except in one case, No. 8155, which contained the unpermitted color magenta. The use of permitted colors does not, however, relieve the manufacturer of the obligation to state the fact of their presence when used. Delinquency in this respect is shown in a number of instances; but in some of these the goods

	9588	9577	9573	9589	9572	9578
Ash	3.77	4.56	3.56	3.53	0.49	7.21
Nitrogen-free extract	73.49	74.20	74.78	74.64	77.40	68.81
Sodium oxide	1.63	1.54	1.29	1.05	0.13	2.50
Potassium oxid	0.21	0.21	0.36	1.00	0.16	0.42
Phosphoric anhydrid	1.32	1.50	0.88	0.13	0.19	2.29
Sulphuric anhydrid	0.03	0.04	0.10	0.08	0.01	0.11
Chlorin	0.76	0.93	0.82	0.45	trace	0.68
Calcium oxid	trace	0.44	0.30	trace	trace	0.75
Tartrates	(?) none	present	(?) none	present	present	none
Weight claimed, oz.	18	18	20	24	36	16
Weight found, oz.	18.2	18.0	19.2	23.8	43.5	16.0
Cost per package, cts.	14	16	15	20	45	15
Cost per lb., cts.	12.3	14.2	12.5	13.5	16.6	15.0

The claims made for these flours seem to be substantiated by our analyses, except that we were unable to detect cream of tartar in Nos. **9588** and **9573.**

FRUIT JUICES.

Five brands of fruit juices were examined as follows:

9587. *Dole's Pure Hawaiian Pineapple Juice,* Hawaiian Pineapple Products Co., Honolulu, Haw. Cost 10 cents per 4.8 fl. oz.

9581. *Du Belle Grape Juice,* Du Belle Grape Juice Co., Rochester, N. Y. "About 2% granulated sugar." Cost 20 cents per 16 fl. oz.

9580. *Hay's Five Fruit,* H. H. Hay Sons, Portland Me. "Strawberries, raspberries, pineapples, oranges, lemons." "1/10 of 1 per cent. sodium benzoate, artificially colored." Cost 40 cents per 16.3 fl. oz.

5582. *Phez,* Pheasant Brand Loganberry Juice, with Sugar, Pheasant Fruit Juice Co., Salem, Ore.

9582. *Tim Pine,* J. Tim Co., New York. "Pineapple juice with sugar added." Cost 25 cents per 15.8 fl. oz.

	9587	9581	9580	5582	9582
Alcohol by volume	0.36	0.26	0.15	0.08	0.12
Solids	13.27	17.87	62.80	34.13	13.54
Ash	0.37	0.38	0.22	.....	0.52
Sucrose	0.16	0.08	1.62	13.48	3.32
Invert sugar	12.95	15.68	59.76	17.87	9.65
Saccharin	none	none	none	none	none

* Sodium benzoate 0.08%.

None of the samples contained saccharine or salicylic acid. **9580** contained amaranth color and 0.08 per cent. of sodium benzoate.

HAMBURG STEAK.

Thirty-four samples sent by the Dairy Commissioner were examined for preservatives. None contained boric acid, and five no sulphurous acid. Fifteen samples contained less than 25 mgms. of sulphurous acid per kilogram, while 13 contained this acid in considerable amount as follows:

No.	Sulphurous Acid. mgms. per kilo.	No.	Sulphurous Acid mgms. per kilo.
11637	876.8	11704	368.0
11640	736.0	11706	1740.8
11641	806.4	11707	1875.2
11646	492.8	11710	3513.6
11647	124.8	11712	531.2
11649	2422.4	11721	1628.8
11701	761.6		

These amounts of sulphurous acid are very excessive, and indicate a widespread use of this preservative in comminuted meats that is not without danger to the public health.

No. **11713** had a decided putrid odor when received by us, and was totally unfit for human food.

CORDIALS.

Twenty-seven samples of cordials, brandies and liqueurs have been examined and the results are given in Table XV.

Products of this type have been examined in this laboratory on previous occasions, notably in 1901 and 1914, and their substance and quality need no extended discussion at this time. The solid matter in them consists almost wholly of cane sugar or its derivative, invert sugar, or mixtures of the two sugars. Five samples by their considerable plus polarization at 87° are shown to contain glucose or starch sugar. The coal-tar colors used are of the permitted group except in one case, No. 8155, which contained the unpermitted color magenta. The use of permitted colors does not, however, relieve the manufacturer of the obligation to state the fact of their presence when used. Delinquency in this respect is shown in a number of instances; but in some of these the goods

TABLE XV—ANALYSES OF

Station No.	Brand	Price per bottle, cents
8114	Creme de Menthe Glaciale. P. Garnier, Enghien, France	70
8130	American Creme de Menthe. M. R. Stern, New York	25
8147	Creme de Menthe, in bulk. Johnson Co.,[2] New Haven	25
8149	Creme de Menthe, Liqueur Superfine. Edouard Riviere	10
8151	Creme de Menthe Cordial Superior Quality	20
8158	Creme de Menthe, in bulk	30
8159	Creme de Menthe. Charles Jacquien et Cie	25
8145	Old Abbey Cordialized Apricot Brandy. California Fruit Prod. Co., New York	25
8157	Apricot Cordial. Johnson Co.,[2] New Haven	25
8156	Wild Cherry Cordial. Johnson Co.,[2] New Haven	25
8133	Gilbert's Grenadine Cordial. John Gilbert & Sons, New Haven	35
8146	Anisette Cordial Superior Quality. Hartford Distillery Co., Hartford	25
8131	Crême de Cèrisès. E. Cusenier, Paris	20
8132	Veritable Cherry Liqueur. E. Cusenier, Paris	20
8139	Meggy-Lelke Weichsel-Cherry Liquor. Schrank Béla es Ödön, Esztergom, Hungary	52
8134	Curacoa Sec. E. Cusenier, Paris	20
8135	Creme de Roses. E. Cusenier, Paris	20
8150	Creme de Rose, Superior Quality. French & Italian Imp. Co., New Haven	10
8153	Creme de Rose. New England Cordial and Importing Co.	20
8136	Grande Liqueur Saint-Martial. P. Bardinet, Bordeaux	20
8137	Kummel. John Gilbert & Son, New Haven	20
8140	Bazilika Ukör, Schrank Béla es Ödön, Esztergom, Hungary	50
8154	Creme de Coffee Cordial. New England Cordial & Importing Co.	20
8155	Creme de Violet. New England Cordial & Importing Co.	20
8138	Forbidden Fruit Liqueur. Louis Bustanoby, New York	50
8152	Imperial Peach Cordial. Henry H. Shufeldt & Co., Peoria, Ill	15
8148	Monopol Vodka. Domestic Product. Russian Monopol Co., Brooklyn, N. Y.	15

[1] Napthol Yellow S and Light Green S F Yellowish, permitted coal-tar dyes.
[5] Declared alcohol 42%. [6] Declared artificially colored. [7] Declared alcohol 34%
[10] Polarization @ 87° = +14.4. [11] Polarization @ 87° = +16.0.

were not purchased in the original containers. The alcoholic distillates in all cases were examined for the presence of methyl (wood) alcohol but none was detected. Monopol Vodka is a clear, colorless liquid possessing the odor and taste of raw distilled spirit, which the partial analysis indicates it to be.

INFANT FOODS.

Two well-known brands, not previously examined by this Station, were analyzed.

CORDIALS, BRANDIES AND LIQUEURS.

Volume of contents, fl. ozs.	Specific Gravity @ 15.6 °C.	Alcohol by Volume %	Total Solids %	Sucrose %	Reducing Sugar as Invert %	Polarization Direct °v	Polarization Invert °v	Temp. °C.	Color
8.3	1.1410	29.30	41.21	40.89	.....	+41.7	—12.5	20	None
6.6	1.1121	18.76	31.85	31.60	.....	+31.8	—10.1	20	N. Y. S & L. G. S F Y.[1]
7.3	1.1110	23.86	33.41	19.00	13.48	+15.2	—10.0	20	" "
1.9	1.1056	11.90	28.69	23.34	4.76	+23.7	—7.3	20	" " 6
2.3	1.0728	20.15	29.94	Present	.....	+43.4	+13.6[3]	19	" "
7.2	1.0718	26.36	25.73	22.70	2.76	+22.3	—7.8	20	" "
7.9	1.1679	15.66	41.22	40.52	.....	+41.0	—12.8	20	" " 6
7.6	1.1029	28.88	32.05	14.33	17.60	+8.6	—10.3	21	Natural
7.3	1.0940	17.88	27.78	.....	26.98	—7.0	—7.0	21	"
7.5	1.1088	13.60	29.44	7.36	20.00	+1.6	—8.1	21	"
6.9	1.3082	4.76	64.16	.....	61.92	—19.8	—19.8	21	Archil
13.2	1.0385	24.32	16.65	15.33	.....	+15.2	—5.1	21	None
1.7	1.1555	25.50[4]	43.48	31.63	10.50	+28.6	—13.2	21	Natural
1.5	1.0617	25.60	21.12	.....	18.00	—5.8	—6.1	21	"
3.2	1.0994	28.60	32.64	.....	30.72	—8.6	—8.6	21	"
1.1	1.0971	38.70[5]	36.96	35.79	.....	+37.1	—10.2	21	Unidentified[6]
1.6	1.1257	32.25[7]	40.65	39.30	.....	+39.4	—12.5	21	Cudbear[6]
2.5	1.0680	26.20	24.20	Present	.....	+30.0	+7.7[8]	21	Amaranth
2.4	1.0704	25.00	24.41	Present	.....	+31.8	+9.0[9]	21	Amaranth[6]
1.9	1.0935	41.00	37.07	27.39	7.56	+33.0	—3.2	21	None
1.6	1.0823	41.20	35.36	31.47	3.25	+34.0	—7.6	21	None
2.9	1.1068	35.40	36.72	0.74	35.72	—9.2	—10.8	21	Natural
2.3	1.0832	22.95	26.34	Present	.....	+34.8	+12.0[10]	21	Natural
2.5	1.0694	23.95	24.71	Present	.....	+32.6	+9.6[11]	21	Magenta[6]
1.9	1.0549	37.20	27.19	12.26	13.44	+8.2	—8.0	21	Unidentified. Coal-tar
2.4	1.0766	16.20	22.98	1.35	20.28	—6.6	—8.4	20	Vegetable[6]
3.7	0.9463	43.20	.....	.....	.....	.....	.....	..	None

[2] Statement: Imported. [3] Polarization @ 87° = +19.2. [4] Declared alcohol 26%
[8] Polarization @ 87° = +13.6. [9] Polarization @ 87° = +15.2.

5576. *Neave's Food for Infants*, J. R. Neave and Co., Fordingbridge, Eng. Wholesale price 30 cents per 16 oz.

5577. *Savory and Moore's Food for Infants and Invalids*, Savory and Moore, London, Eng. Wholesale price 27 cents per 10 oz.

	5576	5577
Water	8.81	6.28
Ash	0.60	0.75
Protein (N x 6.25)	6.94	11.75

	5576	5577
Fat	1.19	1.45
Fiber	0.21	0.12
Nitrogen-free extract	82.25	79.65
Starch	70.42	69.19

Neave's Food is essentially a baked flour, while the *Savory and Moore Food* is composed of wheat flour and malt. Both brands contain very large percentages of starch. Owing to the diastatic ferment present most of the starch in *Savory and Moore's Food*, if prepared according to directions, would be converted into soluble forms, chiefly dextrins. In *Neave's Food* such would not be the case as no ferment is present.

JELLY AND JUNKET POWDERS.

The descriptions of three new brands and their analyses follow:

9570. *Falconjel, Raspberry.* Falcon Packing Co., New York. "Composed of geletine, sugar, citric acid, artificial flavor and vegetable color." Cost 13 cts. per 6.3 oz.

9568. *Jiffy-Jell, Orange.* Waukesha Pure Food Co., Waukesha, Wis. "A mixture, vegetable color." Cost 13 cts. per 3.3 oz.

9569. *Nesnah, Lemon Flavor.* The Junket Folks, Little Falls, N. Y. "Contains U. S. certified color." Cost 10 cts. per 4.0 oz.

	9570	9568	9569
Water	2.43	3.28	0.15
Ash	0.15	0.21	0.35
Gelatin (N x 5.55)	7.66	8.05	none
Cane sugar	88.35	88.11	98.82
Undetermined	1.41	0.35	0.68
Color	*	**	***

* Lichen color, probably cudbear. ** Cochineal. *** Napthol Yellow S and Orange I.

These three samples substantially satisfy their claims, although of course it is incorrect to class cochineal as a "vegetable" color. *Nesnah* contained rennin or a rennet-like substance.

Granting the convenience of such preparations, purchasing sugar in the form of a jelly powder is rather an expensive practice.

MILK.

Three hundred and ninety samples sent by the Dairy Commissioner were analyzed. Of these 132 conformed to the legal

TABLE XVI.—WATERED MILKS.

No.	Dealer.	Solids.	Fat.	No.	Dealer.	Solids.	Fat.
	Bloomfield:				Orange:		
12302	F. Chiaramonti..	11.08	3.6	12144	E. J. Cronin.....	10.25	3.1
12199	J. Viicciaido.....	8.09	2.6	11730	S. G. Grillo.....	3.72	1.3
12300	" "	8.99	3.0	12143	Wasily Paray....	8.18	2.4
12301	" "	9.12	3.0		Shelton:		
	East Lyme:			11939	P. Imbimbo.....	11.28	4.3
11679	Koss Bros.....	11.21	3.6		Southbury:		
	Guilford:			11981	J. N. Benson....	11.62	4.1
12133	Frank Haggerty..	11.66	3.7	11975	H. B. Davis.....	6.20	2.1
12136	R. E. Scranton...	11.26	3.9	11976	" "	9.07	2.4
12138	" " ...	11.23	3.6	11978	E. Mellane.....	12.05	4.3
12139	Willard Scranton.	10.57	3.0	11979	Mrs. Nora Rogers	8.76	2.3
12140	" "	11.08	3.9	11980	" " "	11.90	4.0
	Jewett City:				So. Norwalk		
11854	W. B. Frink, Est.	11.40	3.5	11772	J. H. Crosby....	10.87	3.2
11855	" " "	11.73	3.7	12132	J. H. Wempe.....	11.12	3.4
	Killingly:				Stonington:		
12111	Walter Chase....	11.02	3.6	12152	J. B. Crowley....	11.24	3.3
11650	(Unknown).....	8.15	2.5		Watertown:		
	Meriden:			12018	A. Brazee.....	11.30	3.5
12089	W. A. Reed.....	10.28	3.0		Westport		
12090	" "	10.59	3.1	11973	Robt. Dykman...	11.65	3.9
	Noroton:			11974	" "	11.65	3.8
12029	James H. Mead..	11.60	4.6		Willimantic:		
12030	" " "	10.20	4.0	12173	G. W. Andrews..	11.01	3.1
	No. Franklin:			11669	Reinstein Bros...	9.41	2.9
12268	J. Ries.....	12.07	4.2		Woodbury:		
	Norwich:			11946	T. Madin.....	11.43	3.6
11653	J. J. Harrington..	10.23	3.4	12000	B. F. Ricker....	10.52	3.2
11654	" "	9.95	3.0				
11655	" "	10.29	3.2				
11656	" "	10.19	3.2				
11399	(Unknown).....	10.11	2.8				

standards, 216 were below the standard in one or more respects, 44 were watered, 6 were skimmed and 2 were both skimmed and watered. Of the sub-standard samples, in which no watering or skimming was detected, 9 were deficient in fat, 3 in solids and fat, 118 in solids-not-fat, 42 in solids and solids-not-fat, and 44 in solids, fat and solids-not-fat. The large proportion of adulterated and sub-standard samples is no indication of the quality of the milk generally sold in this state, as all of these samples were taken because of some suspicion as to their purity. That there is an abundance of milk of good quality sold in the state is shown by the composition of the 132 samples which conformed to the standards. These contained from 11.75 to 14.49 per cent. of

solids and from 3.3 to 6.0 per cent. of fat, with averages of 12.61 and 4.03 per cent., respectively. In 57 per cent. of these samples the fat ranged from 3.3 to 4.0, in 30 per cent. from 4.0 to 4.5, in 7 per cent. from 4.5 to 5.9, and in 6 per cent. was over 5.0 per cent.

Table XVI shows the composition of the watered milks and the names of the dealers selling them.

The following tabulations give similar data for the skimmed and the skimmed and watered milks:

SKIMMED MILKS.

No.	Dealer.	Solids.	Fat.
12161	Mansfield Center: H. E. Avery	11.98	3.2
11691	" S. J. Nacsin	10.95	2.6
12169	No. Franklin: J. Ries	11.17	2.8
11457	Southington: W. S. Crosby	10.97	2.6
12130	Sterling: Richard Fortune	11.74	2.8
11391	Willimantic: (unknown)	12.50	3.1

SKIMMED AND WATERED MILKS.

