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Connecticut Agricultural Experiment Station
New Haven, Connecticut

**THE THIRTY-SECOND REPORT ON
FOOD PRODUCTS
AND THE TWENTIETH REPORT ON
DRUG PRODUCTS**

1927

Connecticut Agricultural Experiment Station
New Haven, Connecticut

The Thirty-Second Report on
FOOD PRODUCTS
and the Twentieth Report on
DRUG PRODUCTS

1927

Food and Drug Inspection
and Special Studies

By

E. M. BAILEY

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Contents and Summary

Material	Page	Sampled by or Submitted to		Total	Adulterated, below standard, or otherwise illegal.
		The Station	The Dairy and Food Commissioner		
FOODS					
Carbonated Beverages, etc.	310	1	152	153	15
Cacao Products, sweetened milk chocolate	310	9	0	9	...
Cereal Products, etc.:					
Bread	312	2	1	3	...
Unleavened Bread	312	2	0	2	...
Special foods, "diabetic" foods	312	14	0	14	...
Cheese	314	0	12	12	...
Eggs	314	2	60	62	47
Fats and Oils:					
Butter	315	1	13	14	2
Cottonseed oil	316	0	1	1	0
Olive Oil	316	1	17	18	3
Fruits and Fruit Products	316	1	1	2	...
Ice Cream	317	0	301	301	2
Frozen Custard	317	0	3	3	3
Meat Products:					
Frankfurt sausage	317	0	9	9	6
Meat loaf	317	1	0	1	0
Milk and Milk Products:					
Market Milk	318	128	230	358	53 ¹
Cream	318	3	1	4	0
Evaporated milk, etc.	318	2	0	2	0
Human milk	318	1	0	1	...
Oysters	319	3	0	3	...
Pickles, sweet	319	0	11	11	0
Salad Dressing	319	0	1	1	0
Syrups:					
Honey	320	0	13	13	0
Maple syrup	322	1	6	7	0
Tea	322	14	0	14	...
Tomato Catsup	322	0	10	10	...
Vinegar	323	3	0	3	0
<i>Total for foods</i>		189	842	1031	131

¹ Includes 45 below standard only.

Contents and Summary—*Concluded*

Material	Page	Sampled by or Submitted to		Total	Adulterated, below standard, or otherwise illegal.
		The Station	The Dairy and Food Commis- sioner		
DRUGS					
Ammonia Water.....	325	0	3	3	1
Amyl Nitrite.....	325	0	1	1	0
Borax.....	325	0	2	2	0
Carbon Tetrachloride.....	325	0	4	4	0
Calcium Hydroxide, Solution of.....	326	0	7	7	0
Cream of Tartar.....	326	0	4	4	0
Cresol, Compound Solution of.....	326	0	5	5	...
Ethyl Nitrite, Spirit of.....	327	0	27	27	15
Ferric Chloride, Solution of.....	328	0	8	8	1
Ferrous Carbonate, Mass of.....	328	0	6	6	1
Fowler's Solution.....	329	0	21	21	6
Glycerin.....	329	0	4	4	0
Iodine, Compound Solution of.....	330	0	6	6	2
Iron and Ammonium Acetate, Solution of.....	330	0	6	6	1
Hydriodic Acid, Dilute.....	331	0	4	4	3
Lime, Chlorinated.....	331	0	1	1	1
Mercuric Salicylate.....	332	0	2	2	0
Mercury, Mass of.....	332	0	3	3	1
Pepsin, Powdered.....	332	0	5	5	3
Peppermint, Spirit of.....	333	0	1	1	0
Sulphuric Acid, Aromatic.....	333	0	7	7	2
Thyroid.....	333	0	3	3	0
<i>Total for drugs.....</i>		0	130	130	37
MISCELLANEOUS					
Cod Liver Oil.....	334	20	0	20	0
"Denicotinized" and other tobaccos.....	338	35	0	35	...
Materials examined for poisons, etc.....	351	55	0	55	...
Water analyses (State Water Commis- sion).....	354	17	0	17	...
<i>Total for miscellaneous.....</i>		127	0	127	...
<i>Total for all.....</i>		316	972	1288	168
Babcock glassware, etc.....	354	3095	...	3095	74

The Thirty-Second Report on Food Products and the
Twentieth Report on Drug Products

Food and Drug Inspection and Special Studies

by E. M. BAILEY

The work here summarized is that done for the year 1927 and largely for purposes of food and drug control as required by the Dairy and Food Commissioner in carrying out the provisions of the State food and drug laws. As usual, a good deal of our time is occupied with other inspection work, some of which, notably the inspection of cattle feeds, has materially increased the analytical work required of the department in the last two years. Cooperation with the Tobacco Station at Windsor has involved analyses, in considerable detail, of 40 or more samples of tobacco and a study of the data obtained. A summary of this work is published elsewhere.¹ Two special studies, one of cod liver oil and the other of "denicotinized" tobacco have been made and are reported here. Cooperation has been continued with the State Water Commission, with the Association of Official Agricultural Chemists, and with the Council on Pharmacy and Chemistry of the American Medical Association. The chemist in charge has continued to serve as consultant to this Council; as a member of the Executive Committee, and of the Committee on Recommendations of Referees, of the Association of Official Agricultural Chemists; and as a member of the Joint Committee on Definitions and Standards for Foods.

The increase in analytical work just noted has been in part compensated by the decrease in the number of official milk samples submitted by the Dairy and Food Commissioner in the last two years. However, the total number of samples of foods and drugs examined, exclusive of official milk samples, compares favorably with previous years on a like basis.

Credit is due to Messrs. Shepard, Fisher, Nolan, Mathis and Walden for the analytical work herein reported, and for that reported elsewhere; and to Miss Bacon for assistance in preparing reports. The courtesy of the Biochemical Laboratory in giving facilities for the feeding tests on cod liver oil, and of Miss Cannon who collaborated in the work, is also gratefully acknowledged.

¹ Conn. Exp. Sta., Tobacco Station Bull. 10, 1928.

CEREAL PRODUCTS, ETC.

BREAD.

Three samples of bread were examined. Two were whole wheat products and one, No. 7485, was Thomas' Gluten Bread, the latter submitted by Dr. Herman O. Mosenthal of New York. No. 8105 was Linn's Vitamin Whole Wheat bread, manufactured by the Storck Baking Co., Parkersburg, W. Va. No. 35459 was whole wheat bread sold locally and submitted by the Dairy and Food Commissioner.

Analyses:			
No.	7485	8105	35459
	%	%	%
Moisture.....	40.92	35.77	34.80
Ash.....	2.02	2.58	.....
Protein.....	11.61	10.23	9.40
Fiber.....	0.70	1.29	.....
Carbohydrate.....	43.48 ¹	45.95	.....
Fat.....	1.27	4.18	.....

¹ Starch 32.27%, soluble carbohydrate 6.41%.

Thomas' Gluten Bread, so-called, does not greatly differ in composition from average wheat bread. Linn's Vitamine Whole Wheat bread bore an analysis on the wrapper which was misleading in that it was computed on the air-dry basis whereas the bread contains about 36 per cent of water.

UNLEAVENED BREAD.

Two samples of unleavened bread were submitted by the Dietetic Department of the New Haven Hospital. No. 6751 was Matzos manufactured by Myer London, New York. No. 6752 was Matzos manufactured by the D. Manischewitz Co., Cincinnati, Ohio.

Analyses:		
No.	6751	6752
	%	%
Moisture.....	8.02	8.13
Ash.....	2.13	1.58
Protein.....	12.13	10.69
Fiber.....	0.17	0.12
Carbohydrate.....	76.95	78.92
Fat.....	0.60	0.56

SO-CALLED "DIABETIC" AND SPECIAL FOODS.

Products of this class which have been examined in the past year are listed and their analyses given in Table II.

ANALYSES OF SPECIAL FOODS

TABLE II. ANALYSES OF SO-CALLED DIABETIC AND SPECIAL FOODS

No.	Manufacturer and Name of product	Moisture %	Ash %	Protein %	Fiber %	Carbohydrate		Fat %
						Starch + Sol. %	Other by diff. %	
7133	MacDonell Bros., Brockville, Ont. Gluten flour.....	9.37	0.49	43.66 ¹	0.38	39.44	5.69	0.97
7965	Curdolac Food Company, Waukesha, Wis. Wheatso Flour.....	5.66	13.21	22.88	5.45	22.78 ²	22.56	7.46
7967	Diabeto flour.....	4.55	13.62	31.06	1.03	7.16 ³	29.93	12.65
7968	Improved flour.....	5.05	8.79	40.13	1.75	4.79 ⁴	29.81	9.68
7969	Johnny Cake flour.....	5.00	9.70	35.25	3.50	18.94 ²	15.29	12.32
7970	Nu-Special flour.....	8.34	7.08	42.56	3.13	2.41 ⁵	35.30	1.18
7971	Soya flour.....	5.35	4.20	42.25	4.13	10.00 ¹	17.81	16.26
7966	Breakfast food.....	4.45	9.30	15.19	10.80	8.25 ⁶	45.55	6.46 ⁷
7781	Therapeutic Foods Co. Inc., New York, Agents	9.00	2.11	15.25	0.55	69.65 ⁸		3.44
7782	Biscuits Mousseline Glutines (Charrasse)..... Glutin Mousseline (Charrasse).....	9.21	1.40	16.63	0.70	68.54 ⁸		3.52
7779	Miscellaneous Wallace Toast.....	9.10	3.23	17.22	2.20	64.31 ⁹		3.94
8010	Original Meat (Nature's Original Food Co., Brooke, Virginia).....	61.95	2.38	17.88	0.44	10.90		6.45
6394	Diabetiker Kakao (Freia Chocolate Fabrik, Oslo, Sweden).....	4.24	5.43	23.38	4.73	14.63	25.79	21.80
6395	Diabetiker Chocolate (Freia Chocolate Fa- brik, Oslo, Sweden).....	2.37	3.33	19.25	3.10	10.71	14.88	46.36

¹ Factor 5.7
² Starch present.
³ Starch none or trace.
⁴ Starch trace.
⁵ Starch none.
⁶ Starch 1.37, balance largely or partly due to agar agar.
⁷ In part mineral oil.
⁸ Over 3/4 is starch.
⁹ About 9/10 is starch and soluble carbohydrate.

The Curdovac products were examined for the Council on Pharmacy and Chemistry of the American Medical Association. The Charrasse products, examined for a patient, are not adapted to the diet of anyone with impaired carbohydrate tolerance. Wallace toast is said to be offered as a weight reducing food but its usefulness for such purpose is not apparent from the analysis. The label on the package of Original Meat explains that it is a vegetable product made from nuts and grain. The Swedish cocoa and chocolate are no more adapted to the diabetic diet than are ordinary cocoa and chocolate.

CHEESE.

American cheese, also known as Cheddar cheese and American Cheddar cheese, is cheese made by the Cheddar process, from heated and pressed curd obtained by the action of rennet on whole milk. It should not contain more than 39 per cent of water, and, in the water-free substance, not less than 50 per cent of milk fat.

Cream cheese is the unripened cheese made by the Neufchatel process from whole milk enriched with cream. It contains, in the water-free substance, not less than 65 per cent of milk fat.

Under the laws of some states it is permissible to call cheese made from whole milk "full cream cheese". This is confusing since cream cheese is a separate and distinct product.

Twelve samples of American cheese were examined for the Dairy and Food Commissioner. Three of these were sold as cream, or full cream, cheese but they were evidently cheese of the Cheddar type, and the fat content, on the dry basis, corresponded to the requirements for Cheddar cheese.

The moisture in the samples examined ranged from 31 to 37.4 per cent and the fat content, on the dry basis, ranged from 48.6 to 52.2 per cent. The average moisture was 33.4 per cent and the average percentage of fat in the dry substance was 50.7 per cent.

EGGS.

Under the State law eggs held for more than 15 days in any place where the temperature is reduced by means of artificial refrigeration are cold storage eggs and must be designated as such when sold or offered for sale. Eggs preserved by any other artificial process must be labeled "preserved eggs".

When the price of locally gathered eggs is high and the best grades of cold storage eggs are available there is commercial advantage in offering the storage product as and for fresh eggs. Later as prices for the two types of products become more nearly equalized the abuses cease because there is little if any commercial gain to be made.

It has been estimated that only about 10 per cent of the eggs produced are placed in cold storage. Withdrawals begin during July and by the end of the year three-fourths or more of the total holdings may have been removed. The balance is used up by the 1st of March. The greatest abuses in the marketing of eggs occurs during the fall and early winter months.

It is evident that laboratory examinations alone cannot determine whether or not eggs are offered or sold in violation of the statute relating to cold storage eggs, but the evidence procured by such examinations, supplemented with inspection evidence, will generally lead to reasonably definite conclusions. Laboratory tests aim chiefly to determine whether or not eggs are fresh judged by the usually accepted characteristics of fresh eggs as determined by candling, the condition of the eggs as broken out of the shell and the ammonia content. If not classified as fresh the evidence may give further suggestion as to probable history which will be of service in supplementing inspection evidence. Large air spaces accompanied by low ammonia content indicate eggs held at low temperatures or at cold storage temperatures. Large air spaces with high ammonia content indicate eggs held under less favorable conditions, such as eggs held too long by the retailer or held by the producer in anticipation of higher prices.

In judging market eggs the characteristics of fresh eggs as defined by various workers¹ and our own observations made upon eggs held under known conditions² have been used as a guide.

Of 62 samples examined, 60 of which were submitted by the Dairy and Food Commissioner, all were edible, with one exception, but 46 were not sold under proper descriptions.

FATS AND OILS.

BUTTER

Thirteen samples of butter were examined for moisture and fat.

The Federal law required not less than 80 per cent of milk fat but has no specification for moisture. By regulation in this State butter must contain not less than 80 per cent of fat and not more than 15.99 per cent of water.

Of the samples examined 12 were above the standard for fat, ranging from 82.7 to 86.7 per cent, and substantially within the limit for moisture, the range being 10.4 to 16.2 per cent. One sample, **36521**, sold by Kingsley and Smith of Hartford and

¹ U. S. Dept. Agr., Bull. 565, p. 13 (1918); Penn. Dept. Agr., Bureau of Foods, Bull. 17, p. 44 (1919).

² Conn. Exp. Station, Bull. 255, 1923.

said to be Elgin Creamery butter, was 0.4 per cent low in fat and about 0.5 per cent high in moisture. One sample also, **35654**, sold by J. S. Brown of South Manchester was 4/10 of an ounce short in weight.

One unofficial sample was analyzed and found to meet the requirements for both moisture and fat.

COTTONSEED OIL.

One sample of cottonseed oil was examined and passed.

OLIVE OIL.

Seventeen samples were examined for the Dairy and Food Commissioner and one unofficial sample was tested. Fifteen samples were passed as genuine and three were found to be adulterated. Cottonseed oil was present in all of the adulterated samples and they responded also to the test for sesame oil. These samples were all of the same brand, Dag-ni-nos, bottled by J. R. Dagnino Co., Boston. Two of the samples were purchased of the New England Grocery of Middletown and the third was sold by the Heimler Co. of Hartford.

FRUITS AND FRUIT PRODUCTS.

Fresh grape fruit, **6577**, submitted by Dr. E. P. Joslin, said to be a rare variety and not obtainable in the market, was analyzed as follows:

Weight as received 443.4 grams. Waste, rind, core and seeds, 114 grams. Edible portion 329.4 grams (74.3%).

Analysis of edible portion:

Water.....	89.7%
Ash.....	0.5
Protein.....	0.8
Fiber.....	0.4
Carbohydrate:	
Sugar (total as invert).....	7.6
Undetermined.....	1.0
Fat (ether extract).....	trace

This analysis agrees with that of canned grape fruit (Poms), which we have made; and, so far as sugar content is concerned, it is in accord with published analyses of our ordinary grape fruit.

A sample of currant jelly, **35650**, submitted by the Dairy and Food Commissioner, was not found to be adulterated.

ICE CREAM, ETC.

Three hundred and one samples of ice cream were analyzed for the Dairy and Food Commissioner. Of these only two samples, both made by Foot Farms, Bridgeport, were below the legal standard of 8 per cent for plain ice cream and 6 per cent for fruit and nut ice cream.

The distribution of samples on the basis of fat content is as follows:

Per cent of fat	No. of samples	Per cent of total
8.0 to 9.9	34	11.3
10.0 to 11.9	78	25.9
12.0 and above	187	62.1
7.9 and below	2	0.7

Of nearly 600 samples examined in the last two years only 5 samples have been found containing less than the legal percentage of milk fat. Nearly 2/3 of the total number have contained over 12 per cent.

Frozen custard is subject to the same sanitary regulation as is ice cream, and likewise may be sold when containing less than the standard amount of fat provided the true percentage is declared at the time and place of sale. Three samples, all taken at Savin Rock, West Haven, were illegal in that they contained less than the declared percentage of fat. Declarations of 5 and 6 per cent were made but the products contained only about 4 per cent.

MEAT PRODUCTS.

Nine samples of frankfurt sausage were examined and six were found to contain cereal or other starchy material which was not declared by label or by signs displayed at the time and place of sale.

The illegal products were found at the following places:

	Dealer	Manufacturer
<i>New Haven:</i>	Persky and Kavanaugh New England Market Reliable Meat Market	F. J. McNamara, Bridgeport F. J. McNamara, Bridgeport Chas. Hertler, New Haven
<i>Stamford:</i>	B. Sermet New York Market	Kline and Gmahle, Stamford T. McNamara, Bridgeport
<i>Waterbury:</i>	A. M. Calo	Albany Packing Co., Albany, N.Y.

A sample of beef loaf, **6094**, was analyzed and found to contain about 10 per cent of starch. Cereal or starchy material is recognized as a proper ingredient of beef loaf and no declaration of the added starchy matter is necessary.

MILK.

Three hundred and fifty-eight samples of milk have been analyzed. One hundred and twenty-seven were official samples taken by the Dairy and Food Commissioner and the remainder were unofficial samples (103), taken by the same agency and samples (128), examined for producers or others interested.

The distribution of official samples is as follows:

	No. of samples	Per cent
Not found adulterated.....	74	58.3
Adulterated by watering.....	8	6.3
Below standard:		
in solids and solids-not-fat.....	22	17.3
in solids, fat and solids-not-fat.....	23	18.1
Totals.....	127	100.0

The sources from which adulterated samples were obtained are given in Table III.

Three samples of bottled cream were examined. Two contained 42 and 53 per cent of fat respectively. The third was examined for preservatives only but none were detected.

EVAPORATED MILK, ETC.

A sample of Nestle's cream in sealed tin containers, and one of Borden's Evaporated milk were analyzed as follows:

No.		Solids %	Ash %	Protein %	Fat %	Sugar %
8119	Nestle's Cream.....	32.38	0.56	2.39	26.04	3.39
8118	Borden's Evaporated Milk.....	26.22	1.61	6.68	7.82	10.11

HUMAN MILK.

One sample, 6346, was submitted by the City Board of Health of New Haven. It contained 3.2 per cent of fat, 1.1 per cent of protein, 0.2 per cent of ash and 7.2 per cent of sugar.

TABLE III. ADULTERATED MILK.

No.	Dealer	Solids	Fat
	Containing added water.		
	<i>Guilford</i>		
37614	C. O. Bartlett	10.49	3.2
37627	C. O. Bartlett	10.57	3.0
	<i>Mt. Carmel</i>		
37957	S. Kaufman	11.30	3.6
	<i>New Milford</i>		
37322	Thomas Lillis	6.82	2.1
	<i>Southbury</i>		
35607	Dominick Kamaski	5.15	1.6
35999	Dominick Kamaski	8.16	2.4
	<i>Stepney</i>		
35795	Frank Musbek	11.41	3.9
	<i>Wallingford</i>		
37960	Chas. Bernasky	9.75	3.0

OYSTERS.