12027	Noroton: T. M. Collins	8.12	2.2
11875	Somers: E. H. Pease	9.60	2.1

SAUSAGE.

Twenty-one samples of pork sausage, sent by the Dairy Commissioner, were tested for added starch. In sixteen of these the starch ranged from 0.16 to 0.39 per cent. In the remaining five samples the percentages were much higher, indicating that starch had been added to the sausage meat. The adulterated samples were as follows:

No.	Dealer.	Starch. %
11724	Thos. Rutendo, Hartford	4.63
11731	Meriden Market, Meriden	2.75
11735	Fulton Market, Waterbury	2.55
11738	Palace Market, Waterbury	1.64
11739	Public Market, Waterbury	2.43

SPICES.

In 1916 we inspected spices sold in package form; this year the inspection has been concerned chiefly with bulk goods. Fifty-two samples, sent by the Dairy Commissioner, have been examined.

Applying the standards rigidly 1 sample of black pepper, 10 of cayenne, 4 of cloves, 2 of ginger and 1 of white pepper departed

TABLE XVII.—SPICES.

No.	Dealer.	Ash. Total.	Ash. Insol. in acid.	Starch.	Crude fiber.	Non-volatile ether extract.
	Black Pepper.					
11784	James Van Dyk Co., New York (New Haven store)	6.43	1.40	36.03	11.47	7.72
11802	Ross W. Weir & Co., New York (W. B. Eastman, New Milford)	6.17	1.11	33.96	12.69	8.19
11783	In bulk (F. H. Davis, New London)	6.35	1.35	36.62	12.26	7.90
11788	" " (Flemming & Cowan, Hartford)	**7.12**	1.15	28.41	15.00	8.31
11795	" " (M. Epstein, So. Norwalk)	6.76	1.30	36.84	11.76	7.51
11798	" " (W. F. Brennan, Torrington)	5.31	0.71	39.60	11.06	7.29
11806	" " (Geo. B. Clark, Salisbury)	5.07	0.57	37.57	12.16	7.13
11829	" " (Direct Importing Co., New Haven)	5.73	0.65	41.65	9.93	6.80
11840	" " (Pure Food Market, New Haven)	6.72	1.26	32.76	13.95	8.70
11900	" " (Yale Tea & Coffee Co., Waterbury)	4.56	0.25	34.11	13.52	6.51
	Cayenne Pepper.					
11793	East India Tea Co. (So. Norwalk store)	5.57	0.20	0.62	22.12	17.83
11800	McCormick & Co., Baltimore (Jos. Gaven, Torrington)	**7.50**	**1.52**	1.43	24.08	**10.02**
11782	In bulk (W. F. Barrows, New London)	6.17	**0.57**	1.27	25.94	16.34
11790	" " (Newton, Robertson & Co., Hartford)	**6.61**	**0.65**	0.73	24.40	17.00
11797	" " (A. Davey & Co., So. Norwalk)	6.30	**0.52**	1.07	24.39	16.41
11803	" " (Geo. B. Clark, Salisbury)	**7.43**	**1.11**	0.53	25.15	10.22
11824	" " (Direct Importing Co., Mystic)	6.44	0.50	0.51	19.34	15.00
11830	" " (" " " Bridgeport)	6.37	0.48	0.96	20.65	**13.51**
11833	" " (Village Store Co., Bridgeport)	**7.81**	**0.62**	0.67	24.43	**14.87**
11835	" " (Union Pacific Tea Co., Bridgeport)	**6.97**	**1.20**	1.07	25.65	15.68
11836	" " (Mohican Co., New Haven)	6.06	0.15	0.70	21.39	19.21
11837	" " (Shartenberg & Robinson Co., New Haven)	5.35	0.15	1.17	18.82	**12.36**
11838	" " (Direct Importing Co., New Haven	6.32	0.10	1.07	14.85	**11.11**
11841	" " (Pure Food Market, New Haven)	6.42	0.40	0.87	21.91	16.61
11842	" " (F. J. Markle, New Haven)	5.60	0.38	0.81	24.76	16.82
11844	" " (Grand Union Tea Co., New Haven)	5.81	0.50	0.81	25.11	16.73
11847	" " (Yale Tea & Coffee Co., Waterbury)	**8.56**	**0.72**	1.46	27.73	**3.94**
	Cloves.					
11786	In bulk (S. Satriano, Hartford)	6.26	0.25	..	8.33	17.80
11792	" " (James Butler, Stamford)	6.55	0.32	...	9.42	14.21
11799	" " (W. F. Brennan, Torrington)	6.79	0.60	...	**13.88**	**6.40**
11826	" " (Direct Importing Co., Mystic)	6.25	0.48	...	9.08	17.34
11827	" " (Gager Crawford Co., New London)	5.96	0.27	...	**10.73**	14.81
11839	" " (John Gilbert & Son, New Haven)	7.62	**0.57**	...	8.17	19.86
11845	" " (Carlson Tea Co., New Haven)	6.42	0.39	...	9.79	15.12
11848	" " (Yale Tea & Coffee Co., Waterbury)	6.82	**0.71**	...	9.55	16.90
	Ginger.					
11787	In bulk (S. Satriano, Hartford)	5.12	0.93	49.56	...	...
11794	" " (M. Epstein So. Norwalk)	4.90	0.57	48.66	...	...
11801	" " (H. M. Hoag, Sharon)	5.11	0.70	51.36	...	...
11805	" " (Geo. B. Clark, Salisbury)	**6.51**	0.52	49.90	...	...

Figures in boldface indicate a departure from the standard.

TABLE XVII.—SPICES—*Continued.*

No.	Dealer.	Ash. Total.	Ash. Insol. in acid.	Starch.	Crude fiber.	Non-volatile ether extract.
	Ginger.					
11807	In bulk (F. S. Roberts, New Hartford)	5.17	0.90	49.05	...	...
11828	" " (Direct Importing Co., New Haven)	**6.50**	0.62	48.26	...	...
11831	" " (" " " Bridgeport)	5.57	0.66	49.44	...	...
11843	" " (Pure Food Market, New Haven)	5.95	1.00	49.05	...	...
11846	" " (Great Atl. & Pac. Tea Co., Waterbury)	4.60	0.27	51.52	...	...
11849	" " (Yale Tea & Coffee Co., Waterbury)	4.01	0.46	52.73	...	...
	White Pepper.					
11789	Chas. G. Lincoln & Co. (Brown, Thomson & Co., Hartford)	1.21	0.15	55.46	4.27	7.5
		1.22	0.13	53.72	3.93	7.1
11785	In bulk (Buckley & Reardon, Hartford)	2.03	0.50	55.23	4.38	7.9
11791	" " (James Butler, Stamford)	1.17	0.10	55.74	4.39	7.3
11796	" " (Andrew Davey & Co., So. Norwalk)	1.49	0.06	58.61	4.05	7.0
11804	" " (Geo. B. Clark, Salisbury)	**5.16**	**0.52**	47.24	**7.57**	7.4
11825	" " (Direct Importing Co., Mystic)	1.01	0.07	55.25	3.76	6.9
11834	" " (Davey Bros., Bridgeport)					

Figures in boldface indicate a departure from the standard.

from the standard in some respect. Many of these variations, however, are trivial, and only the following seven can be considered as seriously adulterated:

Cayenne pepper. Nos. **11800, 11803, 11837, 11838** and **11847.**

Cloves. No. **11799.**

White pepper. No. **11825.**

The spices sold in Connecticut market, both in package form and in bulk, are on the whole of satisfactory quality. The adulterations found are due chiefly either to insufficient cleaning of the crude spices, or to careless storage conditions whereby the spice value of the product is impaired.

TEMPERANCE BEVERAGES.

The quite general enactment of laws prohibiting the sale and even the use of intoxicating drinks, makes the analysis of beer substitutes a matter of some importance. Four such brands have been examined this year as follows:

8163. *Anzac Cereal Beverage*, Anzac Co., Boston, Mass. Cost 10 cts. per 12 fl. oz.

TABLE XVIII.—VINEGAR.

No.	Brand.	Acidity.	Solids.
	Cider Vinegar.		
11909	A. & P.	4.44	1.91
11926	American Grocers Society. (A. G. S.)	4.01	1.99
11922	Apple Product Co.	4.01	2.32
11923	Berkshire Products Co.	4.00	1.82
12050	" " "	3.86	1.78
12032	A. C. Blenner & Co.	4.04	1.93
11914	W. W. Cary & Son	4.32	2.08
11919	" " "	4.20	2.09
12038	Cascade Cider Co (C. C. C.)	4.66	2.31
11910	John T. Doyle Co. (Country Club)	4.24	1.90
11935	Lewis DeGroff & Son (Health)	5.12	2.29
11920	Duffy Malt Co. (Duffy's Gold Seal)	4.04	1.98
12036	Eagle Oil & Supply Co. (Sumner)	4.00	1.74
11912	Empire Bottling Works (Empire)	4.01	1.76
11924	Empress Mfg. Co. (Howard)	4.00	1.94
11925	Glautz & Sulkind (G. & S.)	4.57	2.03
12037	Humphrey & Cornell	4.06	1.90
11933	Francis H. Leggett & Co. (Premier)	5.12	2.72
12043	D. E. Mowry Co.	4.60	1.92
12042	Pen Yan Cider Co. (Parson's)	4.80	2.60
11918	Rocco	4.32	1.91
12011	Scutonia	2.04	2.97
11917	Silver Boy Packing Co.	4.28	2.21
12061	Silver Lane Pickling Co.	4.60	2.30
11934	Standard Pickle Co.	4.16	1.83
12063	J. A. Thompson & Son (XXX)	3.84	1.93
12044	R. C. Williams & Co. (Robin Hood)	5.46	2.20
12010	E. H. Woodworth	3.98	1.60
11944	" "	4.00	1.64
11915	Sold by W. R. Bailey, New Haven	4.72	3.26
12031	" " B. Halpert, New Haven	4.00	2.00
12034	" " Kobler Bros., New Haven	4.24	2.48
12035	" " E. Casher & Son, New Haven	3.98	1.81
12039	" " E. J. Bates, New London	4.24	1.70
12041	" " A. Wachanasky, New London	5.18	2.04
12062	" " A. Fronz, Meriden	4.04	1.88
12060	" " G. Galamandra, Meriden	3.72	1.98
12064	" " J. A. Collins, Meriden	3.28	3.27
	Distilled Vinegar.		
12040	Sold by A. Gordon, New London	4.04	0.25
	Distilled and Molasses Vinegar.		
11913	John T. Doyle Co.	3.96	0.36

8161. *Bevo*, Non-Intoxicating, Anheuser-Busch Brewing Association, St. Louis, Mo. Cost 12 cts. per 10 fl. oz.

9162. *Iron Brew*, Non-Alcoholic, The Mass and Waldstein Extract Co., Newark, N. J. "Colored with burnt sugar." Cost 5 cts. per 7.3 fl oz.

9590. *Wesco*, Temperance Beverage Co., Pelham, N. Y. "Alcohol less than ½ per cent." Cost 15 cts. per 11.5 fl. oz.

	8163	8161	8162	9590
Alcohol by volume	0.42	0.38	0.38	0.44
Solids	5.92	6.20	8.37	4.91
Ash	0.21	0.11	0.10	0.18
Direct reducing sugars	2.27	2.42	6.90	1.55
Total reducing sugars	5.41	5.79	7.72	4.15

No saccharin, benzoic or salicylic acids were found in any of the above.

VINEGAR.

Forty samples sent by the Dairy Commissioner were examined. The state standard for vinegar sets limits only for acidity and solids, 4.00 and 1.60 per cent., respectively, and only these determinations were made in this examination. Thirty-five samples satisfied the standard, and five were deficient in acidity, the percentages found ranging from 2.04 to 3.84.

MISCELLANEOUS FOODS.

EGGS. Six samples of eggs, sent by the Dairy Commissioner, and purchased for "fresh eggs," were found to be misbranded.

SUGAR. Of four samples of granulated sugar, sent by the Dairy Commissioner, three were pure, but the fourth contained about 3.5 per cent. of corn starch. A sample of brown sugar from the same source contained 86.87 per cent. of saucrose, and was not adulterated.

OVALTINE. *Ovaltine, Tonic Food Beverage.*. A. Wander, London, Eng. "A concentrated extraction from malt, milk and eggs, flavored with cocoa." "Is rich in lecithin, the assimilable organic compound of phosphorus. It is thus a valuable article of food in cases of mental and nervous exhaustion."

Water	1.03
Ash	3.52
Protein (N x 6.25)	12.75
Fat	5.58
Fiber	0.64
Nitrogen-free extract	76.48
Lecithin phosphoric acid	0.10
Reducing sugars (chiefly maltose, lactose, dextrose and dextrins)	70.01

Active amylase	present
Starch	trace
Calories per 100 gms	407

The product appears to be composed of the foods claimed. The small amount of lecithin phosphoric acid present, 0.10 per cent, hardly seems to justify the claim that the food is "rich in lecithin," or that it is "a valuable article of food in cases of mental and nervous exhaustion."

TAPIOCA. *Sunbeam Pure Food Small Pearl Tapioca, German Sago Style.* Austin, Nichols and Co., New York. Cost 12 cts. per 14 oz.

Water	13.51
Ash	0.16
Protein (N x 6.25)	0.56
Fat	0.05
Fiber	0.05
Starch	85.67
Calories per 100 gms	345

COTTEN SEED BREAD. This is a "war" bread, made according to the following recipe for one loaf:

⅔ cupful cotton seed meal
2⅓ cupfuls bread flour
1 teaspoonful salt
1 tablespoonful sugar
½ cake yeast
1 cupful lukewarm liquid (water, milk, or equal parts of each).

Its composition follows and that of baker's bread for comparison.

We are indebted for the above recipe and sample to the Bureau of Chemistry, U. S. Department of Agriculture.

WHEAT-A-LAXA BREAD. Made by the S. S. Thompson Co., New Haven. "Natural Grain, Laxative, Whole Wheat."

BISCUITS. Three samples were analyzed as follows:

8122. *Homo Whole Wheat Biscuit*, National Biscuit Co., New York, Cost 10 cts. for 66 biscuits weighing 5.9 oz.

8129. *Whole Wheat Crackers*, Loose-Wiles Biscuit Co., Boston, Mass. Cost 15 cts. for 7.4 oz.

8125. *India Biscuit* (formerly *India Digestive Biscuit*), New England Cereal Co., South Norwalk, Conn. Cost 25 cts. for 20 biscuits weighing 11 oz.

	Cotton Seed Bread.	Wheat Bread.	Wheat-A Laxa Bread.	8122	8129	8125
Water	38.02	36.44	33.60	9.56	10.23	8.67
Ash	2.09	1.43	2.17	3.47	3.18	5.02
Protein	13.51	7.65	8.60	9.13	9.13	12.81
Fat	1.63	1.98	3.75	8.10	4.33	2.24
Nitrogen-free extract	*44.75*	*52.50*	*51.90*	69.10	72.80	66.03
Fiber	...	...	...	0.64	0.33	5.23
Calories per 100 grams	248	258	276	386	367	336

NUT MARGARINE. *Nut Margarine, Coco-Nut Brand*, The Nucoa Butter Co., New York "Free from animal fats." "Contains 1-10 per cent of benzoate of soda." Cost 30 cts. per lb.

Water	7.65
Sodium benzoate	0.10
Reichert-Meissl No.	7.25
Refractive index @ 40° C.	1.4502

Phytosterol, cocoanut oil and possibly peanut oil were present, cholesteral and cotton seed oil were not present.

The product consists chiefly of cocoanut oil with possibly some peanut oil. No animal fat is present. This is a wholesome preparation and at present butter prices might well be substituted for that article. The presence of benzoate of soda is objectionable as well as unnecessary.

FLOUR. *Good Health Flour*, A. B. Klar, Canal Dover, O. "Contains muscle, brain, nerve, bone and tooth elements."

Water	12.01
Ash	1.68
Protein (N x 6.25)	15.13
Fat	3.30
Fiber	1.62
Nitrogen-free extract	66.26
Starch	53.83
Phosphoric acid	0.86
Calories per 100 gms.	355

Any good whole wheat flour justifies the above claim quite as well as this particular brand.

OYSTERO. *Oystero*, Oyster Broth Powder, J. S. Darling and Son, Hampton, Va. Carton containing three tubes weighing together about 0.5 oz., and each claimed to be "sufficient to make a pint of oyster broth," cost 25 cts.

Water	3.77
Ash	11.39
Protein (N x 6.25)	52.50
Fat	9.20
Nitrogen-free extract	23.14
Sodium chlorid	3.10
Boric acid	none

The above analysis agrees well with that of dried oyster meat and the preparation appears to be true to name.

GRISSIN. *Piemont Toreador Grissin, Salted, Italian Bread Sticks*, A. Angononoa, New York. Cost 13 cts. per 3.7 oz.