A sample of oysters, 7653, shipped out of the State by a local dealer, and returned as unfit for food, were examined. Also a sample, 7654, of the same lot as proposed for shipment was submitted by the dealer. No. 6343 was a sample from the same dealer examined earlier in the year. Analyses are as follows:

	7653	7654	6343
New weight sample.....	124.8 gms.	167.7 gms.	.....
Weight of liquor.....	19.7 "	17.7 "	.....
Weight of drained oyster meats...	105.1 "	150.0 "	.....
Loss on boiling meats.....	58.99 %	45.00 %	49.90 %
Solids in oyster meats.....	18.21	21.96	21.50
Ash in oyster meats.....	1.23	1.74	1.59
Salt in oyster meats.....	0.03	0.16	0.40
Ash in liquor.....	0.92	1.39	.....
Salt in liquor.....	0.19	0.66	.....

The oysters had been treated with saline solution according to approved methods. Analysis of 7654 oyster before shipment was substantially the same as that of oysters from the same source examined earlier. The solids, ash and salt in the rejected oysters are considerably less, and the loss in boiling considerably more than in the oysters as prepared at the plant and indicate more water in the oysters as returned than in those before shipment. No evidence of unwholesomeness could be detected as judged by the odor and general appearance. Bacteriological examinations were made elsewhere (State Department of Health).

PICKLES.

Eleven samples of sweet pickles were examined for saccharin but none were found to contain it. The samples were submitted by the Dairy and Food Commissioner.

SALAD DRESSING.

One sample of Mayonnaise dressing, 36845, was analyzed. It was made by Otto Seidner Inc., Westerly, R. I.

Analysis:

	As analyzed %	Water-free basis %
Moisture.....	27.07	.....
Ash.....	1.71	2.34
Protein.....	2.75	3.77
Carbohydrate and fiber,		
by difference.....	2.84	3.89
Fat.....	65.63	90.00

On the moisture-free basis the above analysis is substantially the same as that of a previous sample of the same brand examined in this laboratory.¹

¹ Conn. Exp. Station Bull. 255, p. 206-7, 1923.

There is no accepted standard for mayonnaise dressing, but a definition and standard is under consideration by the Committee on Definitions and Standards.

HONEY.

The numerical limits as given in the definition and standard for honey¹ are not over 25 per cent of water, not over 0.25 per cent of ash and not over 8 per cent of sugar (sucrose).

Thirteen official samples of strained honey were examined and the results are given in Table IV. One sample was examined for a purchaser.

No evidence of adulteration was found. The water content was not excessive in any sample. The ash varied from 0.06 to 0.27 per cent and the sucrose ranged from 0.11 to 8.06 per cent. The invert sugar content was within the usual limits ranging from about 72.5 to 78.0 per cent. For the detection of added invert sugar recourse is had to the fact that commercial processes for the manufacture of invert sugar result in the formation of furfural which may be detected by suitable tests. The resorcin and the aniline chloride tests gave no indication of commercial invert sugar in any of the samples examined. The procedure proposed by Auerbach and Bodlander² may be of value for the purpose of detecting added invert sugar and the possibilities of this method are being investigated by the referee on honey.³

Extensive analyses of authentic samples of honey from various sources have shown that the differences between invert polarizations of honey at 20° C. and 87° C. are fairly constant, ranging between the rather narrow limits of 23 and 30 in a large proportion of cases. Differences substantially less than 23 are indications of added glucose. Several methods of estimating glucose from polarization values have been proposed. One of these is Browne's formula⁴ which is generally used in control work. The Beckman test is a qualitative test of some value but negative results do not necessarily mean absence of commercial glucose because some of such glucose gives no iodine reaction.

In the samples which we have examined the differences between invert polarizations at 20° C. and at 87° C. were all between 23.2 and 26.4 with one exception where the difference was 20.5 but in which case, **31752**, one of the polarization values is questionable. The Beckman tests were negative in all cases but the reservation noted above must be made. Estimation of glucose by means of Browne's formula indicates no considerable additions of commercial glucose. On the whole there is no acceptable evidence of adulteration in any of the samples.

¹ S. R. A., F. D. No. 2.

² Zeit. Nahr. und Genuss., 47, 233, 1924

³ H. A. Schuette., A. O. A. C. referee on honey.

⁴ U. S. Dept. Agr. Bur. Chem. Bull. 110.

⁵ A. O. A. C. Methods of Analysis, p. 201.

ANALYSES OF HONEY

TABLE IV. ANALYSES OF HONEY.

No.	Brand, Manufacturer or Dealer	Water	Ash	Acidity (as formic acid)	Difference between invert polarization at 20° and at 87°	Sucrose	Invert Sugar	Glucose (Beckmann test)	Added invert sugar (Resorcin and Aniline Chloride tests.)
		%	%	%		%	%	%	%
31765	Atlantic and Pacific Tea Co. A. & P.	17.68	0.13	0.25	24.7	0.71	71.34	negative	negative
31754	James Butler Inc., New York, Peerless	15.21	0.13	0.13	26.2	0.42	74.15	negative	negative
31784	H. W. Coley, Westport, Conn.	15.24	0.11	0.11	26.2	0.60	77.17	negative	negative
31761	The Wm. Edwards Co., Cleveland, Ohio	13.17	0.07	0.09	24.8	1.76	74.80	negative	negative
31792	W. O. Gilbert, Wilton, Conn.	12.44	0.25	0.07	23.7	2.02	72.82	negative	negative
31750	Hoffman and Hanch Inc., Woodhaven, N. Y., H & H	15.18	0.11	0.07	24.6	7.34	71.39	negative	negative
31791	F. H. Ligggett & Co., New York, Premier	10.64	0.10	0.09	25.2	8.06	72.77	negative	negative
31786	The John G. Paton Co. Inc., New York, Golden Blossom	11.45	0.09	0.14	26.4	0.82	77.59	negative	negative
33343	A. I. Root Co., Medina, Ohio, Airline	15.53	0.08	0.08	24.7	1.05	76.35	negative	negative
31752	E. Vanderwerken, Stamford, Conn., Highland	15.32	0.27	0.12	20.5 ¹	2.18	71.80	negative	negative
34443	Nellie A. White, Hockanum, Conn.	.....	.....	.....	26.0	.....	72.62	negative	negative
31778	R. F. Wixon, Dundee, N. Y.	13.01	0.06	0.07	24.5	2.17	74.34	negative	negative
31769	A. W. Yates, Hartford, Conn.	14.81	0.11	0.09	23.2	0.11	73.82	negative	negative

¹ One polarization value doubtful.

MAPLE SYRUP.

Seven samples of maple syrup were examined. These were sold as pure products and no evidence of added sugar syrup or other adulteration was found. Six of these samples were submitted by the Dairy and Food Commissioner.

TEA.

Fourteen samples of tea were examined for Mr. Geo. F. Mitchell, U. S. Supervising Tea Examiner, in connection with his study of the effects of different methods of packing upon the quality of tea.

TOMATO CATSUP (KETCHUP).

Ten samples of tomato catsup were submitted by the Dairy and Food Commissioner. So far as these products are representative of the present day article the results show a marked contrast to those found in an inspection made in 1910.¹ At that time benzoate of soda was commonly used and artificial coloring matter often added. In the samples recently examined benzoate of soda was not found and no artificial colors were detected.

Analyses are given in Table VI.

The composition now as compared with that found in earlier examinations may be seen from the following summary.

	1927 %	1910 %
Total Solids (as purchased basis).....	20.2 to 36.0	7.3 to 32.5
Salt (as purchased basis).....	1.9 to 3.6	0.7 to 5.2
Salt-free ash (as purchased basis).....	0.7 to 1.1	0.6 to 1.8
Salt-free ash (water and salt-free basis).....	2.2 to 4.9	3.2 to 20.8
Insoluble solids (as purchased basis).....	1.2 to 1.6	1.2 to 6.1
Insoluble solids (water and salt-free basis).....	3.6 to 8.1	7.0 to 45.0
Protein (as purchased basis).....	1.7 to 2.4	0.8 to 3.1
Protein (water and salt-free basis).....	4.6 to 12.5	5.4 to 24.6
Fiber (as purchased basis).....	0.4 to 0.6	0.3 to 0.8
Fiber (water and salt-free basis).....	1.2 to 2.8	1.4 to 10.9

It appears that in the products recently examined the total solids exceed 20 per cent in the material as sold whereas in the earlier inspection many samples contained less than 20 per cent the minimum being less than 10 per cent. Salt-free ash in the dry, salt-free material is 5 per cent or less whereas this was about the minimum found in earlier samples, the maximum being over 20 per cent. The percentages of protein and fiber are also distinctly lower in the recently examined products.

No standards have been adopted for tomato catsup but on the basis of our earlier analyses it appeared that reasonable limits

¹ Conn. Food and Drug Report, 1910, p. 521, et seq.

of composition for a standard catsup might be, in the water and salt-free material, not more than 15 per cent of insoluble solids, not more than 7 per cent of ash, not over 4 per cent of fiber and not more than 12 per cent of protein. All of the samples in the recent inspection come well within these limits.

For the determination of insoluble solids the official method directs to wash 20 grams of material by repeated centrifugalization and transfer the insoluble residue to a previously dried filter, dry at 100° C. for 2 hours, cool, and weigh. We have found it more convenient to determine the soluble solids and obtain the insoluble solids by difference.¹ This avoids the transfer of insoluble material and the use of dried and weighed filters. The collected centrifugal washings are made up to a convenient volume and solids determined in aliquot portions. The aliquots are evaporated on a steam bath followed by short drying (30 mts.), at 100° C. to reduce the caramelization of sugar. The results as a rule are a little higher by the indirect method but the differences are not significant for a determination of this kind.

The comparative figures are as follows:

TABLE V. INSOLUBLE SOLIDS IN CATSUP.

No.	Total solids %	Insoluble solids		Difference by indirect method %
		direct method %	indirect method %	
34429	35.99	1.17	1.27	+ 0.10
34435	29.83	1.38	1.38	± 0.00
34436	31.03	1.50	1.48	- 0.02
34437	33.58	1.15	1.43	+ 0.28
34438	32.34	1.45	1.90	+ 0.45
34449	29.79	1.55	1.57	+ 0.02
36250	35.46	1.47	1.71	+ 0.24
36258	25.10	1.51	1.75	+ 0.24
36259	24.50	1.30	1.38	+ 0.08
36262	20.24	1.48	1.38	- 0.10

The differences do not much exceed 0.25 per cent with one exception. The average variation is +0.13 per cent.