SPLIT PEAS. *Mission Garden Split Peas.* Cost 36 cts. per 32.0 oz.

	Grissin.	Split Peas.
Water	10.10	11.33
Ash	3.59	2.88
Protein (N x 6.25)	11.50	23.44
Fat	7.21	1.01
Fiber	0.21	1.06
Nitrogen-free extract	67.39	60.28
Chlorin	1.39	...
Calories per 100 grams	380	344

RYZON, The Perfect Baking Powder, General Chemical Co., New York. "Monosodium phosphate, sodium bicarbonate, starch." Cost 18 cts. per 8.6 oz. It contained moisture 4.08, phosphoric acid 22.96, carbonic acid 12.73, residual carbonic acid 0.45, available carbonic acid 12.28, sodium oxid 20.32, sulphuric anhydrid 0.22, starch 31.68 per cent., calcium oxid a trace. It is composed, therefore, of about 38.80 per cent. monosodium phosphate, 24.3 sodium bicarbonate, 31.7, starch, 0.4 sodium sulphate, 4.08 moisture and 0.74 undertermined.

8120. *Vegex*, A Vegetable Extract, J. W. Beardsley's Sons, New York, "Made entirely of vegetable products. Contains 35% protein." Cost 25 cts. per 2 oz.

8121. *Vegex Cubes;* same manufacturer as above. Cost 15 cts. per box of 12 cubes, each weighing 0.16 oz.

	8120	8121
Moisture	28.24	7.22
Protein (N x 6.25)	33.00	18.88
Ash	25.73	64.59
Chlorin	7.86	34.59

	8120	8121
=Sodium chlorid	12.96	57.02
Creatinin	none	none
Nitrates	none	none

8127. *Kremette Ice Cream Dressing*, G. F. Heublein and Bro., Hartford. "A Delicious and Palatable Adjunct to Vanilla Ice Cream. Artificially colored." "Alcohol 20%." Price 35 cts. per 6.1 fl. oz.

Spec. grav. @ 15.6° C	1.1609
Alcohol by volume	20.52
Solids	43.24
Sucrose	35.49
Invert sugar	6.40
Ash	0.02
Color	archil or cudbear

8115. *Feinste Schlag-Sahne* (*Sterilized Whipped Cream*), C. Mäden Stubben, Bremen, Germany. "Absolutely pure and free of all ingredients." (Evidently an erroneous translation.) Cost 14 cts. per 8 oz.

Water	62.22
Solids	37.78
Ash	0.56
Protein (N x 6.25)	2.52
Lactose	2.25
Fat	32.05
Borax, benzoate, and salicylate	none

THE DRYING OF VEGETABLES BY MEANS OF THE ELECTRIC FAN.

The drying of vegetables and fruits by artificial heat or by the sun's heat is an old practice, but recently in the effort to conserve food of a perishable nature, drying by means of an unheated current of air from an electric fan has been recommended.

While the method has certain advantages, for instance, a better preservation of flavor and color, doubts rose in our minds as to the keeping qualities of products thus prepared. Accordingly we have tested the method with a number of vegetables, with the following results. For comparison several samples were also dried with artificial heat and one by exposure to the sun.

The drying period which has been recommended generally is

far too short. During our first tests the weather conditions were very unfavorable for successful drying, and our drying periods were longer than would have been required in less humid weather.

After drying, the vegetables were conditioned for a few days as directed, and were then placed in card-board boxes which were tightly wrapped in paraffined paper. The contents of the boxes were examined at first at two-week, later at monthly intervals for the presence of mold or insect infestation.

1. *Rhubarb*, June 1. Thoroughly washed, superficial moisture removed with a clean towel, and the stalks cut into 1–16 in. slices. Dried 15¾ hrs., probably unnecessarily long. In good condition Nov. 7.

2. *Rhubarb*, June 1. Treated as above but dried with artificial heat. dried 16⅔ hrs. In good condition Nov. 7.

3. *Asparagus tips*, June 2. Asparagus washed, surplus moisture removed, and tougher more fibrous portion cut away and dried separately. Tips cut into ½ in., fibrous part into ⅛ in. pieces. Drying very prolonged, as sample was not cut fine enough, and the air was exceedingly humid. Insect infestation noted on Oct. 2.

4. *Asparagus, fibrous part*, June 2. Prepared as above, and dried with artificial heat. In good condition Nov. 7.

5. *Asparagus tips*, June 2. Treated as in No. 4. In good condition Nov. 7.

6. *Carrots*, June 2. Sliced very thin, about 1/32 in. Dried in 3 hrs. In good condition Nov. 7.

7. *Spinach*, June 13. Thoroughly washed, and passed through a slicer, stems and all. Stems proved very hard to dry and were later removed. Dried in about 10 hrs. Slight mold shown on Oct. 2.

8. *Spinach*, June 13. Treated as No. 7, but dried with artificial heat in about 3 hrs. Slight mold shown on Oct. 2.

9. *Spinach*, June 13. Whole leaves, dried with heat. After several hours drying it was necessary to remove the leaf stems. In good condition Nov. 7.

10. *String beans*, June 18. Beans were stringed, washed and blanched in boiling water for 10 min. They were then drained and cut lengthwise for drying. Drying very prolonged. Mold developed after one month.

10a. *String beans*, June 18. Same as No. 10, except that beans were cut crosswise into 1 in. pieces. Drying very prolonged. Badly molded on June 30.

11. *String beans*, June 18. Treated same as No. 10, except that artificial heat was used. Drying very prolonged. In good condition Nov. 7.

12. *String beans*, June 18. Treated same as No. 10a, except that artificial heat was used. Drying very prolonged. In good condition Nov. 7.

13. *Swiss chard*, June 26. Leaves sliced fine, the chopped stems being

COMPOSITION OF DRIED VEGETABLES.

No.		Water.	Ash.	Protein. (N x 6.25).	Fiber.	Nit.-free extract.	Fat.
1	Rhubarb, fan.....	16.70	13.00	13.06	11.35	43.83	2.06
2	Rhubarb, heat.....	13.55	12.98	13.94	13.41	44.68	1.44
3	Asparagus tips, fan.....	19.69	8.13	32.06	7.74	30.54	1.84
4	Asparagus, fibrous, heat..	15.90	7.57	17.31	14.97	43.18	1.07
5	Asparagus tips, heat.....	16.51	8.32	33.31	8.32	31.04	2.50
6	Carrots, fan.....	15.41	7.54	8.63	7.92	60.10	0.40
7	Spinach, fan.....	9.96	22.00	30.88	8.74	25.55	2.87
8	Spinach, heat.....	9.34	22.22	30.50	9.22	24.99	3.73
9	Spinach, whole leaves, heat	10.54	19.65	29.63	5.81	29.51	4.86
10	String beans, long, fan....	15.57	6.91	18.38	13.99	44.37	1.78
11	String beans, long, heat...	12.86	6.32	20.19	11.72	47.06	1.85
12	String beans, short, heat..	13.60	6.36	20.00	12.01	46.36	1.67
13	Swiss chard, fan.....	13.25	20.68	24.06	8.14	30.47	3.40
14	Swiss chard, sun.....	12.74	20.71	24.63	6.44	32.01	3.47
15	Swiss chard, heat.....	12.72	14.81	28.63	6.43	32.69	4.72
16	Peas, fan.....	14.12	3.38	24.25	5.71	51.38	1.16
17	Peas, fan.....	14.01	4.00	27.50	8.58	43.34	2.57
18	Baked beans, fan, heat...	7.70	3.19	24.50	4.55	58.90	1.16

kept separate. Leaves dried in 6 hrs., stems taking longer. In good condition Nov. 7.

14. *Swiss chard*, June 26. Treated same as No. 13, but dried in greenhouse with sun's heat. Drying much slower than with fan. In good condition Nov. 7.

15. *Swiss chard*, July 8. Leaves stripped from stems and the whole leaves dried with heat. Dried in about 6 hrs. In good condition Nov. 7.

16. *Peas*, July 12. Peas shelled and passed through meat grinder. Dried in about 7 hrs. Insect infestation found on Oct. 2.

17. *Peas*, July 13. Treated as No. 16. Dried in 12 hrs., somewhat over dried. Insect infestation found on Sept. 1.

18. *Baked beans.* Beans baked, then dried with fan and current of hot air. In good condition Nov. 7.

To summarize, we find that only 3 of 9 samples dried without heat by the electric fan were in good condition after from 4 to 5 months, while 8 of 9 samples dried with artificial heat and the one sample dried with the sun's heat were free from mold and insect infestation at the end of the same period. On the whole our short experience, therefore, is unfavorable to the cold air, electric fan method of drying.

That the dried vegetables possess high nutritive value is shown by the following analyses of our products. By adding the following parts of water to one part of the dried vegetable the resultant

product would have about the same moisture content as the fresh vegetable: Baked beans, 3, peas 3.5, rhubarb 14, carrots, 7 asparagus 14, spinach 11, Swiss chard 11 and string beans 8 parts.

II. DRUG PRODUCTS.

DRUGS FROM STOCK OF DISPENSING PHYSICIANS.

In the Report for 1916 the analyses of 53 such samples were reported. On the following pages will be found the results with 76 additional samples, completing our first inspection of this class of products.

The names and addresses of the firms represented are shown below:

Bristol Myers Co., Brooklyn, N. Y.
Brewer and Co., Worcester, Mass.
Buffington Pharm. Co., Worcester, Mass.
Daggett and Miller Co., Providence, R. I.
Direct Sales Co., Buffalo, N. Y.
Drug Products Co., New York.
The G. F. Harvey Co., Saratoga Springs, N. Y.
The Harvey Co., Saratoga Springs, N. Y.
Independent Pharm. Co., Worcester, Mass.
C. Killgore, New York.
Maltbie Chemical Co., Newark, N. J.
Moore and Co., Worcester, Mass.
National Drug Co., Philadelphia, Pa.
Norwich Pharmacal Co., Norwich, N. Y.
P. J. Noyes Co., Lancaster, N. H.
The E. L. Patch Co., Boston, Mass.
Polk Calder Co., Troy, N. Y.
Progressive Chemical Co., New Haven, Conn.
Surgeon and Physicians Supply Co., Boston, Mass.
Tailby-Nason Co., Boston, Mass.
The Tracy Co., New London, Conn.
John Wyeth and Bro., Philadelphia, Pa.
Yates Drug and Chemical Co., New York.

In the case of tablets at least half of the number making up the sample were weighed individually. These were then ground into a composite sample and the mixture analyzed. In certain instances only the active drug or drugs were determined, while in others a complete analysis was made.

TABLETS.

Acetasol.

11592. *Acetasol*, made by Daggett and Miller Co.; stock of Dr. F. Schavoir, Stamford. *Claimed;* Acetanilid 50%, caffein

2.5%, sodium salicylate, sodium bicarbonate, sugar of milk and oil of wintergreen q.s. to make 100. *Found;* Weights of 19 tablets ranged from 345.9 to 363.4, average, 353.2 mgms. They contained 44.06% acetanilid, 2.12 caffein, 13.36 sodium bicarbonate and 7.36 sodium salicylate; milk sugar and oil of wintergreen present.

Tablets deficient in acetanilid and caffein.

Ammonium Salicylate Comp.

11588. *Ammonium Salicylate Comp.*, made by Daggett and Miller Co.; stock of Dr. J. G. Stanton, New London. *Claimed per tablet;* Ammonium salicylate 2 grs., caffein 1 gr., camphor ½ gr., acetanilid 1⅓ grs., and Dover's powder 1½ grs. *Found;* Weights of 20 tablets ranged from 405.2 to 454.8, average 425.5 mgms. They contained 27.12% ammonium salicylate, 13.42 caffein and 19.27 acetanilid; camphor present and opium and ipecac (indicating Dover's powder).

Tablets contained in part

	Ammonium Salicylate. grs.	Caffein. grs.	Acetanilid. grs.
Heaviest	1.90	0.94	1.35
Lightest	1.70	0.84	1.21
Average	1.78	0.88	1.26

Tablets deficient in ammonium salicylate and caffein.

Antiseptic Tablets.

11577. *Antiseptic Tablets No. 2*, made by Daggett and Miller Co.; stock of Dr. J. W. Callahan, Norwich. *Claimed per tablet;* Corrosive sublimate 7 grs., citric acid 3.48 grs. *Found;* Weights of 12 tablets ranged from 569.8 to 666.2, average, 603.4 mgms. They contained 56.24% corrosive sublimate, or from 4.94 to 5.78, average, 5.24 grs.

Tablets very variable in weight, all short weight, and deficient in corrosive sublimate.

11619. *Antiseptic Tablets No. 1*, made by Direct Sales Co., stock of Dr. T. F. O'Loughlin, Rockville. *Claimed per tablet;* Corrosive sublimate 7.3 grs., ammonium chlorid 7.7 grs. *Found;* Weights of 12 tablets ranged from 970.8 to 1016.8, average, 983.9 mgms. They contained 47.23% corrosive sublimate, or from 7.08 to 7.41, average 7.17 grs.

Tablets satisfactory.

11558. *Antiseptic Tablets No. 1*, made by the Tracy Co.; stock of Dr. T. J. Connors, West Haven. *Claimed per tablet;* Corrosive sublimate 7.3 grs., ammonium chlorid 7.7 grs. *Found;* Weights of 12 tablets ranged from 1061.9 to 1083.9, average, 1073.3 mgms. They contained 46.57% corrosive sublimate, or from 7.63 to 7.79, average, 7.72 grs.

Tablets satisfactory.

11625. *Alkaline and Antiseptic Tablets (Dr. Seiler's Formula)*, made by National Drug Co.; stock of Dr. E. J. Thompson, Hartford. *Claimed per tablet;* Sodium bicarbonate, sodium biborate, sodium benzoate, sodium salicylate, sodium chlorid, eucalyptol, thymol, menthol, oil of sweet birch. *Found;* Weights of 13 tablets ranged from 834.2 to 883.1, average, 863.2, mgms. No specific amounts being claimed only qualitative tests were made. Sodium borate, carbonate, chlorid, salicylate, benzoate and thymol and menthol were found.

Tablets satisfactory in respect to ingredients.

11447. *Antiseptic Germicide*, made by the Maltbie Chemical Co.; stock of Dr. J. L Gilday, Bridgeport. *Claimed per tablet;* Mercuric iodid ⅜ grs., potassium iodid ⅜ gr., sodium bicarbonate 6 grs. *Found;* Weights of 12 tablets ranged from 1040.8 to 1152.6, average 1096.1, mgms. They contained 2.03 mercuric iodid, 2.88 potassium iodid and 94.25 per cent. sodium bicarbonate; so that one tablet contained

	Mercuric iodid. grs.	Potassium iodid. grs.	Sodium bicarbonate. grs.
Heaviest	0.361	0.512	16.88
Lightest	0.326	0.463	15.14
Average	0.343	0.487	15.94

Tablets satisfactory except for large excess of sodium bicarbonate. It is possible, however, that the sampling agent erroneously copied 6 for 16 grs.

Arsenious Iodid Compound.

11445. *Arsenious Iodid Compound*, made by Drug Products Co.; stock of Dr. C. L. Dichter, Stamford. *Claimed per tablet;* Corrosive sublimate 1-64 gr., potassium iodid 2 grs., syr. iron iodid 5 min., sol. arsenic and mercury iodid 2 min., tinct. nux vomica 2 min. *Found;* Weights of 24 tablets ranged from 497.2 to 559.5, average, 534.6, mgms. They contained 5.21 potassium

and 17.10 per cent. iodin; mercury, arsenic and iron present; sample too small for identification of nux vomica. Based on the potassium content, tablets contained 22.12 per cent. potassium iodid, so that heaviest tablet contained 1.91 grs., lightest, 1.70, average, 1.82.

Tablets slightly deficient in potassium iodid.

Aspirin Tablets.

11587. *Aspirin Tablets*, made by Daggett and Miller Co.; stock of Dr. J. S. Stanton, New London. *Claimed per tablet*; 5 grs. *Found;* Weights of 12 tablets ranged from 422.5 to 447.0, average, 434.1, mgms. They contained 53.65% aspirin, or from 3.50 to 3.70, average, 3.59 grs.

Tablets deficient in aspirin.

11567. *Aspirin Tablets*, made by National Drug Co.; stock of Dr. S. H. Holmes, Jewett City. *Claimed per tablet;* 5 grs. *Found;* Weights of 12 tablets ranged from 339.0 to 356.0, average 347.1, mgms. They contained 84.90% aspirin, or from 4.44 to 4.66, average, 4.55 grs.

Tablets passed.

11563. *Aspirin Compound*, made by the P. F. Noyes Co.; stock of Dr. F. M. Dunn, New London. *Claimed per tablet;* Aspirin 1¼ grs., strontium salicylate 2 grs., acetphenetidin 1 gr., caffein ¼ gr., colchicin 1-200 gr., oil of wintergreen, q.s. *Found;* Weights of 20 tablets ranged from 368.5 to 400.5, average, 385.0, mgms. They contained 18.54 aspirin, 30.78 strontium salicylate, 14.10 acetphenetidin and 3.80 per cent. caffein; oil of wintergreen present and an alkaloid but insufficient for identification as colchicin.