VINEGAR.

Three samples of vinegar, all submitted by producers, were examined for solids and acidity.

¹ Suggested by C. E. Shepard.

TABLE VI. ANALYSES OF TOMATO CATSUP.

No.	Manufacturer and Brand	Total solids %	Solids insol. in water %	Ash %	Salt (NaCl) %	Salt-free ash %	Protein (N x 6.25) %	In the water-and salt-free material				
								Insol %	Ash %	Protein %	Fiber %	
34429	American Packing Corp., Evansville, Ind.	35.99	1.17	4.12	3.38	0.74	1.89	0.39	3.59	2.27	5.80	1.20
34435	Triple A	29.83	1.38	2.95	2.14	0.81	1.80	0.44	4.98	2.92	6.50	1.59
36262	Atlantic and Pacific Tea Co., Brockport, New York, A & P	20.24	1.48	2.75	1.85	0.90	2.29	0.52	8.05	4.90	12.46	2.83
36258	Austin, Nichols & Co., New York, Anco	25.10	1.51	2.68	1.87	0.81	1.93	0.47	6.49	3.48	8.30	2.02
34436	Wm. Boardman & Sons, Hartford, Conn.	31.03	1.50	3.62	2.88	0.74	1.70	0.54	5.33	2.63	6.04	1.92
34437	Curtice Bros., Rochester, N. Y. Blue Label	33.58	1.16	3.91	3.13	0.78	1.89	0.40	3.80	2.56	6.20	1.31
36250	First National Stores, Inc., Norwich, Conn.	35.46	1.47	4.01	3.30	0.71	1.48	0.47	4.57	2.21	4.60	1.46
34449	H. J. Heinz & Co., Pittsburgh, Pa.	29.79	1.55	3.08	1.95	1.13	2.43	0.43	5.56	4.06	8.72	1.58
36259	Libby, McNeil and Libby, Chicago	24.50	1.30	3.12	2.30	0.82	1.85	0.44	5.85	3.69	8.33	1.94
34438	P. J. Ritter Company, Philadelphia	32.54	1.45	4.38	3.62	0.76	1.84	0.57	5.02	2.63	6.37	1.97
	T. A. Snider Preservative Co., Chicago	35.99	1.55	4.38	3.62	1.13	2.43	0.57	8.05	2.21	12.46	2.83
	Maximum	20.24	1.16	2.68	1.85	0.71	1.70	0.39	3.59	2.21	4.60	1.20
	Minimum	29.81	1.40	3.46	2.64	0.82	1.91	0.47	5.32	3.14	7.33	1.78
	Average											

DRUGS.

AMMONIA WATER.

Ammonia water should contain not less than 9.5 nor more than 10.5 per cent of ammonia (NH₃), and the stronger solution should contain not less than 27 nor more than 29 per cent.¹

Three samples were examined, one of which was very deficient.

TABLE VII. ANALYSES OF AMMONIA WATER.

No.	Dealer	Per cent ammonia (NH ₃)
36131	Hartford: South Green Pharmacy	9.0
36327	Meriden: Broderick and Curtin	9.3
36302	Waterbury: Waterbury Drug Co. (26%)	26.9

AMYL NITRITE.

One sample of amyl nitrite was examined. This substance should contain not less than 80 per cent of amyl nitrite² and 89 per cent was found in the sample examined. The sample was labeled "for inhalation only" and the manufacturer was Eli Lilly & Co.

BORAX.

Two samples were examined. One was 20 Mule Team Borax and the other was Powdered Borax made by the United Drug Co., Boston. Both of these products were high in actual borax due to loss of some water of crystallization. On the basis of 5 molecules of water the samples in the order named, showed approximately 98 and 100 per cent of sodium tetraborate.

CARBON TETRACHLORIDE.

Four samples of this product were examined, none of which claimed U. S. P. grade, but were marked "technical" or "not for medicinal use". The samples, therefore, are not judged on the basis of U. S. P. specifications. They contained from 0.1 per cent to 0.37 per cent of carbon disulphide, from 0.6 mgms. to 18 mgms. per 100 cc. of non-volatile matter at 100° C., and no chloride, free chlorine, aldehyde or material carbonizable by sulphuric acid except in one sample which contained a trace of carbonizable material.

¹ U. S. P. X, p. 55, 56.
² U. S. P. X, p. 49.

CREAM OF TARTAR.

Four samples of cream of tartar (acid potassium tartrate), were examined but only one of these was sold as a U. S. P. article. This was a product of the United Drug Co., Boston, and contained 99.1 per cent of acid potassium tartrate which is very close to the standard required (99.5). The other samples ranged from 98.2 to 98.8 per cent pure.

COMPOUND SOLUTION OF CRESOL.

This solution should contain cresol in the amount of 46 to 52 per cent by volume. The five samples examined contained 46 to 51 per cent and were satisfactory. The further stipulation that 90 per cent of the dry cresols should distill between 195° C. and 205° C. was not met. It has been pointed out by Griffin¹ however, that the U. S. P. method of assay does not give distillation results which meet the requirements of the standard, for the reason that potassium carbonate is not a suitable drying agent for the liberated cresols. Dehydrated copper sulphate is satisfactory for the purpose according to this investigator.

SOLUTION OF CALCIUM HYDROXIDE.
(Lime Water)

Lime water should contain not less than 0.14 gram in 100 cc of solution at 25° C. Prepared at lower temperatures more calcium is held in solution, e. g. at 15° C. 100 cc will contain about 0.17 gram of calcium hydroxide. At temperatures above 25° C. the amount of calcium in solution diminishes.

Seven samples were examined and all substantially met the standard for this product.

Analyses are given in Table VIII.

TABLE VIII. ANALYSES OF LIME WATER.

No.	Dealer	Mfr.	Calcium hydroxide gm/100 cc
36418	<i>Derby:</i> Geo. H. Hardy	Own make	0.17
36260	<i>Middletown:</i> Liggett's Drug Store	Own make	0.13
36265	<i>New London:</i> Nichols and Harris	Own make	0.14
36518	<i>Unionville:</i> Paul F. Flynn	Own make	0.13
36254	<i>Waterbury:</i> Apothecaries Hall	Own make	0.14
36261	<i>West Hartford:</i> Allen B. Judd Co.	Own make	0.15
36270	<i>Whitneyville:</i> Country Club Pharmacy	Own make	0.15

¹ Jour. Am. Pharm. Assn., 15, 3, 196 (1926).

SPIRIT OF ETHYL NITRITE.
(Sweet Spirit of Nitre).

This preparation is an alcoholic solution of ethyl nitrite containing not less than 3.5 nor more than 4.5 per cent of ethyl nitrite, (C₂H₅NO₂).

Quite as much care should be exercised in preserving this article as in the preparation of it. The finished product should be kept in well-stoppered, amber-colored bottles, in a cool, dark place. If properly kept it will retain its strength for a considerable length of time. The solution is said to have been kept for several years without appreciable loss of strength. A sample prepared in this laboratory and kept for 3 months in a tightly stoppered bottle, protected from light but at room temperature, lost 8 per cent of the total ethyl nitrite. If the solution had been kept at a lower temperature the deterioration no doubt would have been much less.

In 1911 of thirty-four samples examined, thirty were found considerably below standard. In 1923 forty-eight samples were analyzed and thirteen found to be low in ethyl nitrite. During the past year twenty-seven samples were tested and more than one-half (15), of the number were considerably below the minimum of 3.5 per cent. The improvement noted in 1923 is not maintained in the latest inspection.

Analyses are given in Table IX.

TABLE IX. ANALYSES OF SPIRIT OF ETHYL NITRITE

No.	Dealer	Ethyl nitrite, per cent
36343	<i>Ansonia:</i> E. W. Smith & Co.	3.8
36349	<i>Branford:</i> Branford Pharmacy	4.1
36400	The Spaulding Co.	1.8
37028	The Spaulding Co.	2.3
36402	William's Drug Store	2.3
37030	William's Drug Store	3.3
36894	<i>Chester:</i> H. A. King	3.6
36898	<i>Granby:</i> Loomis Bros.	3.9
36333	<i>Naugatuck:</i> Leary's Drug Store	2.7
37019	Leary's Drug Store	1.7
36339	Geo. Smith & Son	3.7
36409	<i>Shelton:</i> E. J. Barden	3.1
37022	E. J. Barden	2.9
36411	Mahoney's Corner Drug Store	3.2
36338	<i>Seymour:</i> Geo. Smith & Son	2.9
37021	Geo. Smith & Son	3.9
36405	<i>Thompsonville:</i> Thompsonville Drug Co.	2.4
37032	Thompsonville Drug Co.	3.2
36268	<i>Torrington:</i> Claxton's Pharmacy	1.7
37035	Claxton's Pharmacy	1.8
36330	<i>Wallingford:</i> W. P. Lynch	3.3
36255	<i>Waterbury:</i> Apothecaries Hall Co.	1.2
37018	Apothecaries Hall Co.	1.5
36269	<i>Whitneyville:</i> Country Club Pharmacy	3.8
36346	<i>Winsted:</i> Bannon's Drug Store	3.1
36344	The Case Drug Store	2.2
37034	The Case Drug Store	3.7

SOLUTION OF FERRIC CHLORIDE.

Solution of Ferric Chloride should contain not less than 10 per cent nor more than 11 per cent of iron (Fe). A considerable excess of iron was found in two samples but one of these, **36337**, by a declaration of specific gravity showed that it differed from the U. S. P. standard.

Eight samples were examined and the results are given in Table X.

TABLE X. ANALYSES OF SOLUTION OF FERRIC CHLORIDE.

No.	Dealer	Per cent of iron (Fe)
36113	<i>Baltic:</i> Baltic Pharmacy	10.66
36413	<i>Derby:</i> Blume's Pharmacy	10.46
36412	C. F. Hotchkiss	12.28
36146	<i>Fairfield:</i> Clampett's Pharmacy	10.76
36132	<i>Hartford:</i> J. M. Rosenthal	10.97
36337	<i>Naugatuck:</i> Cross Drug Store	12.35
36300	<i>Waterbury:</i> Turgeon's Drug Store	11.44
36144	<i>Westport:</i> The Bridge Pharmacy	10.75

MASS OF FERROUS CARBONATE.