One tablet contained in part

	Aspirin. grs.	Strontium salicylate. grs.	Acetphenetidin. gr.	Caffein. gr.
Heaviest	1.15	1.90	0.87	0.235
Lightest	1.05	1.75	0.80	0.216
Average	1.10	1.83	0.84	0.226

Tablets slightly deficient in aspirin, strontium salicylate and acetphenetidin.

Blaud's Compound.

11572. *Blaud Pills Compound No.* 6, made by Independent Pharmaceutical Co.; stock of Dr. E. P. Douglass, Groton. *Claimed per pill;* Arsenious acid 1/60 gr., strychnin sulphate 1/60 gr., corrosive sublimate 1/60 gr., powdered capsicum 1/64 gr. extr. gentian 1/16 gr., Blaud's mass 5 grs. *Found;* Weights of 24 pills ranged from 577.8 to 646.2, average, 613.3, mgms. They contained 15.45 ferrous carbonate and 0.16 per cent. arsenious acid; capsicum and strychnin sulphate (impure residue=0.19%) present; mercury present but material insufficient for determination.

One pill contained in part

	Ferrous carbonate. grs.	Arsenious acid. gr.	Strychnin sulphate (impure). gr.
Heaviest	1.54	0.0160	0.0189
Lightest	1.38	0.0143	0.0169
Average	1.46	0.0151	0.0180

Tablets passed.

11593. *Blaud's Compound Tablets No.* 7, made by National Drug Co.; stock of Dr. F. Schavoir, Stamford. *Claimed per tablet;* Extr. nux vomica 1/10 gr., Blaud's mass 5 grs., arsenious acid 1/60 gr., extr. cascara sagrada 1 gr., manganese binoxid 1 gr. *Found;* Weights of 24 tablets ranged from 680.1 to 725.5, average, 703.5, mgms. They contained 8.30 ferrous carbonate, 0.15 arsenious acid, and 8.73 per cent. manganese binoxid; cascara and strychnin present (impure alkaloidal residue=0.20%).

One tablet contained in part

	Ferrous carbonate. gr.	Arsenious acid. gr.	Maganese binoxid. gr.
Heaviest	0.93	0.0168	0.98
Lightest	0.87	0.0157	0.92
Average	0.90	0.0163	0.95

Tablets satisfactory.

Bronchitis Tablets.

11585. *Bronchitis No.* 6, made by C. Killgore; stock of Dr. F. E. Wilcox, Willimantic. *Claimed per tablet;* Creosote 1 min., strychnin sulphate 1/60 gr., terpen hydrate 2 grs., eucalyptol ½ gr. *Found;* Weights of 20 tablets ranged from 461.2 to 535.4, average, 499.6 mgms. They contained 0.23 strychnin sulphate and approximately 22.60 per cent. terphen hydrate; creosote and possibly eucalyptol present.

One tablet contained in part:

	Strychnin Sulphate. gr.	Terpen hydrate (approx.) grs.
Heaviest	0.0190	1.87
Lightest	0.0164	1.61
Average	0.0177	1.74

Tablets probably slightly deficient in terpen hydrate.

Calcreose.

11552. *Calcreose No. 2*, made by the Maltbie Chemical Co.; stock of Dr. C. K. Heady, Milford. *Claimed per tablet;* Calcreose (a powder containing approximately 5% of beechwood creosote in chemical combination with calcium) 4 grs., reduced iron ½ gr., arsenic trioxid 1/150 gr., strychnin 1/150 gr. *Found;* Weights of 20 tablets ranged from 570.0 to 621.4, average, 590.9 mgms. They contained calcium oxid 8.92, reduced iron 6.33, arsenic trioxid 0.038, ash 29.91, talc 3.14, strychnin not over 0.035 and creosote approximately 15.38 per cent.

The amounts of arsenic and strychnin are much higher than claimed.

Calomel Tablets.

11575. *Calomel Tablet Triturates*, made by Buffington Pharmacy Co.; stock of Dr. R. E. Black, New London. *Claimed per tablet;* Calomel 1/10 gr., flavored with wintergreen. *Found;* Weights of 26 tablets ranged from 70.7 to 86.2, average, 77.1, mgms. They contained 8.10 per cent. of calomel, or from 0.089 to 0.109, average 0.097 gr.

Tablets satisfactory.

11573. *Calomel Tablets*, made by Drug Products Co.; stock of Dr. W. A. Hillard, Pawcatuck. *Claimed per tablet;* Calomel 1/10 gr., flavored with spearmint. *Found;* Weights of 25 tablets ranged from 72.7 to 89.4, average, 76.7 mgms. They contained 8.42 per cent. of calomel, or from 0.094 to 0.116, average, 0.099 gr.

Tablets satisfactory.

11627. *Calomel Tablet Triturates*, made by the Harvey Co.; stock of Dr. G. F. Lewis, Stratford. *Claimed per tablet;* Calomel 1 gr. *Found;* Weights of 25 tablets ranged from 111.5 to 126.8, average, 119.9 mgms. They contained 49.37 per cent. of calomel, or from 0.85 to 0.97, average, 0.91 gr.

Tablets passed.

11611. *Calomel Tablets* (*Calomets*), made by Moore and Co.; stock of Dr. E. M. Hamblin, Bristol. *Claimed per tablet;* Calomel 1/10 gr. *Found;* Weights of 25 tablets ranged from 28.2 to 38.4, average, 36.2 mgms. They contained 16.85 per cent. of calomel, or from 0.068 (a single light tablet) to 0.109, average, 0.094 gr.

Tablets satisfactory.

11568. *Calomel Tablet Triturates*, made by National Drug Co.; stock of Dr. S. H. Holmes, Jewett City. *Claimed per tablet;* Calomel 1/10 gr. *Found;* Weights of 25 tablets ranged from 73.6 to 87.2, average, 79.3 mgms. They contained 7.94 per cent. of calomel, or from 0.091 to 0.107, average, 0.097 gr.

Tablets satisfactory.

11559. *Calomel Tablet Triturates*, made by E. L. Patch Co.; stock of Dr. H. Stendel, Ansonia. *Claimed per tablet;* Calomel, 1 gr. *Found;* Weights of 25 tablets ranged from 134.2 to 148.8, average, 141.2 mgms. They contained 45.28 per cent. of calomel, or from 0.94 to 1.04, average, 0.99 gr.

Tablets satisfactory.

11609. *Calomel Tablets*, made by Tailby-Nason Co.; stock of Dr. W. R. Hanrahan, Bristol. *Claimed per tablet;* Calomel 2 grs. *Found;* Weights of 18 tablets ranged from 153.2 to 169.5, average, 161.7 mgms. Tablets contained 69.34 per cent. of calomel, or from 1.64 to 1.82, average, 1.73 grs.

Tablets deficient in calomel.

11586. *Calomel Tablets*, stock of Dr. T. R. Parker, Willimantic; **11603**, stock of Dr. C. A. Hamilton, Waterbury; **11557**, stock of Dr. T. J. Connors, West Haven; all made by Yates Drug and Chemical Co. *Claimed per tablet;* Calomel 1/10 gr. *Found;* In **11586** weights of 25 tablets ranged from 84.5 to 98.5, average, 94.9 mgms. They contained 6.62 per cent. of calomel, or from 0.086 to 0.101, average, 0.097 gr. In **11603** weights of 25 tablets ranged from 90.1 to 110.9, average, 106.3 mgms. They contained 6.30 per cent. of calomel, or from 0.088 to 0.108, average, 0.103 gr. In **11557** weights of 25 tablets ranged from 90.0 to 99.6, average, 95.8 mgms. They contained 7.04 per cent. of calomel, or from 0.098 to 0.108, average, 0.104 gr.

Tablets in the three samples satisfactory.

11595. *Calomel Tablets*, stock of Dr. W. Burke, Greenwich; **11614**, stock of Dr. N. A. Burr, Manchester; both made by Yates Drug and Chemical Co. *Claimed per tablet;* Calomel 1/4 gr.

Found; In **11595** weights of 25 tablets ranged from 90.1 to 100.9, average, 96.8 mgms. They contained 16.23 per cent. of calomel or from 0.226 to 0.253, average, 0.242 gr. In **11614** weights of 25 tablets ranged from 86.2 to 95.5, average, 91.1 mgms. They contained 17.16 per cent. of calomel, or from 0.228 to 0.252, average, 0.242 gr.

Tablets in both samples satisfactory.

Calomel and Soda Tablets.

11571. *Calomel and Soda Tablet Triturates No.* 3, made by Independent Pharmaceutical Co.; stock of Dr. E. P. Douglass, Groton. *Claimed per tablet;* Calomel 1/4 gr., sodium bicarbonate 1 gr. *Found;* Weights of 25 tablets ranged from 116.5 to 130.2, average, 124.3 mgms. They contained 12.52 calomel and 57.46 per cent. sodium bicarbonate, so that one tablet contained:

	Calomel. gr.	Sodium bicarbonate. grs.
Heaviest	0.252	1.15
Lightest	0.225	1.03
Average	0.240	1.10

Tablets are satisfactory.

11570. *Calomel Compound Tablet Triurates No.* 6, made by E. L. Patch Co.; stock of Dr. J. H. McLoughlin, Jewett City. *Claimed per tablet;* Calomel 1/2 gr., sodium bicarbonate 1/2 gr. *Found;* Weights of 25 tablets ranged from 150.0 to 166.9, average, 160.3 mgms. They contained 19.74 calomel and 74.93 per cent. sodium bicarbonate, so that one tablet contained:

	Calomel gr.	Sodium bicarbonate. grs.
Heaviest	0.509	1.93
Lightest	0.456	1.73
Average	0.488	1.85

Tablets satisfactory, the claim for sodium bicarbonate probably having been copied incorrectly.

11606. *Calomel and Soda Tablets*, made by Yates Drug and Chemical Co.; stock of Dr. J. Gaucher, Waterbury. *Claimed per tablet;* Calomel 1/10 gr., sodium bicarbonate 1 gr. *Found;* Weights of 25 tablets ranged from 121.9 to 129.6, average, 126.5 mgms. They contained 5.34 calomel and 51.14 per cent. sodium bicarbonate, so that one tablet contained:

	Calomel. gr.	Sodium bicarbonate. grs.
Heaviest	0.107	1.02
Lightest	0.100	0.96
Average	0.104	1.00

Tablets satisfactory.

Cascara Compound.

11607. *Cascara Compound No.* 3, made by E. L. Patch Co.; stock of Dr. R. J. Lawton, Terryville. *Claimed per tablet;* Cascarin 1/4 gr., aloin 1/4 gr., podophyllin 1/6 gr. extr. belladonna 1/8 gr., strychnin sulphate 1/60 gr., gingerine 1/8 gr. *Found;* Weights of 25 tablets ranged from 165.9 to 199.6, average, 181.5 mgms. They contained aloin, ginger, resins (probably podophyllin) and probably cascara; no tests were made for belladonna alkaloids; no calomel present; 0.56 per cent. of total alkaloids chiefly strychnin. Heaviest tablet contained 0.0172, lightest 0.0143, average 0.0157 gr. of strychnin.

Tablets satisfactory.

Cathartic Compound.

11578. *Cathartic Compound*, made by Daggett and Miller Co.; stock of Dr. J. N. Callahan, Norwich. *Claimed per tablet;* Extr. colocynth Co. 1 1/4 grs., calomel 1 gr., jalap resin 1/3 gr., powdered gamboge 1/4 gr. *Found;* Weights of 17 tablets ranged from 410.2 to 443.9, average, 430.3 mgms. They contained 14.60 per cent. of calomel, a large amount of resinous material, aloes and a bitter principle (colocynth), the aloes indicating the presence of Extr. colocynth Co. The tablets contained from 0.92 to 1.00, average, 0.97 gr. of calomel.

Tablets satisfactory.

11452. *Cathartic Compound*, made by National Drug Co.; stock of Dr. T. Martino, Hartford. *Claimed per tablet;* Extr. colocynth Co., 1 1/4 grs., calomel 1 gr., jalap resin 1/8 gr., powdered gamboge 1/4 gr. *Found;* Weights of 20 tablets ranged from 320.0 to 346.1, average, 332.0 mgms. They contained 14.60 per cent. of calomel, a large amount of resinous material, aloes and a bitter principle (colocynth), the aloes indicating the presence of Extr. colocynth Co. The tablets contained from 0.72 to 0.78, average, 0.75 gr. of calomel.

Tablets deficient in calomel.

Cold Tablets.

11576. *Cold Tablets,* made by Buffington Pharmacy Co.; stock of Dr. R. E. Black, New London. *Claimed per tablet;* Acetanilid 1½ grs., powdered opium 3/20 grs., camphor monobrom 1/3 gr., caffein citrated ½ gr., cascara sagrada ½ gr. *Found;* Weights of 20 tablets ranged from 252.8 to 269.6, average, 263.1 mgms. They contained 33.40 acetanilid and 12.16 per cent. of caffein citrated U. S. P.; powdered opium, camphor monobrom and cascara present. One tablet contained in part:

	Acetanilid. grs.	Caffein citrated, U. S. P. gr.
Heaviest	1.39	0.51
Lightest	1.30	0.47
Average	1.36	0.49

Tablets deficient in acetanilid.

11618. *Cold Tablets No. 2 (Dr. Gage)* made by Moore and Co.; stock of Dr. T. E. O'Loughlin, Rockville. *Claimed per tablet;* Powdered capsicum ¼ gr., tinct. aconite 1 min., quinin sulphate 2 grs. and Dover's powder 2 grs. *Found;* Weights of 20 tablets ranged from 415.4 to 462.2, average, 446.4 mgms. They contained 28.77 per cent. quinin sulphate; capsicum, Dover's powder (opium and ipecac) present; no test made for aconitin. They contained from 1.84 to 2.05, average, 1.98 grs. quinin sulphate.

Tablets satisfactory so far as tested.

Hammond's Tonic.

11560. *Triturate Tablets Tonic (Dr. Hammond),* made by E. L. Patch Co.; stock of Dr. H. Stendel, Ansonia. *Claimed per tablet;* Iron pyrophosphate ½ gr., quinin sulphate ½ gr., strychnin sulphate 1/120 gr. *Found;* Weights of 20 tablets ranged from 95.8 to 100.8, average, 98.9 mgms. They contained 23.90 total alkaloids, 6.12 iron and 11.24 per cent. phosphoric acid; quinin and strychnin present as sulphates; material insufficient for quantitative separation of the small amount of strychnin. Iron pyrophosphate is an indefinite salt, but judging from the relation between the iron and phosphoric acid found the tablets contained from 19 to 20 per cent. of anhydrous iron pyrophosphate.

Tablets passed as probably satisfactory.

Headache Tablets.

11608. *Acetanilid Comp. Tablets,* made by Brewer and Co.; stock of Dr. W. R. Hanrahan, Bristol. *Claimed per tablet;* Acetanilid 3.5 grs., caffeine 0.5 grs., sodium bicarbonate 1 gr. *Found;* Weights of 15 tablets ranged from 452.7 to 477.8, average, 462.3 mgms. They contained 47.52 acetanilid, 6.80 caffeine and 13.94 per cent. sodium bicarbonate, so that one tablet contained:

	Acetanilid. grs.	Caffein. gr.	Sodium bicarbonate. grs.
Heaviest	3.50	0.50	1.03
Lightest	3.32	0.48	0.97
Average	3.39	0.49	0.99

Tablets satisfactory

11626. *Acetanilid Comp. Tablets, No. 4,* made by National Drug Co.; stock of Dr. E. J. Thompson, Hartford. *Claimed per tablet;* Acetanilid 3½ grs., sodium bicarbonate 8/10 gr., sodium bromid 1/10 gr., caffeine citrated ½ gr. *Found;* Weights of 15 tablets ranged from 375.9 to 403.9, average, 389.2 mgms. They contained 57.93 acetanilid, 15.46 sodium bicarbonate, 1.46 sodium bromid and 8.24 per cent. citrated caffeine U. S. P., so that one tablet contained:

	Acetanilid. grs.	Sodium bicarbonate. gr.	Sodium bromid. gr.	Caffein citrated, U. S. P. gr.
Heaviest	3.61	0.96	0.091	0.51
Lightest	3.36	0.90	0.085	0.48
Average	3.48	0.93	0.088	0.50

Tablets passed, although slightly deficient in sodium bromid.