Mass of ferrous carbonate (Vallet's Mass), should contain not less than 35 per cent of ferrous carbonate, FeCO_3 .¹ Saccharated ferrous carbonate² is a somewhat similar preparation containing not less than 15 per cent of ferrous carbonate. Bland's Mass is not a U. S. P. preparation but there is an article known by that name and is said to be the powder from which Bland's pills are made. A sample, **7784**, sold as "Bland's Mass" was found to contain about 25 per cent of ferrous carbonate.

Six samples were collected by the Dairy and Food Commissioner.* There was evidently some misunderstanding on the part of druggists as to what article was desired although mass of ferrous carbonate was asked for. Three of the articles obtained were correctly labelled and met the standard for the article called for. Two others were labelled "Bland's Mass" in each case and may have been the article as labelled but they were not the article demanded. One preparation was labelled ferrous carbonate. It was too low in iron for the article called for, too high for saccharated ferrous carbonate.

The analyses are given in Table XI.

¹ U. S. P. X, p. 234
² U. S. P. X, p. 152

TABLE XI. ANALYSES OF MASS OF FERROUS CARBONATE.

No.	Dealer	Manufacturer	Per cent of FeCO_3 %
36342	<i>Ansonia:</i> Bristol Drug Co.	Malinckrodt	43.75
36133	<i>Hartford:</i> J. Robens (Bland's Mass)	Powers, Weightman, Rosengarten	11.91
36314	<i>Putnam:</i> Geo. E. Dresser	Clafin & Co.	36.54
36141	<i>So. Norwalk:</i> Irving Drug Co. (Bland's Mass)	.....	19.43
36331	<i>Wallingford:</i> Modern Drug Co. (Ferrous Carbonate)	.....	30.90
36328	Moran's Drug Store	.....	41.36

FOWLER'S SOLUTION.

This is a solution of sodium arsenite and should contain not less than 0.975 per cent nor more than 1.025 per cent of arsenic trioxide (As_2O_3).

Twenty-one samples were examined. Six were considerably outside the limits as specified in the standard.

The analyses are given in Table XII.

TABLE XII. ANALYSES OF FOWLER'S SOLUTION.

No.	Dealer	Manufacturer	Per cent of arsenic trioxide (As_2O_3)
36401	<i>Branford:</i> The Spaulding Co.	.....	1.025
36407	<i>Derby:</i> East Side Pharmacy	.....	1.047
36415	The Purdy Drug Co.	Squibb's	0.973
36348	<i>East Haven:</i> Metcalf's Drug Store	.....	0.966
34434	<i>Hartford:</i> G. Fox and Co.	.....	1.006
34445	<i>New Haven:</i> Liggett's Drug Store	Liggett's	0.948
34439	<i>Norwich:</i> James C. Mara	Lehn & Fink	0.950
36312	<i>Putnam:</i> G. N. Lemaitre	Eastern Drug Co.	0.932
36313	Providence St. Pharmacy	Brewer & Co.	0.999
36410	<i>Shelton:</i> Shelton Pharmacy	.....	0.952
36253	<i>Waterbury:</i> Apothecaries Hall Co.	Apoth. Hall Co.	0.948
36304	Breas Pharmacy	C. W. Whittlesey	0.951
36306	W. J. Dunphy	Lilly's	0.979
36305	Ebbs Drug Co.	Own make	0.696
36307	The Lake Drug Co.	.....	0.851
36149	McCarthy Pharmacy	Apoth. Hall Co.	0.703
36148	W. H. Pickett Drug Co.	Apoth. Hall Co.	0.716
36320	<i>Willimantic:</i> Wilson's Drug Store	.....	0.905
36404	<i>Windsor Locks:</i> Bridge Pharmacy	United Drug Co.	0.860
36403	R. J. Keefe Pharmacy	Gibson & Howell	0.983
36345	<i>Winsted:</i> City Pharmacy	.....	0.830

GLYCERIN.

Among other specifications given in the Pharmacopoeia for glycerin the specific gravity should not be below 1.249 at 25° C. and the fatty acids and esters in 50 cc should be equivalent to not less than 4 cc of half-normal hydrochloric acid.¹

¹ U. S. P. X, p. 180

The four samples examined were not labelled as U. S. P. grade but all were reasonably pure. The specific gravities ranged from 1.249 to 1.258 and the fatty acid equivalents ranged from 3.3 to 4.3 cc of half-normal hydrochloric acid.

COMPOUND SOLUTION OF IODINE.

This preparation is not the same as the tincture of iodine. The compound solution of iodine, (Lugol's Solution), should contain not less than 4.8 grams nor more than 5.2 grams of iodine and not less than 9.8 grams nor more than 10.2 grams of potassium iodide in 100 cc of the solution.¹ The tincture contains more iodine and less potassium iodide than the compound solution.

Six samples were examined. No. **36414** was tincture of iodine and so labelled (although compound solution was called for), but it contained too little iodine for either the tincture or the solution and the potassium iodide was not correct for either preparation. No. **36335** was low in iodine but a second sample from the same source was substantially correct.

The analyses are given in Table XIII.

TABLE XIII. ANALYSES OF COMPOUND SOLUTION OF IODINE.

No.	Dealer	Iodine gms/100cc	Potass. iodide, gms/100 cc
36341	Ansonia: McQuade Drug Store	4.9	10.1
36414	Derby: Purdy Drug Co. (labeled Tr. Iodine Co.)	3.3	6.7
36127	Hartford: Thomas A. Lynch	4.4	10.1
36335	Naugatuck: A. R. Adams	2.8	10.4
37020	A. R. Adams	4.7	9.7
36142	So. Norwalk: Stillson-Powell Corp.	4.4	10.0

SOLUTION OF IRON AND AMMONIUM ACETATE.

This preparation should contain not less than 0.6 gram nor more than 0.8 gram of ammonia (NH₃), and not less than 0.16 gram nor more than 0.20 gram of iron (Fe), in 100 cc.

Six samples were examined. One of these, **36128**, was not the article called for but was a different preparation viz., Liquor of Ammonium Acetate, and was so labelled. It was about 2/3 strength for the U. S. P. article of that name. The other samples were satisfactory or were passed as substantially conforming to the requirements.

The analyses are given in Table XIV.

¹ U. S. P., X, p. 217.

TABLE XIV. ANALYSES OF SOLUTION OF IRON AND AMMONIUM ACETATE, ETC.

No.	Dealer	Iron, Fe., gm/100 cc	Ammonia, (NH ₃), gm/100 cc
36340	Ansonia: Stever's North End Pharmacy	0.17	0.65
36147	Fairfield: Randall's Pharmacy	0.22	0.61
36128	Hartford: Thomas A. Lynch (Liq. Ammonia Acetate)	none	4.30
36325	Meriden: Pink's Pharmacy	0.22	0.86
36406	Thompsonville: Steel's Corner Drug Store	0.19	0.80
36301	Waterbury: Litsky's Pharmacy	0.20	0.79

HYDRIODIC ACID, DILUTE.

Four samples were submitted by the Dairy and Food Commissioner. One of these, **36434**, was the article called for and was of standard strength, i.e. not less than 9.5 per cent nor more than 10.5 per cent of hydriodic acid.¹ In the cases of **36104** and **36136** there may have been a misunderstanding as to the article demanded because the samples delivered were marked hydrochloric acid (or muriatic acid); but one was too strong for dilute hydrochloric acid and the other was about 1/2 of the standard strength prescribed for that article. In the other case, **36324**, the sample was labelled "hydriodic acid, dilute" but the preparation was hydrochloric acid. We should hope that a physician's prescription calling for hydriodic acid would be more successful in obtaining that article than was the oral request of the inspector.

The dealers from whom samples were purchased are as follows:

36104	Hartford:	S. S. Nelson.
36136		M. M. Taylor
36324	Meriden:	H. F. Pigeon
36434	New Britain:	The Packard Drug Co.

CHLORINATED LIME.

The U. S. P. standard for this product is 30 per cent of available chlorine, but the one sample examined, **36101**, Babbitt's, sold by the Gladding Drug Co., Hartford, was labelled not less than 24 per cent available chlorine. The sample was evidently old stock, at least it contained but 1.5 per cent of available chlorine and was practically worthless as a disinfectant. Chlorinated lime should be packed in air-tight containers and stored in a cool, dry place. There appears to be no commercial package which will preserve this product very successfully.

Inspections made in the past have shown many deficiencies in this product. We have found that packages kept in the laboratory lose from 1 to 3 per cent of chlorine in the period of about two months.²

¹ U. S. P. X, p. 181.

² Conn. Exp. Sta. Bull. 236, p. 292, 1921.

MERCURIC SALICYLATE.

This preparation should contain not less than 54 per cent nor more than 59.5 per cent of mercury (Hg).¹

Two samples were examined, both of which were a little in excess of the maximum limit of mercury. Each contained 60.4 per cent. No. **36130** was sold by the Metropolitan Drug Co. of Hartford and No. **36513** was sold by the Central Drug Co. of Bristol.

MASS OF MERCURY.

Mass of mercury, also known as Blue Mass or Blue Pill, should contain not less than 32 per cent nor more than 34 per cent of mercury (Hg).²

Three samples were analyzed. One of these, **36321**, contained substantially the amount of mercury required of the U. S. P. Blue Mass but it was not the official preparation. It was probably powdered Blue Mass.³

Analyses are given in Table XV.

TABLE XV. ANALYSES OF MASS OF MERCURY.

No.	Dealer	Mercury (Hg), per cent
36137	<i>Hartford:</i> Harry Wynn	34.7
36329	<i>Wallingford:</i> F. W. Marx	32.7
36321	<i>Willimantic:</i> Bay State Drug Co.	35.3

PEPSIN, POWDERED.

Pepsin is a substance containing a protein-digesting enzyme and is generally obtained from the fresh stomach of the hog. One part of powdered pepsin should digest 3,000 times its own weight of freshly coagulated and disintegrated egg albumen.⁴

In testing for proteolytic activity of pepsin we have found it more convenient to use edestin as the protein substrate instead of egg albumen, interpreting the results in terms of U. S. P. units on the basis of 1:20,000 by the edestin method = 1:30,000 by the U. S. P. method.⁵

Only five samples were examined. All were purchased in bulk. Three of the five were below standard in peptic activity. Assays are given in Table XVI.

¹ U. S. P. X, p. 191.

² U. S. P. X, p. 235.

³ See U. S. Dispensatory, 20th Ed., p. 688.

⁴ U. S. P. X, p. 280.

⁵ Conn. Exp. Station Report 1911, p. 185.

TABLE XVI. ASSAYS OF POWDERED PEPSIN.

No.	Dealer	Peptic activity, (U. S. P. basis).
36102	<i>Hartford:</i> The Gladding Drug Co.	1 : 1500
36103	S. S. Nelson	1 : 6000
36303	<i>Waterbury:</i> Waterbury Drug Co.	1 : 2000
36438	<i>Watertown:</i> Post Office Drug Store	1 : 1500
36439	D. G. Sullivan	1 : 3000

SPIRIT OF PEPPERMINT.
(Essence of Peppermint)

Essence of peppermint should contain approximately 10 per cent of peppermint oil.¹ The one sample, **36895**, submitted contained 12.2 per cent of oil. It was purchased of H. A. King, Chester.

SULPHURIC ACID, AROMATIC.

Aromatic sulphuric contains free sulphuric acid and ethyl sulphuric acid equivalent to not less than 19 per cent nor more than 21 per cent of total sulphuric acid, H₂SO₄.

Seven samples were examined, two of which were considerably below standard.

Analyses are given in Table XVII.

TABLE XVII. ANALYSES OF AROMATIC SULPHURIC ACID.

No.	Dealer	Sulphuric acid, H ₂ SO ₄ %
36417	<i>Derby:</i> Central Pharmacy	16.3
36416	Hyde's Pharmacy	18.2
36105	<i>Hartford:</i> Griswold Drug Co.	15.6
36408	<i>Shelton:</i> E. J. Borden	19.3
36140	<i>So. Norwalk:</i> Clifford Pharmacy	19.2
36145	<i>Westport:</i> Westport Drug Co.	20.0
36318	<i>Willimantic:</i> Wilson's Windham Pharmacy	19.5

THYROID.

Thyroid is the clean, dried and powdered thyroid gland obtained from domesticated animals which are used for food by man. It should contain not less than 0.17 per cent nor more than 0.23 per cent of iodine in thyroid combination and be free from inorganic iodine.²

Three samples were examined. They were purchased in bulk and the manufacturers were given as Park, Davis & Co., Armour, and Eli Lilly Co. The products contained 0.39, 0.19 and 0.20

¹ U. S. P. X, p. 355.

² U. S. P. X, p. 384.

per cent of iodine respectively. One was double strength and the original package may have been so marked. No statement to that effect was given by the retailer however.

COD LIVER OIL

E. M. BAILEY, HELEN C. CANNON AND H. J. FISHER.

Twenty samples of cod liver oil were examined with reference to a number of chemical constants. They were for the most part Norwegian oils for medicinal use. The Gorton and New Brunswick products were oils for stock feeding, the first named being an American oil. The Napco product was also of American origin. The Isdahl oil was sampled from a shipment of bulk oil, stock of the C. W. Whittlesey Co., New Haven. The New Brunswick sample was from stock of the Frank S. Platt Co., New Haven. The sample of Gorton oil was supplied by courtesy of the Gorton Cod Liver Oil Co. of Gloucester, Mass.

The constants of the oils are given in Table XVIII.

Iodine numbers and saponification values are within the range usually observed for cod liver oil. Unsaponifiable matter is well within the limit prescribed by the Pharmacopoeia (not over 1.5 per cent). The double saponification method was used for this determination.¹ The relatively high acidity noted in sample 5460 is largely, or in part, due to free carbon dioxide with which the oil is saturated.

COLOR TESTS FOR VITAMIN A.

Color reactions observed when the unsaponifiable fraction of cod liver oil is treated with various chemical reagents and the apparent correlation between such reactions and the vitamin potency of the oil, as noted by Drummond² and his co-workers, have suggested the possibility of approximately evaluating the vitamin potency of cod liver oils by a relatively simple and rapid test. Wokes and Willimott³ as a result of their study conclude that color values as determined by their application of the antimony trichloride test afford a reliable index to the vitamin A content of cod liver oil. Notwithstanding these and other studies which indicate the close association or relationship between this vitamin and the chromogenic substances in the oil, there is not enough acceptable evidence at this time to justify the evaluation of cod liver oils with respect to vitamin A on the basis of color reactions.

¹ Official and Tentative Methods of Analysis, A. O. A. C. p. 295.

² Lancet, 198, 862, 1920.
Biochem. Jour., 19, 753, 1925.

³ Analyst, 47, 314, 1922.
Analyst, 52, 515, 1927.

TABLE XVIII. ANALYSES OF COD LIVER OIL.

No.	Brand Name of Oil	Iodine No.	Saponification No.	Unsaponifiable	Free Fatty Acids (calc. as Oleic acid).
				%	%
5426	Isdahl & Co.....	167.0	182.4	0.53	0.64
5427	Isdahl & Co.....	161.9	182.8	0.48	0.75
5428	Isdahl & Co.....	175.7	182.5	0.44	0.66
5429	Isdahl & Co.....	167.9	184.3	0.43	0.79
5430	Isdahl & Co.....	171.6	182.8	0.41	0.72
5431	Isdahl & Co.....	171.2	184.0	0.42	0.65
5455	McKesson & Robbins.....	164.3	183.5	0.31	0.79
5456	Scott's Blue Seal (Scott & Bowne)	165.5	183.7	0.42	0.66
5457	Harris (The Harris Laboratories)	165.4	183.6	0.61	0.59
5458	Mead's (Mead, Johnson & Co.)..	168.7	183.4	0.62	0.54
5459	Lofoten (Park-Davis & Co.)....	160.7	184.6	0.45	0.72
5460	Squibb's (E. R. Squibb & Sons) ..	159.7	182.4	0.64	1.55 ¹
5461	Patch's flavored. (E. L. Patch) ..	161.3	182.8	0.93	0.85
5462	Peter Mueller's.....	174.2	181.8	0.53	0.51
5463	Lofoten (Eli Lilly & Co.).....	164.6	182.4	0.19	0.71
5464	Nason's (Tailby-Nason Co.).....	156.7	175.7	0.33	0.67
5465	Stone's (Eastern Drug Co.).....	168.1	182.8	0.27	0.75
6686	New Brunswick Laboratories....	171.9	182.0	0.12	0.59
6687	Gorton's (Gorton's Cod Liver Oil Co.).....	156.7	183.1	0.18	0.81
7538	Nopco (National Oil Products Co.)	158.8	181.0	0.95	0.79

¹ Free CO₂ present.

To determine the correlation, if any, between color reactions, and vitamin A potency as determined in terms of U. S. P. units, a number of these oils were examined.

Color values were first determined by an adaptation of the method as outlined by Carr and Price:¹

Antimony trichloride was washed with chloroform and dried over sulphuric acid in vacuo. Thirty grams of this washed and dried salt were dissolved so far as possible in 100 cc of chloroform, and after settling the clear solution was used for the tests. Ten grams of oil to be tested were dissolved in, and diluted to 50 cc with, chloroform. For the test 0.2 cc of the oil solution was taken in a test tube, 2 cc of antimony trichloride solution added, the mixture shaken, and the blue color which developed compared at once with the standard before the onset of the transition colors (red and brown), took place. A series of color standards representing arbitrary values of from 1 to 20 was prepared as follows:

One-tenth of a gram of crystal violet and 0.1 gram of methylene blue were each made up to 100 cc with alcohol. One cubic centimeter of the crystal violet solution plus 4 cc of the methylene blue solution were diluted to 250 cc with alcohol. Portions of this solution were taken in amounts of from 0.1 cc to 2.0 cc in intervals of 0.1 cc in a series of test tubes and the volumes in each made up to 2 cc. This series therefore represents an arbitrary color scale of from 1 to 20.

¹ Biochem. Jour. 20, 497, 1926.

All of the samples were tested by this procedure and all found to come within the limits of our scale with three exceptions, values for which were estimated by means of suitable dilutions of the original oil solutions. A summary of the color values obtained is as follows:

Color value of 5 or less	6 samples
Color value of over 5 and not over 10	9 samples
Color value of 10 and not over 15	1 sample
Color value of 15 and not over 20	1 sample
Color value of 20 and over	3 samples

It was found that color values could be checked very closely on repeated tests. It is interesting to observe that the sample of Gaduol, a so-called extract of cod liver oil, which our feeding tests¹ showed to be of very low vitamin A potency, gave a negative test with antimony trichloride.

COLOR TEST FOR VITAMIN D.

Shear's test² for vitamin D was tried on a number of samples. By this procedure it was found that cottonseed oil may give a color not readily distinguishable from that produced by cod liver oil, and the green shade mentioned by the author as characteristic of cod liver oil was not observed. Rosenheim and Webster³ have found that the Shear test is given by substances which are inactive with respect to vitamin D, and also by certain organic peroxides.

FEEDING TESTS FOR VITAMIN A.

Since it was impracticable to conduct feeding trials with all of the twenty samples upon which chemical tests had been made, a limited number were chosen on the basis of their behavior when tested by the antimony trichloride reagent. It was not expected that relatively small differences in color values would be reflected in feeding tests to any measurable extent; but it was thought that the extremes of color values, and possibly some of the intermediate values, might show conspicuous differences in this respect. Accordingly oils were selected which had been evaluated on the color scale at approximately 5, 10, 15, 20, 30 and 70. Although only seven samples were tested some fifty or more separate feeding trials were made extending over a period of several months.

¹ Conn. Exp. Sta., Bull. 276, 283, 1926.

² Proc. Soc. Exp. Biol. and Med., XXIII, 546.

³ Biochem. Jour., XX, 544.

The trials were conducted according to the procedure outlined in the Pharmacopoeia¹ for the assay of cod liver oil for vitamin A and the results are expressed in terms of U. S. P. units. The results are summarized in the following tabulation which gives also the corresponding color values of the oils tested.