11444. *Acetanilid Comp. Tablets No. 17,* made by National Drug Co.; stock of Dr. C. L. Dichter, Stamford. *Claimed per tablet;* Acetanilid 3 grs., sodium bicarbonate 2 grs., caffeine citrated ½ gr., camphor monobrom ½ gr., acid tartaric 1/8 gr., fl. ex. gelsemium 1 min., oil of cinnamon q. s. *Found;* Weights of 12 tablets ranged from 438.5 to 459.8, average, 446.1 mgms. They contained 43.16 acetanilid, 7.20 citrated caffein U. S. P., and 28.45 per cent. sodium bicarbonate; camphor monobrom, tartaric acid, oil of cinnamon and gelsemium present, so that one tablet contained in part:

	Acetanilid. grs.	Citrated caffein, U. S. P. gr.	Sodium bicarbonate. grs.
Heaviest	3.06	0.51	2.02
Lightest	2.92	0.49	1.93
Average	2.97	0.50	1.96

Tablets satisfactory.

11622. *Migrain Tablets No. 2*, made by E. L. Patch Co.; stock of Dr. T. F. Rockwell, Rockville. *Claimed per tablet;* Acetanilid 2 grs., caffein citrated 0.5 gr. camphor monobrom 0.5 gr. *Found;* Weights of 20 tablets ranged from 227.2 to 254.4, average, 240.3 mgms. They contained 54.26 acetanilid and 13.32 per cent. citrated caffein U. S. P. camphor monobron present; so that one tablet contained:

	Acetanilid. grs.	Citrated caffein, U. S. P. gr.
Heaviest	2.13	0.52
Lightest	1.90	0.47
Average	2.01	0.49

Tablets satisfactory.

11620. *Migrain Tablets No. 3*, made by Surgeons and Physicians Supply Co.; stock of Dr. T. F. O'Loughlin, Rockville. *Claimed per tablet;* Acetanilid 2 grs., caffein citrated 0.5 gr., camphor monobrom 0.5 gr. *Found;* Weights of 15 tablets ranged from 298.7 to 349.8, average, 328.8 mgms. They contained 36.20 acetanilid and 8.92 per cent. citrated caffein, U. S. P.; camphor monobrom present; so that one tablet contained:

	Acetanilid. grs.	Citrated caffein, U. S. P. gr.
Heaviest	1.95	0.48
Lightest	1.77	0.41
Average	1.84	0.45

Tablets passed.

11583. *Migrain Tablets*, made by Tailby-Nason Co.; stock of Dr. T. Soltz, New London. *Claimed per tablet;* Acetanilid 2 grs., caffein citrated 0.5 gr., camphor monobrom 0.5 gr. *Found;* Weights of 20 tablets ranged from 198.4 to 233.4, average, 223.0 mgms. They contained 58.03 acetanilid and 14.36 per cent. citrated caffein, U. S. P.; camphor monobrom present; so that one tablet contained:

	Acetanilid. grs.	Citrated caffein, U. S. P. gr.
Heaviest	2.09	0.52
Lightest	1.78	0.44
Average	2.00	0.50

Tablets satisfactory.

11601. *Migrain Tablets*, made by Tailby-Nason Co.; stock of Dr. C. Rowling, New Haven. *Claimed per tablet;* Acetanilid 2 grs., caffein 0.25 gr., camphor monobrom 0.5 gr. *Found;* Weights of 20 tablets ranged from 202.6 to 230.6, average, 221.2 mgms. They contained 57.94 acetanilid and 7.18 per cent. caffein; camphor monobrom present; so that one tablet contained:

	Acetanilid. grs.	Caffein. gr.
Heaviest	2.06	0.26
Lightest	1.81	0.22
Average	1.98	0.24

Tablets satisfactory.

11605. *Headache Tablets* (Dr. F. J. Hawley), made by Yates Drug and Chemical Co.; stock of Dr. J. Caucher, Waterbury. *Claimed per tablet;* Acetanilid 2.5 grs., aromatic powder 0.5 gr., sodium bicarbonate 1 gr., caffein 0.5 gr., camphor 0.1 gr., oil quassia q. s. *Found;* Weights of 15 tablets ranged from 341.6 to 362.7, average, 330.6 mgms. They contained 46.61 acetanilid, 8.90 caffein and 19.16 per cent. sodium bicarbonate; volatile oil, aromatics and camphor present; so that one tablet contained:

	Acetanilid. grs.	Caffein. gr.	Sodium bicarbonate. grs.
Heaviest	2.61	0.50	1.07
Lightest	2.46	0.47	1.01
Average	2.52	0.48	1.04

Tablets satisfactory.

Hexamethylene Tetramine Tablets.

11598. *Hex-uro-gen*, made by Daggett and Miller Co.; stock of Dr. H. L. F. Locke, Hartford. *Claimed per tablet;* Hexamethylenamine 5 grs., acid sodium phosphate 5 grs. *Found;* Weights of 12 tablets ranged from 676.9 to 706.7, average, 694.7 mgms. They contained 51.80 hexamethylene tetramine and 42.16 per cent. of acid sodium phosphate, so that one tablet contained:

	Hexamethylene tetramine. grs.	Acid sodium phosphate. grs.
Heaviest	5.65	4.60
Lightest	5.41	4.41
Average	5.55	4.52

Tablets satisfactory.

11612. *Hexaform Tablets*, made by Yates Drug and Chemical Co.; stock of Dr. A. S. Brackett, Bristol. *Claimed per tablet;* Hexaform 5 grs. *Found;* Weights of 12 tablets ranged from 311.8

to 338.2, average, 323.6 mgms. They contained 99.75 per cent. hexamethylene tetramine, or from 4.80 to 5.21, average, 4.98 grs. per tablet.

Tablets satisfactory.

Hypophosphites Compound.

11599. *Tabs. Hypophosphites Compound Improved*, made by Daggett and Miller Co.; stock of Dr. H. L. F. Locke, Hartford. *Claimed per tablet;* Iron hypophosphite 3/8 gr., manganese hypophosphite ¼ gr., quinin hypophosphite 1/6 gr., calcium hypophosphite ¼ gr., potassium hypophosphite 3/8 gr., strychnin hypophosphite 1/64 gr., arsenious acid 1/50 gr., cascarin 1/8 gr. *Found;* Weights of 25 tablets ranged from 150.2 to 177.9, average, 161.4 mgms. They contained 2.05 iron, 2.42 manganese, 1.04 calcium, 3.57 potassium, 10.82 phosphorus and 0.51 per cent. arsenious acid; quinin, strychnin and hypophosphites present. The claimed amounts of the various hypophosphites require 3.31 per cent. iron, 2.95 manganese, 2.34 calcium and 5.59 potassium, with 17.37 total phosphorus. Our analysis shows only about 62 per cent. of the required phosphorus and deficiencies in iron, manganese, calcium and potassium.

Tablets below strength claimed.

Iodized Calcium.

11449. *Calcium Iodized*, made by Daggett and Miller Co.; stock of Dr. S. M. Garlick, Bridgeport. *Claimed per tablet;* Calcium iodized 1 gr. *Found;* Weights of 25 tablets ranged from 91.5 to 111.0, average, 101.7 mgms. They contained 3.09 per. cent. total iodin, 0.26 available iodin, 14.20 total calcium oxid and 3.28 calcium iodid (calculated from the non-available iodin). The tablets, therefore, contained from 1/227 to 1/270, average, 1/244 gr. available iodin and from 1/18 to 1/22, average, 1/20 gr. calcium iodid.

No standard for comparison.

La Grippe Saratoga Tablets.

11624. *La Grippe Saratoga Tablets*, made by the Harvey Co.; stock of Dr. J. B. Waters, Hartford. *Claimed per tablet;* Acetanilid 1¾ grs., caffein citrated ½ gr., ipecac, 1/20 gr., quinin salicylate ½ gr., capsicum 1/10 gr., podophyllin 1/40 gr., aloin 1/40 gr. *Found;* Weights of 15 tablets ranged from 350.2 to 405.9, average, 380.4 mgms. They contained 31.11 acetanilid, 8.96 citrated caffein U. S. P., 6.32 total alkaloids and 2.45 per cent. salicylic acid (probably as quinin salt); capsicum, quinin salicylate, aloin, podophyllin and ipecac powder present; so that one tablet contained in part:

	Acetanilid. grs.	Citrated Caffein, U. S. P. gr.
Heaviest	1.95	0.56
Lightest	1.68	0.48
Average	1.83	0.53

Tablets quite variable in weight, but satisfactory as regards average composition.

Mercury Protoiodid Tablets.

11602. *Mercury Protoiodid Tablets*, made by Polk Calder Co.; stock of Dr. M. D. Slattery, New Haven. *Claimed per tablet;* Mercury protoiodid ¼ gr., charcoal 1/10 gr., aromatics q.s. *Found;* Weights of 25 tablets ranged from 97.0 to 102.5, average, 99.1, mgms. They contained 15.22 per cent. of mercury protoiodid, or from 0.228 to 0.240, average, 0.233 gr. per tablet.

Tablets satisfactory.

Mixed Treatment.

11453. *Mixed Treatment (Dr. Sherwell)*, made by National Drug Co.; stock of Dr. T. Martino, Hartford. *Claimed per tablet;* Corrosive sublimate 1/64 gr., potassium iodid 2 grs. syr. iron iodid 5 min., liq. arsenic and mercury iodid 2 min., tinct. nux vomica 3 min. *Found;* Weights of 20 tablets ranged from 497.4 to 532.4, average, 514.6, mgms. They contained 5.75 potassium and 20.06 per cent. iodin; mercury, arsenic and iron present; insufficient sample to confirm presence of nux vomica. Based on the potassium percentage tablets contained 24.41 per cent. potassium iodid, so that heaviest contained 2.01, lightest 1.87, average, 1.94 grs.

Tablets passed.

Myalgie (Dr. Harvey).

11566. *Myalgie (Dr. Harvey)*, made by Daggett and Miller Co.; stock of Dr. G. E. Bradford, New London. *Claimed per tablet;* Sodium salicylate 2 grs., acetanilid 2 grs., cerium oxalate ½ gr., caffein citrated ½ gr. *Found;* Weights of 20 tablets ranged from 382.2 to 419.4, average, 406.6, mgms. They contained

21.26 sodium salicylate, 25.30 acetanilid, 4.92 citrated caffein U. S. P., and 7.10 per cent. cerium oxalate; so that one tablet contained

	Sodium Salicylate. grs.	Acetanilid. grs.	Citrated caffein, U. S. P. gr.	Cerium Oxalate. gr.
Heaviest	1.38	1.64	0.32	0.46
Lightest	1.26	1.50	0.29	0.42
Average	1.33	1.59	0.31	0.45

Tablets deficient in sodium salicylate, acetanilid and citrated caffein.

Neuralgie No. 5.

11610. *Neuralgie No. 5*, made by Yates Drug and Chemical Co.; stock of Dr. E. M. Hamblin Bristol. *Claimed per tablet;* Acetanilid 2 grs., aconitin 1/100 gr., strychnin muriate 1/120 gr., quinin muriate 1 gr. *Found;* Weights of 15 tablets ranged from 309.5 to 324.2, average, 317.9, mgms. They contained 39.60 acetanilid and 17.50 per cent. total alkaloids; quinin, strychnin and chlorids present; no test made for aconitin.

One tablet contained in part

	Acetanilid. grs.	Total Alkaloids. gr.
Heaviest	1.98	0.875
Lightest	1.89	0.837
Average	1.94	0.659

Tablets passed.

Phenolphthalein Tablets.

11581. *Phenolphthalein Tablets*, stock of Dr. N. B. Lewis, Norwich; **11589,** stock of Dr. G. A. Shelton, Shelton; both made by the G. F. Harvey Co. *Claimed per tablet;* Phenolphthalein 2 grs. *Found;* In **11581** weights of 24 tablets ranged from 276.9 to 303.9, average, 287.2, mgms. They contained 48.46 per cent. phenolphthalein, or from 2.07 to 2.27, average, 2.15, grs. per tablet. In **11589** weights of 20 tablets ranged from 288.7 to 305.2, average, 297.3 mgms. They contained 43.13 per cent. phenolphthalein, or from 1.92 to 2.03, average, 1.98 grs. per tablet.

Tablets in both samples satisfactory.

Phenolphthalein and Calomel Tablets.

11621. *Phenolphthalein and Calomel Tablets*, made by Tailby-Nason Co.; stock of Dr. T. F. Rockwell, Rockville. *Claimed per tablet;* Phenolphthalein 1/10 gr., calomel 1/10 gr. *Found;* Weights of 25 tablets ranged from 90.9 to 109.2, average, 102.5, mgms. They contained 6.94 per cent. phenolphthalein and 6.56 calomel, so that one tablet contained

	Phenol-phthalein. gr.	Calomel. gr.
Heaviest	0.117	0.111
Lightest	0.097	0.092
Average	0.110	0.104

Tablets satisfactory.

Quinin Sulphate Tablets.

11615. *Quinin Sulphate Tablets*, made by Tailby-Nason Co.; stock of Dr. W. S. Gillam, South Manchester. *Claimed per tablet;* Quinin sulphate 2 grs. *Found;* Weights of 15 tablets ranged from 312.0 to 336.9, average, 322.6 mgms. They contained 38.41 per cent. quinin sulphate, or from 1.85 to 2.00, average, 1.91, grs. per tablet.

Tablets satisfactory.

11623. *Quinin Sulphate Tablets*, made by John Wyeth and Bro.; stock of Dr. J. B. Waters, Hartford. *Claimed per tablet;* Quinin sulphate 2 grs. *Found;* Weights of 20 tablets ranged from 256.6 to 280.0, average, 266.3, mgms. They contained 44.06 per cent. quinin sulphate, or from 1.74 to 1.90, average, 1.81 grs. per tablet.

Tablets deficient in quinin sulphate.

11590. *Quinin Sulphate Tablets*, made by Yates Drug and Chemical Co.; stock of Dr. G. A. Shelton, Shelton. *Claimed per tablet;* Quinin sulphate 2 grs. *Found;* Weights of 20 tablets ranged from 210.0 to 234.5, average 225.3 mgms. They contained 62.18 per cent. quinin sulphate, or from 2.01 to 2.25, average, 2.16 grs. per tablet.

Tablets satisfactory.

Quinin and Nux Vomica Tablets.

11600. *Quinin and Nux Vomica Tablets*, made by Tailby-Nason Co.; stock of Dr. C. Rawling, New Haven. *Claimed per tablet;* Quinin sulphate 1 gr., extr. nux vomica 1/10 gr. *Found;* Weights of 20 tablets ranged from 175.9 to 195.3, average, 186.1 mgms. They contained 32.79 per cent. quinin sulphate; nux vomica

alkaloids present but not determined. Tablets contained in part from 0.89 to 0.99, average, 0.94 gr. quinin sulphate per tablet.

Tablets satisfactory.

Sodium Bromid Tablets.

11574. *Sodium Bromid Tablets*, made by Buffington Pharmacy Co.; stock of Dr. E. A. Hillard, Pawcatuck. *Claimed per tablet;* Sodium bromid 5 grs. *Found;* Weights of 25 tablets ranged from 317.0 to 328.2, average, 324.2 mgms. They consisted wholly of sodium bromid and contained from 4.89 to 5.06, average, 5.00 grs. per tablet.

Tablets satisfactory.

Sodium Salicylate Tablets.

11450. *Sodium Salicylate Tablets*, made by Drug Products Co.; stock of Dr. C. P. Townsend, Bridgeport. *Claimed per tablet;* Sodium salicylate 5 grs. *Found;* Weights of 12 tablets ranged from 376.5 to 465.0, average, 412.6, mgms. They contained 71.55 per cent. sodium salicylate, or from 4.16 to 5.14, average, 4.56 grs. per tablet.

Tablets deficient in sodium salicylate, 5 of the 12 showing a deficiency greater than 10 per cent. and only one containing the full amount claimed; very variable in weight.

11569. *Sodium Salicylate Tablets*, made by the Maltbie Chemical Co.; stock of Dr. J. H. McLoughlin, Jewett City. *Claimed per tablet;* Sodium salicylate 5 grs. *Found;* Weights of 20 tablets ranged from 428.5 to 464.5, average, 451.0 mgms. They contained 70.71 per cent. sodium salicylate, or from 4.67 to 5.07, average, 4.92 grs. per tablet.

Tablets satisfactory.

11613. *Sodium Salicylate Tablets*, made by Yates Drug and Chemical Co.; stock of Dr. A. S. Brackett, Bristol. *Claimed per tablet;* Sodium salicylate 5 grs. *Found;* Weights of 21 tablets ranged from 425.0 to 450.5, average, 440.9, mgms. They contained 69.74 per cent. sodium salicylate, or from 4.57 to 4.85, average, 4.74 grs. per tablet.

Tablets passed.

Strontium Salicylate Tablets.

11580. *Strontium Salicylate Tablets*, made by Drug Products Co.; stock of Dr. N. B. Lewis, Norwich. *Claimed per tablet;*

Strontium salicylate, 5 grs. *Found;* Weights of 24 tablets ranged from 363.0 to 407.5, average, 386.5 mgms. They contained salicylic acid equivalent to 76.23 per cent. strontium salicylate (strontium present, but only 93.8 per cent. of theoretical amount), or from 4.27 to 4.80, average, 4.54 grs. per tablet.