Color value of oil (approximate)	Vitamin A value (U. S. P. units)
5	250
5	500
10	250
15	250
20	500
30	500
70	1000

In general, the higher color values are associated with the higher vitamin A potencies. The highest feeding value obtained was with the sample which also showed the highest color value. However, two samples, each with color values of about 5 but having vitamin A values of 250 and 500 respectively, destroy the otherwise reasonably consistent correlation between these two series of tests. It is of interest to note that the highest values for both color intensity and vitamin content were obtained in a sample of American oil intended only for stock feeding purposes.

It has been pointed out in criticism of the U. S. P. assay for cod liver oil that no provision is made for the possible influence of a lack of vitamin D in the basal ration, and that, consequently, the values of vitamin A may not be satisfactorily accurate expressions of potency for this vitamin. The present standard for vitamin A potency *viz.*, 50 units, is regarded by many investigators as too low. From the results obtained by the present method of assay this criticism appears to be justified. However, the standard should not be fixed so high as to lay undue emphasis upon vitamin content. This would tend to result in competition for high vitamin oils with increase in cost and to exclude average oils of acceptable potency. The basal test ration as now recommended would be improved by the addition of vitamin A-free fat or oil. In our experience the present ration is not eaten well by experimental animals, especially when they are in a weakened condition.

The limited series of trials recorded here do not justify general conclusions of a definite character. They lend some support to the already suggested correlation between color reactions and vitamin A potency, but it is premature to conclude that color tests, thus far devised, may be relied upon as indices of relative concentrations of vitamin A, in cod liver oil.²

¹ U. S. P., X, p. 469.

² Since this work was completed the report of the Accessory Food Factors Committee to the League of Nations Health Organization has been published. *Analyst*, 53, p. 156, March, 1928. Their results are substantially in accord with the experience here recorded.

"DENICOTINIZED" TOBACCO.

E. M. BAILEY, O. L. NOLAN AND W. T. MATHIS.

Since tobacco cannot be classed either as a food or as a drug the examination of it hardly comes within the scope of food and drug inspection. Its wide-spread use, however, makes it a matter of general interest and its effect upon the health and well being of the consumer is always a fruitful topic for controversial discussion. Those who look with disfavor upon the use of tobacco in any form will find added argument against smoking in the recent work of Neuberg and Ottenstein¹ who have demonstrated the formation of small amounts of wood alcohol during the smoking of cigars and cigarettes.

Because of inquiries, which come to us from physicians and others, regarding the merits of so-called "denicotinized" tobaccos, or tobacco products for which reduced nicotine content is claimed or inferred by label declaration, we have examined as many of these products as we could obtain. Some of these were purchased in the open market, but in most cases manufacturers or distributors have cooperated by submitting samples.

A list of the brands examined, the manufacturers or distributors of them, and the essential claims with respect to ingredient tobaccos and nicotine content, are here given.

7979. *Sano Denicotinized Cigarettes.* The Health Cigar Co., New York. Made from choicest tobaccos grown in Turkey and the United States. Scientifically processed and blended to eliminate the bulk of the nicotine. Endorsed by health institutions and physicians. All that joyous aroma but less nicotine. English blend, mildest of the mild.

7980. *Sano Cigars.* Same manufacturer as above. Contains less than 1% nicotine. Can be safely smoked by those who otherwise could not smoke. Havana filler Sumatra wrapper.

7981. *O-Nic-O Supermild Cigarettes.* Bulk of nicotine removed. Aroma and fragrance retained. Lincoln & Ulmer, Inc., 132 W. 43rd St., New York. Blend of imported and domestic tobaccos.

7982. *O-Nic-O Supermild Cigars.* Lincoln & Ulmer Inc., 132 W. 43rd St., New York. Bulk of nicotine removed. Imported Havana filler, Sumatra wrapper. Absolutely harmless.

7983. *O-Nic-O Supermild Smoking Tobacco.* Lincoln & Ulmer Inc. A superb blend of Havana, Turkish and Virginia tobaccos. Manufactured and processed by Lincoln and Ulmer Inc. Bulk of nicotine removed. Aroma and fragrance retained.

7984. *Sackett Smoking Tobacco Denicotined.* (Bulk of nicotine removed). Fragrance and flavor retained. Supermild. The Bonded Tobacco Co., 1182 Broadway, New York.

7985. *Sackett De-Nicotined Cigars.* (Bulk of nicotine removed). Fragrance of flavor retained. The Bonded Tobacco Company, 1182 Broadway, New York.

7987. *Sackett Denicotined Cigarettes No. 2.* Bulk of nicotine removed. The Bonded Tobacco Co., 1182 Broadway, New York.

"DENICOTINIZED" TOBACCO

7988. *Sackett Cigarettes De-Nicotined.* A Supermild cigarette. A combination of the finest grades of imported and domestic tobaccos with the bulk of nicotine removed.

7986. *"Dormy" Blue Riband Cigarettes.* Cestrada Cigarette Co., London. R. H. Macy & Co., Inc., New York, Sole Distributors. Finest Turkish. Specially treated for reduction of nicotine.

7990. *"Dormy" Red Riband.* Finest Turkish cigarettes. Specially treated for the reduction of nicotine. Cestrada Cigarette Co., London. R. H. Macy & Co., Distributors.

7991. *Cestrada Virginia de Luxe.* Finest Virginia Cigarettes. Specially treated for reduction of nicotine. Cestrada Cigarette Co., London. R. H. Macy Co., Distributors.

7989. *The Dormy Smoking Mixture.* Cestrada Cigar and Cigarette Co., 23 Pall Mall, London, S. W. I. R. H. Macy & Co., Inc., Sole Distributors.

Bottom of can: *Denicotinised Tobacco.* Specially treated for the reduction of nicotine and other harmful properties.

The usual method by which denicotinized tobaccos are prepared is essentially a resweating process accomplished by treatment with superheated steam or by heating in vacuum chambers. Dixon¹ cites the use of solvents for removing nicotine and other objectionable constituents. It is conceivable also that diluents consisting of non-nicotine-containing leaves foreign to tobacco might be used, but no attempt was made in this investigation to detect the presence of such foreign material.

The terms "processed" and "unprocessed", frequently used in this discussion, refer to the special resweating treatment employed to reduce nicotine content. It is understood of course, that all tobacco undergoes various processes in the course of its preparation for commercial purposes.

It will be noticed that none of these brands are claimed to be nicotine-free. However, such terms as "denicotinized" and "denicotined" will generally be construed to mean "practically free from nicotine", particularly if the further assurance is given, or implied, that the consumer may smoke as much as he likes of these processed tobaccos. To such declarations as "bulk of nicotine removed" or "reduced nicotine content" less objection can be raised; from the first statement we should expect that over one-half of the original nicotine had been removed while any reduction at all in nicotine would suffice to make the second declaration one of fact. The obvious difficulty in judging whether or not these statements are true lies in the lack of information as to the amount of nicotine in the various tobaccos before they were processed. No average figure for the nicotine content of tobacco in general can be given because wide differences occur due to varieties of leaf and varied conditions of culture and growth. There may be substantial differences also among the leaves of the same plant, dark (upper) leaves showing higher nicotine content than leaves lower down on the stalk (lights and seconds).

¹ Biochem. Zeitschr., 188, 217. 1927.

¹ British Medical Journal, No. 3485, Oct. 1927.

But the consumer is not greatly concerned with the question of whether or not labels are technically correct or exactly descriptive. His interest is to know how these processed tobaccos compare in nicotine content with ordinary tobaccos for which no claims of reduced nicotine are made. There is a considerable amount of data already available which shows the range of nicotine in cured tobacco leaves and in ordinary smoking tobacco, cigars and cigarettes. Some of this is here summarized. The data cited are given on the basis of the moisture-free material.

Twenty-seven samples¹ of tobacco grown in Virginia and North Carolina ranged from 1.68 to 6.17 per cent of nicotine. There were only two showing less than 2 per cent and only five showing more than 5 per cent. The average of all was 3.7 per cent.

Twenty-nine samples² of domestic tobacco grown in various parts of the United States ranged from 1.45 to 5.53 per cent and averaged 3.38 per cent. These figures are on the basis of leaves with midrib intact. The average nicotine in the midrib-free leaf, according to the above analyses, was 4.10 per cent. Midribs are removed for the manufacture of chewing tobacco but they may or may not be removed from tobacco prepared for smoking purposes.

Fourteen samples³ of Havana Seed tobacco ranged from 2.38 to 2.74 per cent and the average of all was 2.59 per cent. These figures are for the entire leaf; without midribs the nicotine content would be somewhat higher.

Howard⁴ has analyzed twelve samples of pipe tobacco, cigars and cigarettes, including well-known brands, and found from 1.44 to 3.31 per cent of nicotine. The average being 2.31 per cent. He also examined a number of brands of chewing tobacco, finding from 1.07 per cent to 2.88 per cent.

Thurston⁵ gives data upon chewing tobacco, cigars and cigarettes. Four brands of chewing tobacco ranged from 0.98 to 1.50 per cent and averaged 1.14 per cent of nicotine. These figures are on the basis of the material as purchased. Accepting 12 per cent of moisture (as shown by Howard's analyses), as an average water content the average nicotine in the dry material is about 1.30 per cent. Five brands of cigars ranged from 1.26 to 1.73 per cent, averaging 1.52 per cent. Assuming 8 per cent of moisture this average becomes 1.65 per cent in the dry substance. Twenty-five brands of cigarettes contained nicotine in amounts ranging from 0.43 to 3.34 per cent. These figures converted to the moisture-free basis, assuming 8 per cent of water in the samples as purchased, become 0.47 to 3.63 per cent, the average being 1.84 per cent.

¹ Virginia Agr. Exp. Station, Bull. 52, 1895.

² No. Carolina Exp. Station, Bull. 122, 1895.

³ Conn. Exp. Station, Tobacco Station Bull. 10, 1928.

⁴ New Hampshire State Board of Health, Quarterly Bull., Jan. 1916.

⁵ Agr. Commission, Ohio, Bureau of Drugs, Bull. 2, Nov. 1914.