Tablets deficient in strontium salicylate, 7 of the 24 showing a deficiency greater than 10 per cent., and no tablet containing the full amount claimed.

Strychnin Sulphate Tablets.

11564. *Strychnin Sulphate Tablets*, made by Bristol Myers Co.; stock of Dr. F. M. Dunn, New London. *Claimed per tablet;* Strychnin sulphate 1/60 gr. *Found;* Weights of 53 tablets ranged from 66.0 to 86.2, average, 75.2 mgms. They contained 1.31 per cent. strychnin sulphate, or from 0.0134 to 0.0174, average, 0.0152 gr. per tablet.

Tablets satisfactory.

11440. *Strychnin Sulphate Tablets*, made by Independent Pharmaceutical Co.; stock of Dr. C. K. Isham, Hartford. *Claimed per tablet;* Strychnin sulphate 1/60 gr. *Found;* Weights of 50 tablets ranged from 87.8 to 114.0, average, 96.0 mgms. They contained 1.09 per cent. strychnin sulphate, or from 0.0147 to 0.0192, average, 0.0161 gr. per tablet.

Tablets satisfactory.

11597. *Strychnin Sulphate Tablets*, made by Progressive Chemical Co., New Haven; stock of Dr. A. E. Abrams, Hartford. *Claimed per tablet;* Strychnin sulphate 1/50 gr. *Found;* Weights of 50 tablets ranged from 48.5 to 77.8, average, 67.6 mgms. They contained 0.79 per cent. strychnin sulphate, or from 0.0059 to 0.0095, average, 0.0082, gr. per tablet.

Tablets deficient in strychnin sulphate and very variable in weight.

11582. *Strychnin Sulphate Tablets*, made by the Tracy Co., New London; stock of Dr. T. Soltz, New London. *Claimed per tablet;* Strychnin sulphate 1/60 gr. *Found;* Weights of 48 tablets ranged from 96.1 to 123.2, average, 109.3 mgms. They contained 0.91 per cent. strychnin sulphate, or from 0.0135 to 0.0173, average, 0.0154 gr. per tablet.

Tablets satisfactory.

11594. *Strychnin Sulphate Tablets*, stock of Dr. W. Burke, Greenwich; **11604,** stock of Dr. C. A. Hamilton, Waterbury; both made by Yates Drug and Chemical Co. *Claimed per tablet;* Strychnin sulphate 1/60 gr. *Found;* In **11594** weights of 50 tablets ranged from 90.9 to 106.0, average, 99.0 mgms. They contained 1.03 per cent. strychnin sulphate, or from 0.0144 to 0.0169, average, 0.0158 gr. per tablet.

In **11604** weights of 51 tablets ranged from 94.0 to 101.0, average, 96.3 mgms. They contained 1.03 per cent. strychnin sulphate, or from 0.0149 to 0.0161, average, 0.0153 gr. per tablet.

Tablets in both samples satisfactory.

Solutions.

Elixir of Iron, Quinin and Strychnin.

11596. *Elixir of Iron, Quinin and Strychnin Phosphate*, made by Brewer and Co.; stock of Dr. A. E. Abrams, Hartford. *Claimed;* Each fl. dram contains tinct. iron citrochlorid 7½ min., quinin hydrochlorid ½ gr., strychnin phosphate 1/64 gr. *Found;* The elixir contained 16.68 per cent. alcohol by volume, 0.52 iron, 0.672 quinin (approximately) and 0.028 strychnin (approximately). It contained therefore, 8.8 min. tinct. iron citrochlorid, approximately 0.49 gr. quinin hydrochlorid and approximately 1/41 gr. strychnin phosphate.

Elixir satisfactory.

11616. *Elixir Iron, Quinin and Strychnin No.* 2, made by Yates Drug and Chemical Co.; stock of Dr. W. R. Tinker, South Manchester. *Claimed;* Each fl. oz. contains strychnin sulphate 2/15 gr., quinin sulphate 4 grs., tinct. iron citrochlorid 60 min., sodium citrate q.s., alcohol 19 per cent. *Found;* The elixir contained 17.55 per cent. alcohol by volume, 0.52 iron, 0.577 quinin (approximately), and 0.020 strychnin (approximately). It therefore contained per fl. oz. 70.9 min. tinct. iron citrochlorid, approximately 3.85 grs., quinin sulphate and approximately 2/15 gr. strychnin sulphate.

Elixir satisfactory.

Elixir Lactated Pepsin.

11617. *Elixir Lactated Pepsin Stronger*, made by the Harvey Co. stock of Dr. W. R. Tinker, South Manchester *Claimed;*

Each fl. dram contains pepsin (1/3000) 1 gr., pancreatin 1 gr., maltase ¼ gr., diastase 1/16 gr., lactic acid 5/32 min., hydrochloric acid ⅛ min., alcohol 17 per cent. *Found;* Spec. grav. @ 15.6° C. 1.1228, alcohol by volume 16.35 per cent.; pepsin and pancreatin present; diastatic action faint, if any. The pepsin present showed about 15.5 per cent. of the activity the claimed amount of U. S. P. pepsin should exhibit, the pancreatin from 8 to 10 per cent. of the claimed activity.

Elixir below the strength claimed.

Solution Iodin and Potassium Iodid.

11591. *Sol. Iodin and Potassium Iodid*, made by Yates Drug and Chemical Co.; stock of Dr. J. E. Black, Shelton. *Claimed;* Alcohol 91.5; tinct. iodin 1 part, alcohol 2 parts. *Found;* It contained 91.70 per cent. alcohol by volume, and 1.69 gms. potassium iodid and 2.83 gms. iodin per 100 cc. A solution of one part of tincture iodin U. S. P. and two parts of alcohol should contain from 1.50 to 1.83 gms. potassium iodid and from 2.16 to 2.50 gms. iodin per 100 cc.

Solution satisfactory.

Spt. Ammonia Aromatic.

11561. *Spt. Ammonia Aromatic*, made by Yates Drug and Chemical Co.; stock of Dr. C. W. Gaylord, Branford. *Claimed;* Spirit of Ammonia Aromatic, alcohol 67 per cent. *Found;* Sample contained 62.00 per cent. alcohol by volume, and 1.6167 gms. of ammonia per 100 cc. with aromatic oils.

Solution passed.

Syrup Hydriodic Acid.

11562. *Syrup Hydroidic Acid*, made by Norwich Pharmacal Co.; stock of Dr. C. W. Gaylord, Branford. *Claimed;* Syr. hydriodic acid, U. S. P. *Found;* Spec. grav. @ 25° C. 1.2155 1.32 gms. hydriodic acid per 100 cc.

Solution passed.

TABLE XIX.—VARIATIONS IN THE WEIGHTS OF MEDICINAL TABLETS.

Station No.	Name of Tablet.	Weight per tablet.			Maximum variation		
		Maximum. mgms.	Minimum. mgms.	Average. mgms.	Above average. Per cent.	Below average. Per cent.	Total.
	Acetasol.						
11592	Daggett & Miller Co.	363.4	345.9	353.2	2.9	2.1	5
	Ammon. Salicylate Compound.						
11588	Daggett & Miller Co.	454.8	405.2	425.5	6.9	4.8	11
	Antiseptic (Corrosive Sublimate).						
11577	Daggett & Miller Co. (7 grs.)	666.2	569.8	603.4	10.4	5.6	16
11619	Direct Sales Co. (7.3 grs.)	1016.8	970.8	983.9	3.3	1.3	4
11558	The Tracy Co. (7.3 grs.)	1083.9	1061.9	1073.3	1.0	1.1	2
	Alkaline Antiseptic.						
11625	National Drug Co.	883.1	834.2	863.2	2.3	3.4	5
	Antiseptic Germicide.						
11447	Maltbie Chem. Co.	1152.6	1040.8	1096.1	5.2	5.0	10
	Arsenious Iodid Comp.						
11445	Drug Products Co.	559.5	497.2	534.6	4.5	7.0	11
	Aspirin.						
11587	Daggett & Miller Co. (5 grs.)	447.0	422.5	434.1	3.0	2.7	5
11567	National Drug Co. (5 grs.)	356.0	339.0	347.1	2.6	2.3	4
	Aspirin Compound.						
11563	P. J. Noyes Co.	400.5	368.5	385.0	3.0	4.3	7
	Blaud's Compound.						
11572	Independent Pharm. Co.	646.2	577.8	613.3	5.4	5.8	11
11593	National Drug Co.	725.5	680.1	703.5	3.1	3.3	6
	Bronchitis No. 6.						
11585	C. Killgore	535.4	461.2	499.6	7.2	7.7	14
	Calcrease.						
11552	Maltbie Chem. Co.	621.4	570.0	590.9	5.2	3.5	8
	Calomel.						
11575	Buffington Pharm. Co. (1/10 gr.)	86.2	70.7	77.1	11.8	8.3	20
11573	Drug Products Co. (1/10 gr.)	89.4	72.7	76.7	16.6	5.2	21
11627	Harvey Co. (1 gr.)	126.8	111.5	119.9	5.8	7.0	12
11611	Moore & Co. (1/10 gr.)	38.4	28.2	36.2	6.1	22.1	28
11568	National Drug Co. (1/10 gr.)	87.2	73.6	79.3	10.0	7.2	17
11559	E. L. Patch Co. (1 gr.)	148.8	134.2	141.2	5.4	5.0	10
11609	Tailby-Nason Co. (2 grs.)	169.5	153.2	161.7	4.8	5.3	10
11586	Yates Drug & Chem. Co. (1/10 gr.)	98.5	84.5	94.9	3.8	11.0	14
11603	" " " " (1/10 gr.)	110.9	90.1	106.3	4.3	15.2	19
11557	" " " " (1/10 gr.)	99.6	90.0	95.8	4.0	6.1	10
11595	" " " " (¼ gr.)	100.9	90.1	96.8	4.2	6.9	11
11614	" " " " (¼ gr.)	95.5	86.2	91.1	4.8	5.4	10
	Calomel & Soda.						
11571	Independent Pharm. Co. (¼ gr.)	130.2	116.5	124.3	4.7	6.3	11
11570	E. L. Patch Co. (½ gr.)	166.9	150.0	160.3	4.1	6.4	10
11606	Yates Drug & Chem. Co. (1/10 gr.)	129.6	121.9	126.5	2.5	3.6	6
	Cascara Compound.						
11607	E. L. Patch Co.	199.6	165.9	181.5	10.0	8.6	18
	Cathartic Compound.						
11578	Daggett & Miller Co.	443.9	410.2	430.3	3.2	4.7	7
11452	National Drug Co.	346.1	320.0	332.0	4.2	3.6	7

TABLE XIX.—VARIATIONS IN THE WEIGHTS OF MEDICINAL TABLETS—*Continued.*

Station No.	Name of Tablet.	Weight per tablet.			Maximum variation.		
		Maximum. mgms.	Minimum. mgms.	Average. mgms.	Above average. Per cent.	Below average. Per cent.	Total. Per cent.
	Cold Tablets.						
11576	Buffington Pharm. Co.	269.6	252.8	263.1	2.5	3.9	6.4
11618	Moore & Co.	462.2	415.4	446.4	3.5	7.0	10.5
	Hammond's Tonic.						
11560	E. L. Patch Co.	100.8	95.8	98.9	1.9	3.1	5.0
	Headache Tablets (Acetanilid).						
11608	Brewer & Co. (3.5 grs.)	477.8	452.7	462.3	3.4	2.1	5.5
11626	National Drug Co. (3.5 grs.)	403.9	375.9	389.2	3.9	3.4	7.3
11444	" " " (3 grs.)	459.8	438.5	446.1	3.4	1.7	4.8
11622	E. L. Patch Co. (2 grs.)	254.4	227.2	240.3	5.9	5.5	11.4
11620	Surg. & Phys. Supply Co. (2 grs.)	349.8	298.7	328.8	6.4	9.2	15.6
11583	Tailby-Nason Co. (2 grs.)	233.4	198.4	223.0	4.7	11.0	15.7
11601	" " " (2 grs.)	230.6	202.6	221.2	4.2	8.4	12.6
11605	Yates Drug & Chem. Co. (2.5 grs.)	362.7	341.6	350.6	3.2	2.6	5.8
	Hexamethylene tetramine.						
11598	Daggett & Miller Co. (5 grs.)	706.7	676.9	694.7	1.7	2.6	4.3
11612	Yates Drug & Chem. Co. (5 grs.)	338.2	311.8	323.6	4.5	3.6	8.1
	Hypophosphites Compound.						
11599	Daggett & Miller Co.	177.9	150.2	161.4	10.2	6.9	17.1
	Iodized Calcium.						
11449	Daggett & Miller Co. (1 gr.)	111.0	91.5	101.7	9.1	10.0	19.1
	LaGrippe Tablets.						
11624	Harvey Co.	405.9	350.2	380.4	6.7	7.9	14.6
	Mercury Protoiodid.						
11602	Polk Calder Co. (¼ gr.)	102.5	97.0	99.1	3.4	2.1	5.5
	Myalgie.						
11566	Daggett & Miller Co.	419.4	383.2	406.6	3.1	5.8	8.9
	Neuralgie.						
11610	Yates Drug & Chem. Co.	324.2	309.5	317.9	2.0	2.6	4.6
	Phenolphthalein.						
11581	G. F. Harvey Co. (2 grs.)	303.9	276.9	287.2	5.8	3.6	9.4
11589	" " " (2 grs.)	305.2	288.7	297.3	2.7	2.9	5.6
	Phenolphthalein & Calomel.						
11621	Tailby-Nason Co. (1/10 gr.)	109.2	90.9	102.5	6.5	11.3	17.8
	Quinin sulphate.						
11615	Tailby-Nason Co. (2 grs.)	336.9	312.0	322.6	4.4	3.3	7.7
11623	John Wyeth & Bro. (2 grs.)	280.0	256.5	266.3	5.1	3.7	8.8
11590	Yates Drug & Chem. Co. (grs. 2)	234.5	210.0	225.3	4.1	6.8	10.9
	Quinin & Nux vomica.						
11600	Tailby-Nason Co.	195.3	175.9	186.1	4.9	5.5	10.4
	Sodium bromid.						
11574	Buffington Pharm. Co. (5 grs.)	328.2	317.0	324.2	1.2	2.2	3.4
	Sodium salicylate.						
11450	Drug Products Co. (5 grs.)	465.0	376.5	412.6	12.7	8.7	21.4
11569	Maltbie Chem. Co. (5 grs.)	464.5	428.5	451.0	3.0	5.0	8.0
11613	Yates Chem. & Drug Co. (5 grs.)	450.5	425.0	440.9	2.2	3.6	5.8
	Strontium salicylate.						
11580	Drug Products Co. (5 grs.)	407.5	363.0	386.5	5.4	6.1	11.5

TABLE XIX.—VARIATIONS IN THE WEIGHTS OF MEDICINAL TABLETS—*Concluded.*

Station No.	Name of Tablet.	Weight per tablet.			Maximum variation.		
		Maximum. mgms.	Minimum. mgms.	Average. mgms.	Above average. Per cent.	Below average. Per cent.	Total. Per cent.
	Strychnin sulphate.						
11564	Bristol Myers Co. (1/60 gr.).....	86.2	66.0	75.2	14.6	12.2	26.8
11440	Independent Pharm. Co. (1/60 gr.)..	114.0	87.8	96.0	18.8	8.5	27.1
11597	Progerssive Chem. Co. (1/50 gr.)...	77.8	48.5	67.6	15.1	28.3	43.4
11582	The Tracy Co. (1/60 gr.).....	123.2	96.1	109.3	12.7	12.1	24.8
11594	Yates Drug & Chem. Co. (1/60 gr.)	106.0	90.9	99.0	7.1	8.2	15.3
11604	" " " " (1/60 gr.)	101.0	94.0	96.3	4.9	2.4	7.3

Summary.

Fifteen of the 76 samples did not contain the amounts of drugs claimed, allowing a tolerance of 10 per cent. The names of these with their manufacturers were as follows:

Buffington Pharm. Co.
Cold Tablets.
Daggett and Miller Co.
Acetasol.
Ammonium Salicylate Comp.
Antiseptic Tablets No. 2.
Aspirin Tablets.
Tabs. Hypophosphites Comp.
Myalgie (Dr. Harvey).
Drug Products Co.
Sodium Salicylate.
Strontium Salicylate.
The Harvey Co.
Elixir Lactated Pepsin.
National Drug Co.
Cathartic Compound.
B. F. Noyes Co.
Aspirin Compound.
Progessive Chemical Co.
Strychnin Sulphate.
Tailby-Nason Co.
Calomel Tablets.
John Wyeth and Bro.
Quinin Sulphate.

Or to summarize the whole inspection, of 111 samples of tablets 22 were deficient, and of 18 samples of solutions 8 were unsatisfactory.

Variations in the Weights of Tablets.

This subject having been discussed at some length in our Report for 1916, only a summary of the results will be discussed here. We now have data on the variations in weight of 111 samples of tablets. While in some cases these are remarkably uniform in weight, in others the variations are so great as to indicate very careless manufacture. Table XIX gives the detailed results on this year's samples.

TABLE XX.—VARIATIONS IN MEDICAMENT IN TABLETS.

Station No.	Name of Tablet.	Amount declared. grs.	Amount found.			Maximum Variation from Claim.	
			Maximum. grs.	Minimum. grs.	Average. grs.	Above.	Below.
						%	%
11588	Ammonium Salicylate Comp.						
	Ammonium salicylate.....	2	1.90	1.70	1.78	0	15.0
	Caffein.....	1	0.94	0.84	0.88	0	16.0
	Acetanilid.....	1⅓	1.35	1.21	1.26	1.5	9.0
11577	Antiseptic Tablets No. 2.						
	Corrosive sublimate.....	7	5.78	4.94	5.24	0	29.4
11619	Antiseptic Tablets No. 1.						
	Corrosive sublimate.....	7.3	7.41	7.08	7.17	1.1	3.0
11558	Antiseptic Tablets No. 1.						
	Corrosive sublimate.....	7.3	7.79	7.63	7.72	6.7	4.1
11447	Antiseptic Germicide.						
	Mercuric iodid.....	⅜	0.361	0.326	0.343	0	13.1
	Potassium iodid.....	⅜	0.512	0.463	0.487	36.5	0
	Sodium bicarbonate.....	6	16.88	15.14	15.94		
11445	Arsenious Iodid Compound.						
	Potassium iodid.....	2	1.91	1.70	1.82	0	15.0
11587	Aspirin.						
	Aspirin.....	5	3.70	3.50	3.59	0	30.0
11567	Aspirin.						
	Aspirin.....	5	4.66	4.44	4.55	0	11.2
11563	Aspirin Compound.						
	Aspirin.....	1¼	1.15	1.05	1.10	0	16.0
	Strontium salicylate.....	2	1.90	1.75	1.83	0	12.5
	Acetphenetidin.....	1	0.87	0.80	0.84	0	20.0
	Caffein.....	¼	0.235	0.216	0.226	0	13.6
11572	Blaud's Compound.						
	Ferrous carbonate.....	1	1.54	1.38	1.46	54.0	0
	Arsenious acid.....	1/60	0.0160	0.0143	0.0151	0	14.4
	Strychnin sulphate.....	1/60	0.0189*	0.0169*	0.0180*	13.2*	0*
11593	Blaud's Compound.						
	Ferrous carbonate.....	1	0.93	0.87	0.90	0	13.0
	Arsenious acid.....	1/60	0.0168	0.0157	0.0163	0.6	6.0
	Manganese binoxid.....	1	0.98	0.92	0.95	0	8.0
11585	Bronchitis No. 6.						
	Strychnin sulphate.....	1/60	0.0190	0.0164	0.0177	13.8	1.8
	Terpen hydrate.....	2	1.87*	1.61*	1.74*	0*	19.5*
11575	Calomel Tablet Triturates.						
	Calomel.....	1/10	0.109	0.089	0.097	9.0	11.0
11573	Calomel Tablets.						
	Calomel.....	1/10	0.116	0.094	0.099	16.0	6.0
11627	Calomel Tablet Triturates.						
	Calomel.....	1	0.97	0.85	0.91	0	15.0
11611	Calomel Tablets.						
	Calomel.....	1/10	0.109	0.068	0.094	9.0	32.0
11568	Calomel Tablet Triturates.						
	Calomel.....	1/10	0.107	0.091	0.097	7.0	9.0

* Approximate.

TABLE XX.—VARIATIONS IN MEDICAMENT IN TABLETS—*Continued.*

Station No.	Name of Tablet.	Amount declared. grs.	Amount found. Maximum. grs.	Amount found. Minimum. grs.	Amount found. Average. grs.	Maximum Variation from Claim. Above.	Maximum Variation from Claim. Below.
						%	%
11559	Calomel Tablet Triturates. Calomel	1	1.04	0.94	0.99	4.0	6.0
11609	Calomel Tablets. Calomel	2	1.82	1.64	1.73	0	18.0
11586	Calomel Tablets. Calomel	1/10	0.101	0.086	0.097	1.0	14.0
11603	Calomel Tablets. Calomel	1/10	0.108	0.088	0.103	8.0	12.0
11557	Calomel Tablets. Calomel	1/10	0.108	0.098	0.104	8.0	2.0
11595	Calomel Tablets. Calomel	¼	0.253	0.226	0.242	1.2	9.6
11614	Calomel Tablets. Calomel	¼	0.252	0.228	0.242	0.8	8.8
11571	Calomel and Soda Tablets No. 3. Calomel	¼	0.252	0.225	0.240	0.8	10.0
	Sodium bicarbonate	1	1.15	1.03	1.10	15.0	0
11570	Calomel Compound, Tablets No. 6. Calomel	½	0.509	0.456	0.488	1.8	8.8
	Sodium bicarbonate	½(?)	1.93	1.73	1.85	(?)	(?)
11606	Calomel and Soda Tablets. Calomel	1/10	0.107	0.100	0.104	7.0	0
	Sodium bicarbonate	1	1.02	0.96	1.00	2.0	4.0
11578	Cathartic Compound. Calomel	1	1.00	0.92	0.97	0	8.0
11452	Cathartic Compound. Calomel	1	0.78	0.72	0.75	0	28.0
11576	Cold Tablets. Acetanilid	1½	1.39	1.30	1.36	0	13.3
	Caffein citrated	½	0.51	0.47	0.49	2.0	6.0
11618	Cold Tablets No. 2. Quinin sulphate	2	2.05	1.84	1.98	2.5	8.0
11608	Acetanilid Compound Tablets Acetanilid	3½	3.50	3.32	3.39	0	5.1
	Caffein	½	0.50	0.48	0.49	0	4.0
	Sodium bicarbonate	1	1.03	0.97	0.99	3.0	3.0
11626	Acetanilid Compound Tablets No. 4. Acetanilid	3½	3.61	3.36	3.48	3.1	4.0
	Sodium bicarbonate	8/10	0.96	0.90	0.93	20.0	0
	Sodium bromid	1/10	0.091	0.085	0.088	0	15.0
	Caffein citrated	½	0.51	0.48	0.50	2.0	4.0
11444	Acetanilid Compound Tablets No. 17. Acetanilid	3	3.06	2.92	2.97	2.0	2.7
	Caffein citrated	½	0.51	0.49	0.50	2.0	2.0
	Sodium bicarbonate	2	2.02	1.93	1.96	1.0	3.5

TABLE XX.—VARIATIONS IN MEDICAMENT IN TABLETS—*Continued.*

Station No.	Name of Tablet.	Amount declared. grs.	Amount found. Maximum. grs.	Amount found. Minimum. grs.	Amount found. Average. grs.	Maximum Variation from Claim. Above.	Maximum Variation from Claim. Below.
						%	%
11622	Migrain Tablets No. 2. Acetanilid	2	2.13	1.90	2.01	6.5	5.0
	Caffein citrated	½	0.52	0.47	0.49	4.0	6.0
11620	Migrain Tablets No. 3. Acetanilid	2	1.95	1.77	1.84	0	11.5
	Caffein citrated	½	0.48	0.41	0.45	0	18.0
11583	Migrain Tablets. Acetanilid	2	2.09	1.78	2.00	4.5	11.0
	Caffein citrated	½	0.52	0.44	0.50	4.0	12.0
11601	Migrain Tablets. Acetanilid	2	2.06	1.81	1.98	3.0	9.5
	Caffein	¼	0.26	0.22	0.24	4.0	12.0
11605	Headache Tablets (Hawley). Acetanilid	2½	2.61	2.46	2.52	4.4	1.6
	Caffein	½	0.50	0.47	0.48	0	6.0
	Sodium bicarbonate	1	1.07	1.01	1.04	7.0	0
11598	Hex-uro-gen. Hexamethylene tetramin	5	5.65	5.41	5.55	13.0	0
	Acid sodium phosphate	5	4.60	4.41	4.52	0	11.8
11612	Hexaform Tablets. Hexamethylene tetramine	5	5.21	4.80	4.98	4.2	4.0
11624	La Grippe Tablets. Acetanilid	1¾	1.95	1.68	1.83	11.4	4.0
	Caffein citrated	½	0.56	0.48	0.53	12.0	4.0
11602	Mercury Protoiodid Tablets. Mercury protoiodid	¼	0.240	0.228	0.233	0	8.8
11566	Myalgie (Dr. Harvey). Sodium salicylate	2	1.38	1.26	1.33	0	37.0
	Acetanilid	2	1.64	1.50	1.59	0	25.0
	Caffein citrated	½	0.32	0.29	0.31	0	42.0
	Cerium oxalate	½	0.46	0.42	0.45	0	16.0
11610	Neuralgie Tablets No. 5. Acetanilid	2	1.98	1.89	1.94	0	5.5
11581	Phenolphthalein Tablets. Phenolphthalein	2	2.27	2.07	2.15	13.5	0
11589	Phenolphthalein Tablets. Phenolphthalein	2	2.03	1.92	1.98	1.5	4.0
11621	Phenolphthalein and Calomel Tablets. Phenolphthalein	1/10	0.117	0.097	0.110	17.0	3.0
	Calomel	1/10	0.111	0.092	0.104	11.0	8.0
11615	Quinin Sulphate Tablets. Quinin sulphate	2	2.00	1.85	1.91	0	7.5
11623	Quinin Sulphate Tablets. Quinin sulphate	2	1.90	1.74	1.81	0	13.0
11590	Quinin Sulphate Tablets. Quinin sulphate	2	2.25	2.01	2.16	12.5	0
11600	Quinin and Nux Vomica. Quinin	1	0.99	0.89	0.94	0	11.0

TABLE XX.—VARIATIONS IN MEDICAMENT IN TABLETS—*Concluded.*

Station No.	Name of Tablet.	Amount declared. grs.	Amount found. Maximum. grs.	Amount found. Minimum. grs.	Amount found. Average. grs.	Maximum Variation from Claim. Above.	Maximum Variation from Claim. Below.
						%	%
11574	Sodium Bromid Tablets. Sodium bromid.....	5	5.06	4.89	5.00	1.2	2.2
11450	Sodium Salicylate Tablets. Sodium salicylate.....	5	5.14	4.16	4.56	2.8	16.8
11569	Sodium Salicylate Tablets. Sodium salicylate.....	5	5.07	4.67	4.92	1.4	6.6
11613	Sodium Salicylate Tablets. Sodium salicylate.....	5	4.85	4.57	4.74	0	8.6
11580	Strontium Salicylate Tablets. Strontium salicylate.....	5	4.80	4.27	4.54	0	14.6
11564	Strychnin Sulphate Tablets. Strychnin sulphate.....	1/60	0.0174	0.0134	0.0152	4.2	19.8
11440	Strychnin Sulphate Tablets. Strychnin sulphate.....	1/60	0.0192	0.0147	0.0161	15.0	12.0
11597	Strychnin Sulphate Tablets. Strychnin sulphate.....	1/50	0.0095	0.0059	0.0082	0	70.5
11582	Strychnin Sulphate Tablets. Strychnin sulphate.....	1/60	0.0173	0.0135	0.0154	3.6	19.2
11594	Strychnin Sulphate Tablets. Strychnin sulphate.....	1/60	0.0169	0.0144	0.0158	1.2	13.8
11604	Strychnin Sulphate Tablets. Strychnin sulphate.....	1/60	0.0161	0.0149	0.0153	0	10.8

Below is shown a comparison of between Kebler's results in 1914 with 231 lots and our own with 111 samples.

	Kebler. Per cent.	Connecticut. Per cent.
Showing variation less than 10%...	43	44
" " more " 10%...	57	56
" " " " 12%...	44	35
" " " " 15%...	28	26
" " " " 20%...	9	10

The results of the two inspections are strikingly similar.

Twelve of our samples show total variations in weight of 20 per cent. or over. The fact that eight of these contained such potent drugs as corrosive sublimate, acetphenetidin, nitroglycerin and strychnin sulphate, makes the discrepancy a matter of considerable gravity.

Variations in Amount of Medicament in Tablets.

It is of even greater importance, however, to ascertain how closely the composition of the tablets conforms with that claimed

for them on the label. In securing these data it has been necessary to assume that the tablets are of uniform composition, and that the manufacturer has carefully prepared his mix before passing it through the machines. The small quantity of medicament in certain tablets makes the analysis of individual tablets of such drugs almost an impossibility. In the table which follows, therefore, it has been assumed that all the tablets in any one sample were chemically the same and the amounts of medicament recorded for the heaviest and lightest tablets have been calculated from the analysis of a composite of 10, 25 or more tablets. Table XX gives the detailed results in this respect on this year's samples.

Considering the variations both above and below the claimed amounts, we find a wide range, from 54.0 per cent. above to 70.5 per cent. below. The following is a summary of these variations in both directions in the 111 samples:

	Number.	Per cent. of total determinations.
Variations less than 5%.....	169	55
" from 5.00–9.99%.....	56	18
" " 10.00–14.99%...	40	13
" " 15.00–19.99%...	22	7
" " 20.00–29.99%...	10	3
" " 30.00–50.00%...	8	3
" over 50%.....	4	1

That is, 27 per cent. of all the drugs determined varied from the claimed amount by more than 10 per cent. and 14 per cent. by more than 15 per cent.

In the smaller tablets a slight variation causes a relatively large percentage variation, and possibly a comparison based on grains of active drug present is more illuminating. On this basis the following variations from claim are shown:

	Claimed. grs.	Found. Max. grs.	Found. Min. grs.	Maximum Variation. from Claim. grs.	Maximum Variation. from Claim. Per cent.
Acetanilid.....	1.33	1.35	1.21	—0.12	— 9.0
"	1.50	1.30	1.30	—0.20	—13.3
"	1.75	1.95	1.68	+0.20	+11.4
"	2.00	2.13	1.50	—0.50	—25.0
"	2.50	2.61	2.46	+0.11	+4.4
"	3.00	3.06	2.92	—0.08	— 2.7
"	3.50	3.61	3.32	—0.18	— 5.1
Acetphenetidin.....	1.00	0.87	0.80	—0.20	—20.0
Ammonium salicylate....	2.00	1.90	1.70	—0.30	—15.0

	Claimed. grs.	Pound. Max. grs.	Pound. Min. grs.	Maximum Variation. from Claim. grs.	Maximum Variation. from Claim. Per cent
Arsenious oxid	0.0167	0.0168	0.0143	—0.0024	—14.4
Aspirin	1.25	1.15	1.05	—0.20	—16.0
"	5.00	4.66	3.50	—1.50	—30.0
Caffein	0.25	0.260	0.216	—0.034	—13.6
"	0.50	0.50	0.47	—0.03	— 6.0
"	1.00	0.94	0.84	—0.16	—16.0
Caffein citrated	0.50	0.56	0.29	—0.21	—42.0
Calomel	0.10	0.116	0.068	—0.032	—32.0
"	0.25	0.253	0.225	—0.025	—10.0
"	0.50	0.509	0.456	—0.044	— 8.8
"	1.00	1.04	0.72	—0.28	—28.0
"	2.00	1.82	1.64	—0.36	—18.0
Cerium oxalate	0.50	0.46	0.42	—0.08	—16.0
Corrosive sublimate	7.00	5.78	4.94	—2.06	—29.4
" "	7.30	7.79	7.08	+0.49	+6.7
Ferrous carbonate	1.00	1.54	0.87	+0.54	+54.0
Hexamethylene tetramine	5.00	5.65	4.80	+0.65	+13.0
Manganese binoxid	1.00	0.98	0.92	—0.08	— 8.0
Mercury iodid	0.375	0.361	0.326	—0.049	—13.1
Mercury protoiodid	0.25	0.240	0.228	—0.022	— 8.8
Phenolphthalein	0.10	0.117	0.097	+0.017	+17.0
"	2.00	2.27	1.92	+0.27	+13.5
Potassium iodid	2.00	1.91	1.70	—0.30	—15.0
Quinin sulphate	1.00	0.99	0.89	—0.11	—11.0
" "	2.00	2.25	1.74	—0.26	—13.0
Sodium bicarbonate	0.80	0.96	0.90	+0.16	+20.0
" "	1.00	1.15	0.96	+0.15	+15.0
" "	2.00	2.02	1.93	—0.07	— 3.5
Sodium bromid	0.10	0.091	0.084	—0.015	—15.0
" "	5.00	5.06	4.89	—0.11	— 2.2
Sodium phosphate, acid	5.00	4.60	4.41	—0.59	—11.8
Sodium salicylate	2.00	1.38	1.26	—0.74	—37.0
" "	5.00	5.14	4.16	—0.84	—16.8
Strontium salicylate	2.00	1.90	1.75	—0.25	—12.5
" "	5.00	4.80	4.27	—0.73	—14.6
Strychnin sulphate	0.0167	0.0192	0.0134	—0.0033	—19.8
" "	0.0200	0.0095	0.0059	—0.0141	—70.5
Terpen hydrate	2.00	1.87	1.61	—0.39	—19.5

While the composition of the tablets agrees as a rule very satisfactorily with that claimed, the above table shows that the individual variations are far too wide. Moreover, the maximum variation is more often below than above the amount claimed, only 9 of the 47 drugs determined showing a maximum above the claim.

These variations for the whole 111 samples of tablets may be summarized as follows:

	Number.	Per cent.
Variation less than 5%	11	13
" " " 10%	30	37
" " " 15%	47	57
" " " 20%	62	75
" " " 30%	73	89
" " " 50%	78	95
" more " 50%	4	5

In other words, in more than one-third of the determinations the variation from the claim amounts to over 10 per cent. in more than one-half to over 15 per cent., in one-fourth to over 25 per cent., while in 4 drugs the maximum variation amounts to from 54 to 70.5 per cent.

Judging by examinations made by Kebler and by ourselves in past years, tablets taken from the stocks of druggists show quite as great variations as these. It is the tablets themselves we criticize, not the persons who happen to sell or dispense them.

TOILET PREPARATIONS.

At the last session of the Legislature an act was passed forbidding the use of wood alcohol in any preparation intended for internal or external use; and if used in products intended for technical purposes a poison label on the container is required.

To test the observance of this law the Dairy Commissioner submitted 25 samples of toilet preparations taken from the stock of dealers in barbers' supplies. The results of our examination of these are given in Table XXI.

Twelve of the 25 samples contained wood alcohol in amounts ranging from about 11 per cent to 84.80 per cent. Not only was this use of wood alcohol illegal, but in no instance was its presence in these samples stated on the label. Sample **12216,** although claiming 90 per cent. methyl alcohol, contained only 39.20 per cent. alcohol all in the form of ethyl. Sample **12209** claimed " menthol " alcohol, whatever that is, and contained 39.56 per cent. methyl alcohol. Five samples claimed to be bay rum, which if of standard quality should contain about 58 per cent. of grain alcohol; they actually contained 30.64 per cent. alcohol (28 per cent. of which was methyl), 15.00 per cent. grain alcohol (30 per cent. claimed),

TABLE XXI.—TOILET PREPARATIONS.

Sample No.	Dealer.	Brand.	Specific gravity @ 15.6° C.	Total alcohol by vol.	Per cent. of total alcohol in form of methyl.
12205	A. Amico, Seymour.....	Imported Bay Rum (C. A. Johnson, New Haven).....	0.9536	39.64	28.83
12206	" " "	Bayryber Toilet Water (F. J. Mangini, Waterbury).....	0.9496	40.60	100.00
12214	T. Baker, Danbury.....	Unexcelled Herb Rub (Rich. Lenroth, Jersey City).....	0.9778	21.96	0
12215	Frank Dieli, Bridgeport....	Bouquet de Fleurs.....	0.9974	3.00	0
12216	" " " ...	Circassian Hair Dressing.....	0.9610	39.20[1]	0
12217	" " " ...	Domestic Bay Rum.....	0.9811	15.00[2]	0
12223	Jos. Fanighetti, Waterbury	Extr. Witch Hazel (C. A. Johnson, New Haven).....	0.9877	8.90	0
12207	C. A. Johnson, New Haven	Imported Bay Rum.....	0.9536	40.32	27.80
12208	" " " " "	Letonneaux Eau de Quinine.	0.9193	59.60[3]	0
12209	" " " " "	Bouquet Toilet Water.....	0.9530	39.56[4]	100.00
12219	G. Lupo, New Haven.....	Bay Toilet Water.....	0.9656	27.52	100.00
12220	" " " "	Superior Hair Tonic.....	0.9562	36.92	100.00
12224	F. J. Mangini, Waterbury.	Hoffmann's Hair Tonic.....	0.9477	43.12	0
12210	A. Palmer, Bridgeport.....	Quinine Tonic Comp. (Rich. Lenroth, Jersey City).....	0.9599	37.56	0
12211	" " "	Glacier Scalp Rub (Rich. Lenroth, Jersey City).....	0.9367	48.24	0
12200	N. Seidman, Hartford.....	Eau de Quinine.....	0.9678	29.64[5]	47.67
12201	" " "	Sage Head Rub.....	0.9611	34.20[6]	0
12202	" " "	Floral Bouquet Toilet Water.	0.9555	37.92[7]	0
12218	E. F. Stefhan, New Haven.	Violet Toilet Water.....	0.9674	28.36	0
12222	R. F. Surinek, Bridgeport..	Remo Bay Rum (Remo Co., Bridgeport).....	0.8730	84.80	100.00
12221	" " " " ..	Remo Quinine Hair Tonic (Remo Co., Bridgeport)...	0.9101	70.60	100.00
12212	J. Tavano, Bridgeport.....	Carnation Hair Dressing (Barber Supplies Co., Bridgeport).....	0.9631	29.06	100.00
12213	" " "	Comtesse Aime Bay Rum (Perfumerie Comtesse Aime Paris).....	0.9726	23.24[8]	0
12203	E. Warshaw & Co., Bridgeport.....	Carnation Hair Tonic.....	0.9636	30.00	100.00
12204	" " " " "	Eau de Quinine Hair Tonic..	0.9375	51.32	100.00

[1] Claimed 90% ethyl alcohol.
[2] Claimed 30% grain alcohol.
[3] Claimed 62% alcohol.
[4] Claimed 50% menthol alcohol.
[5] Claimed 50% grain alcohol.
[6] Claimed 45% grain alcohol.
[7] Claimed 40% grain alcohol.
[8] Claimed 25% grain alcohol.

40.32 per cent. (all methyl), 84.80 per cent. ethyl, and 23.24 per cent. ethyl (25 per cent. claimed). Similarly the one sample of extract of witch hazel, which should contain at least 14.25 per cent. of grain alcohol, contained only 8.90 per cent.

The following is a summary of the examination:

Containing wood alcohol:

12205 Johnson's Imported Bay Rum.
12207 " " "
12209 " Bouquet Toilet Water.
12206 Mangini's Bayryber Toilet Water.
12219 Lupo's Bay Toilet Water.
12220 " Superior Hair Tonic.
12200 Seidman's Eau de Quinine.
12222 Remo Bay Rum.
12221 " Quinine Hair Tonic.
12212 Carnation Hair Dressing.
12203 Carnation Hair Tonic.
12294 Warshaw's Eau de Quinine Hair Tonic.

Containing less grain alcohol than standard:

12223 Johnson's Extr. Witch Hazel.

Containing less alcohol than claimed:

12216 Dieli's Circassian Hair Dressing.
12217 " Domestic Bay Rum.
12208 Johnson's Letonneaux Eau de Quinine.
12209 " Bouquet Toilet Water.
12200 Seidman's Eau de Quinine.
12201 " Sage Head Rub.
12202 " Floral Bouquet Toilet Water.
12213 Comtesse Aime Bay Rum.

MISCELLANEOUS DRUGS.

11324. *Watkins Cough Medicine,* The J. R. Watkins Medicine Co., Winona, Minn. "Alcohol 11 per cent., chloroform 4 min. per oz."

Spec. grav. @15.6° C.	1.2352
Alcohol by volume	12.73
Solids	59.08
Ash	0.30
Chloroform	0.67
Sugar	present
Alkaloids	present
Gelsemium	indicated
Saccharin	present
Morphin, opium, cocain	absent

This is a sugar syrup containing alcohol, chloroform, saccaharin and gelsemium.

11325. *Watkins Catarrh Relief*, The J. R. Watkins Medicine Co., Winona, Minn. "2.5 grs. chloterone per av. oz."

Loss — 100°C.	3.43
Chloretone	0.45
Volatile oils, menthol	present
Alkaloids	absent

The above medicine was tested chiefly for the chloretone. The base was a mixture of a non-saponifiable hydrocarbon and a fat.

12225. *Hanford's Balsam of Myrrh*, G. C. Hanford Mfg. Co. "Wood alcohol 84%." This was tested only for methyl (wood) alcohol, of which it contained 88.96 per cent. by volume. Its sale is illegal in this state.

12226. *Elastic Soluble Gelatine Capsules No. 49 Santal Oil, 10 minims*, American Druggists Syndicate, Long Island City, N. Y. Cost $3.25 per 100 capsules. The capsules contained on the average 8.65 minims of santal oil. The oil showed a specific gravity @ 25° C. of 0.9726, an optical rotation of —15.7 @ 20° C. in a 100 mm tube, and contained 95.90 per cent. of total alcohols calculated as santalol.

5583. *Koch's Celebrated Hair Dye.* Sample consisted of two bottles. Bottle 1 contained a clear, yellow liquid which darkened on exposure to the air; it consisted of a solution of pyrogallol in water (2.858 gms. per 100 cc.). Bottle 2 contained a clear liquid with an ammoniacal odor. It consisted of an ammoniacal solution of silver nitrate (0.771 gm. of silver nitrate and 5.75 gms. of ammonia per 100 cc.).

12150. *Silicate of Soda*, dist. by The Talcott Co., Hartford. It contained 28.44 per cent. silicic oxid and 0.04 per cent. suspended matter; sodium was present, and a very slight amount of iron and alumina. **11744.** *Turpentine*, General Naval Stores Co., New York. It had a specific gravity @ 15.6° of 0.8605 and a refractive index @ 20° C. of 1.4685; it had an initial distillation temperature of about 150° and about 93 per cent. distilled under 170°; unpolymerized residue 3.2 per cent. Sample passed.

MISCELLANEOUS SAMPLES SENT BY PRIVATE INDIVIDUALS.

Anzac. A sample of this temperance beer contained 0.25 per cent of alcohol by volume.

Butter. Thirteen samples were tested, of which 8 were genuine, 2 were oleomargarine, 2 were renovated butter, and one contained the excessive moisture of 38.3 per cent.

Butter Color. The sample examined was annatto in oil solution.

Coffee. The single sample tested showed no adulteration.

Coffee Wax. A substance obtained during the refining process for caffein contained water 6.27, ash 2.10, protein (N x 6.25) 19.00, ether extract 71.31, and nitrogen-free extract 1.32 per cent.

Coffee Residue. A residue from the manufacture of Kaffee Hag. The coffee is dry charred before treatment with the solvent, and the solution containing the caffein is filtered this residue being left. It contained

Water	8.57	Nitrogen-free extract	52.11
Ash	10.79	Total nitrogen	1.90
Protein (N x 6.25)	11.88	Total phosphoric acid	0.24
Ether extract	0.25	Potash, water-soluble	4.10
Fiber	16.40		

Confectionery. A sample of *Lolly Pops* suspected of having cuased sickness was examined. No heavy metals or alkaloids were found; the color was a mixture of caramel and a small amount of Orange I.

Cottage Cheese. Old Fashioned Cottage Cheese, made by Benvenuto Farm, West Bloomfield. It contained.

Water	26.28	Ash	1.57
Solids	23.72	Lactic acid	0.76
Protein	17.61	Lactose, etc.	1.38
Fat	2.40		

Cream Nine samples were tested containing from 17 to 39 per cent. of butter fat; two of these contained sucrate of lime.

Fish. Two samples were tested for preservatives with negative results.

Flour. The sample tested was not adulterated.

Grape Juice. A sample suspected of containing poison was found normal in all respects.

Ice Cream. The three samples tested contained from 10.27 to 11.92 per cent. of butter fat.

Maple Syrup. The sample tested contained 66.70 per cent. solids, 0.69 ash and had a Winton lead number of 1.36 (2.04 on dry basis).

Milk. Twenty-four samples were tested, of which 10 were genuine, 12 were below standard, 1 was watered and 1 was both skimmed and watered.

Olive Oil. The sample examined was very largely, if not entirely, peanut oil.

Peanut Butter. A sample sold by the Great Atlantic and Pacific Tea Co. contained the following:

Water	1.93	Fat	45.97
Ash	2.99	Fiber	1.59
Protein (N x 6.25)	28.13	Nitrogen-free extract	19.19

Salt Pork. A sample of the brine and one of the meat itself, each contained boric acid and nitrates.

Semolina. Sample of two cars sold by L. A. Viviano, New York, were analyzed with the following results:

	1st car.	2nd car.
Water	12.53	13.23
Ash	0.70	0.65
Protein (N x 6.25)	13.13	12.63
Fiber	0.27	0.24
Fat	1.14	1.07
Nitrogen-free extract	72.23	72.18

Sludge from Gas Co. The sample contained water 65.00, ash 29.04, organic and volatile matter 5.96, lime 15.94, magnesia 0.91, total sulphuric anhydrid 0.47, water-soluble sulphuric anhydrid 0.35 per cent.

Sugar. Three samples were tested, two of which were not adulterated. The third sample contained 0.86 per cent. of sulphuric acid, probably an accidental contamination acquired during transportation.

Tobacco Dust. The sample tested contained 1.22 per cent. of nicotin.

Vanilla Extract. A sample of *Thompson's Extract of Vanilla*, made by C. S. Lettell and Co., New York, contained 0.185 per cent. of vanillin with no coumarin.

Vinegar. Forty-four samples were tested, of which 31 conformed to the state standard. Three were below standard in acidity, 5 in solids and 4 in both acidity and solids. One sample contained 0.131 gm. of zinc per 100 cc.

Water. The sample tested showed 8.9 parts per million of chlorin, 414.0 parts of sulphuric anhydrid and less than 0.1 part of iron.

Whisky. Two samples were tested which contained no adulteration.

Wine. The single sample tested contained 11.90 per cent. of alcohol by volume.

Alcohol. The sample tested contained 89.7 per cent. of ethyl alcohol by volume.

B-K Bacili-Kil, made by General Laboratories, Madison, Wis. The material was an aqueous solution of alkaline earth and alkali hypochlorites; it contained approximately 3.41 gms. of available chlorin per 100 cc.; calcium, magnesium, sodium, potassium, and hypochlorites present; no heavy metals.

Police Cases. Three suspicious samples of drugs were sent to us by the local police. One was heroin hydrochlorid, one morphin sulphate, while the third was an abortion medicine consisting chiefly of ferrous iron and aloes. No ergot, savin, pennyroyal or alkaloids were detected.

Prescriptions. A sample of 3 gr. phenacetin in powders suspected of substitution was examined; the prescription was genuine. Another prescription supposed to consist of two parts bismuth subcarbonate and one part magnesium peroxid, was tested quantitatively and bismuth, magnesium, carbonates and peroxids were found.

Samples suspected of containing poisons. Twelve samples of this kind were examined. A milk suspected of containing carbolic acid was found to contain that drug. Another suspected milk was found normal in all respects. A sample of suspected raspberry jam contained no alkaloids or heavy metals. A sample of bird pie contained much free yellow phosphorus. A sample of wheat bran was tested with negative results. The contents of a cow's stomach were found to contain zinc; two samples of paint to which it was suspected the cow might have had access contained no zinc, one being a lead pigment and the other a mixture of lead chromate and Prussian blue. A sample of *Baby Buster Scratch Feed* alleged to have caused the death of 45 young chickens, was fed to two chickens for four days with no bad effects. A hen and a rooster, which were suspected of having been poisoned, were examined; no metallic poison was detected; the crops were gorged

with food and greatly distended, the lungs congested; the birds appeared to have died of suffocation rather than of poison. The contents of a dog's stomach were examined and a large quantity of mercury, probably derived from corrosive sublimate, was found. A red powder found scattered in a pig pen was tested for alkaloids and metallic poisons with negative results; iron, lime and sulphates were present in abundance.

Summary of Examinations.

Sampled by Station:

Canned Beans	62	Prepared Flours	6
Bread (weights only)	265	Fruit Juices	5
Bread Materials	56	Infant Foods	2
Breakfast Foods	30	Jelly Powders	3
Brosia Meals	4	Malt Extracts	3
Chocolate and Cocoa	5	Malt Flours	4
Condensed Coffee	1	Temperance Beverages	4
Coffee Substitutes	6	Miscellaneous Foods	17
Cordials	27	Dried Vegetables	18
Diabetic Foods	8	Drug	1
Flavoring Extracts	9		
		Total	536

Sampled by Dairy Commissioner:

	Total.	Adulterated.		Total.	Adulterated.
Butter	14	3	Spices	52	7
Cocoa	1	0	Sugar	5	1
Cream	8	0	Vinegar	40	5
Eggs	6	6	Physician's Drugs	76	15
Hamburg Steak	34	14	Toilet Preparations	25	19
Milk	390	258*	Miscellaneous Drugs	6	1
Sausage	21	5			
			Total	678	334*

Sent by Private Individuals 140 44

Total samples examined 1354

* Including 118 samples of milk deficient only in solids—not—fat.