Because they furnish data upon some well-known brands of ordinary tobaccos, the analyses of cigarettes as given by Thurston and those of cigars, cigarettes and pipe tobacco as given by Howard, are quoted in Table I.

TABLE I. ANALYSES OF ORDINARY TOBACCOS.

Brand	As purchased	Nicotine	Moisture-free %
	%		
(Cigarettes, analyses by Thurston)			
Nebo.....	2.03	...	...
Nebo.....	1.93	...	...
Fatima.....	2.79	...	...
Hassan.....	1.94	...	...
Sweet Caporal.....	2.05	...	...
Helmar.....	1.56	...	...
Mogul.....	1.45	...	...
Egyptian.....	1.59	...	...
Omar.....	1.98	...	...
Murad.....	1.52	...	...
Royal Nestor.....	1.47	...	...
Turkish Trophies.....	1.44	...	...
Home Run.....	1.89	...	...
Home Run.....	1.67	...	...
Home Run.....	1.78	...	...
Piedmont.....	3.34	...	...
Zubelda.....	1.97	...	...
La Luchana.....	0.43	...	...
Tareyton.....	1.75	...	...
Egyptian Luxury.....	1.60	...	...
Fifty-six.....	1.43	...	...
Rameses II.....	1.73	...	...
Schinasi.....	1.51	...	...
Condax.....	1.06	...	...
Egyptienne Straights.....	1.45	...	...
Egyptian Arabs.....	1.35	...	...
Makaroff.....	1.21	...	...
Phillip Morris.....	1.48	...	...
Maximum.....	3.34	3.63	
Minimum.....	0.43	0.47	
Average.....	1.69	1.84	

TABLE I. ANALYSES OF ORDINARY TOBACCOS (Concluded).

Brand	As purchased %	Nicotine %	Moisture-free %
(Cigars, cigarettes and pipe tobacco, analyses by Howard)			
Black Bass, chewing and smoking . . .	2.46		2.83
B L Light Plug, pipe tobacco	2.62		2.95
Lucky Strike Plug, pipe tobacco	1.76		1.93
Main Brace Cut Plug, pipe tobacco . . .	1.29		1.44
Old English Curve Cut	1.94		2.10
Prince Albert	1.82		1.99
Tuxedo	2.22		2.36
Seven-Twenty-Four, cigars	1.64		1.83
Sweet Caporal Cigarettes	2.85		3.00
Richmond Straight-Cut No. 1, cig- arettes	2.79		3.31
Mogul, Egyptian cigarettes	1.52		1.64
Mecca, cigarettes	2.17		2.33
Maximum	2.85		3.31
Minimum	1.29		1.44
Average	2.09		2.31

In addition to these data recent analyses made in this laboratory are given in Table II. No attempt was made to analyze a large number of brands but rather to include representative types of leaf and the list therefore includes Virginia, Kentucky Burley, Havana, Manilla, Porto Rican, Turkish and various blends. In addition to determinations of total nicotine, the so-called "free" nicotine has been determined as well as certain other items of interest.

TABLE II. ANALYSES OF SOME ORDINARY TOBACCOS.
(Air Dry Basis)

No.	Brand	Water %	Total Nitrogen %	Nitric Nitrogen %	"Ammon- iacal" Nitrogen %	Organic Nitrogen %	Nicotine %	"Free" Nicotine %	pH value ¹
8731	Capstan Navy Cut cigarettes	7.68	1.81	0.02	0.20	1.59	2.30	0.26	5.1
8732	Piedmont cigarettes	8.90	2.02	0.05	0.24	1.73	2.89	0.37	5.4
8733	Chesterfield cigarettes	8.60	2.30	0.08	0.24	1.98	2.53	0.45	5.4
8734	Camel cigarettes	8.80	2.46	0.13	0.23	2.10	2.21	0.42	5.5
8735	Old Gold cigarettes	9.60	2.31	0.09	0.25	1.97	2.17	0.43	5.5
8736	Phillip Morris cigarettes	6.25	2.56	0.03	0.22	2.31	1.40	0.17	5.2
8737	Egyptian Deities cigarettes	5.75	2.41	0.00	0.20	2.21	1.28	0.15	5.2
8738	Pall Mall cigarettes	6.17	2.53	0.00	0.23	2.30	1.38	0.14	5.2
8176	Toro, Porto Rican cigarettes	6.96	3.77	0.20	0.50	3.07	1.06	0.37	...
8177	Toro, Porto Rican cigarettes	6.92	3.57	0.23	0.43	2.91	1.08	0.45	...
8178	Lucky Strike cigarettes	8.58	3.34	0.17	0.24	1.93	1.88	0.41	...
8739	Knickerbocker cigars	8.23	3.96	0.00	0.69	3.27	1.90	0.60	6.8
8740	Reyes de Espana cigars	8.55	3.71	0.12	0.27	3.32	1.16	0.79	7.5
8741	Manilla cigars	7.90	3.72	0.00	0.34	3.38	1.31	0.72	7.5
8742	Blue Boar pipe tobacco	11.75	2.39	0.00	0.18	2.21	1.45	0.33	5.9
8743	Weldon Slice (Kentucky Burley leaf)	9.85	2.18	0.16	0.26	1.76	1.84	0.50	5.8
8744	Hudson's Bay Imperial Mixture	12.85	1.59	0.00	0.22	1.37	1.95	0.13	5.1
8745	Gilbert's Mixture	8.83	2.27	0.10	0.24	1.93	2.09	0.45	5.6
	Maximum	12.85	3.96	0.23	0.69	3.38	2.89	0.79	7.5
	Minimum	5.75	1.59	0.00	0.18	1.37	1.06	0.13	5.1
	Average	8.45	2.66	0.08	0.29	2.30	1.77	0.40	5.8

¹ pH value determined on infusion made by mixing 2.5 gm. ground sample with 50 cc distilled water.

TABLE IIA. ANALYSES OF SOME ORDINARY TOBACCOS.
(Water-free Basis)

No.	Brand	Total Nitrogen	Nitric Nitrogen	"Ammoniacal" Nitrogen	Organic Nitrogen	Nicotine	"Free" Nicotine
		%	%	%	%	%	%
8731	Capstan Navy Cut cigarettes	1.96	0.02	0.22	1.72	2.49	0.28
8732	Piedmont cigarettes	2.22	0.06	0.26	1.90	3.17	0.41
8733	Chesterfield cigarettes	2.52	0.09	0.26	2.17	2.77	0.49
8734	Camel cigarettes	2.70	0.14	0.25	2.31	2.42	0.46
8735	Old Gold cigarettes	2.56	0.10	0.28	2.18	2.40	0.48
8736	Phillip Morris cigarettes	2.73	0.03	0.23	2.47	1.49	0.18
8737	Egyptian Deities cigarettes	2.56	0.00	0.21	2.35	1.36	0.16
8738	Pall Mall cigarettes	2.70	0.00	0.25	2.45	1.47	0.15
8176	Toro, Porto Rican cigarettes	4.05	0.21	0.54	3.30	1.14	0.40
8177	Toro, Porto Rican cigarettes	3.84	0.25	0.46	3.13	1.16	0.48
8739	Lucky Strike cigarettes	2.56	0.19	0.26	2.11	2.06	0.45
8740	Knickerbocker cigars	4.32	0.00	0.75	3.57	2.07	0.65
8740	Reyes de Espana cigars	4.06	0.13	0.30	3.63	1.27	0.86
8741	Manilla cigars	4.04	0.00	0.37	3.67	1.42	0.78
8742	Blue Boar pipe tobacco	2.71	0.00	0.20	2.51	1.64	0.37
8743	Weldon Slice (Kentucky Burley leaf)	2.42	0.18	0.29	1.95	2.04	0.55
8744	Hudson's Bay Imperial Mixture	1.82	0.00	0.25	1.57	2.24	0.15
8745	Gilbert's Mixture	2.49	0.11	0.26	2.12	2.29	0.49
	Maximum	4.32	0.25	0.75	3.67	3.17	0.86
	Minimum	1.82	0.00	0.20	1.57	1.14	0.15
	Average	2.90	0.08	0.31	2.51	1.94	0.43

TABLE III. ANALYSES OF SO-CALLED "DENICOTINIZED" TOBACCOS.
(Air Dry Basis)

No.	Brand	Water	Total Nitrogen	Nitric Nitrogen	"Ammoniacal" Nitrogen	Organic Nitrogen	Nicotine	"Free" Nicotine
		%	%	%	%	%	%	%
7970	Sano cigarettes	8.03	2.57	0.07	0.28	2.22	2.51 ¹	0.40
8048	Sano cigarettes	11.25	...	...	...	...	2.13 ¹	...
7980	Sano cigars	9.50	3.25	0.20	0.68	2.37	1.27	0.44
9570	Sano cigars	11.59	...	...	...	...	0.87	...
7081	O-Nic-O cigarettes	6.54	3.00	0.11	0.25	2.64	1.14	0.20
8892	O-Nic-O cigarettes	6.98	...	...	...	...	0.73	...
8893	O-Nic-O cigarettes	7.65	...	...	...	...	0.95	...
7982	O-Nic-O cigars	9.14	3.46	0.25	0.41	2.80	0.72	0.21
7983	O-Nic-O smoking tobacco	11.71	2.64	0.10	0.22	2.32	0.97	0.21
7984	Sackett smoking tobacco	10.85	2.60	0.10	0.24	2.26	0.98	0.18
7985	Sackett cigars	9.06	3.37	0.16	0.34	2.87	0.67	0.18
7987	Sackett cigarettes No. 2	9.41	2.73	0.07	0.25	2.41	1.07 ²	0.20
7988	Sackett cigarettes	7.18	2.60	0.01	0.20	2.39	1.07	0.13
7986	Dormy Blue R. Turkish cigarettes (Cestrada)	6.80	2.62	0.04	0.21	2.37	1.19	0.15
7990	Dormy Red R. Turkish cigarettes (Cestrada)	6.87	2.64	0.03	0.21	2.40	1.19	0.19
7991	Cestrada Virginia cigarettes	6.67	1.68	0.04	0.14	1.50	2.10	0.33
7989	Dormy smoking tobacco (Cestrada)	10.26	2.50	0.07	0.23	2.20	2.26	0.28
	Maximum	11.71	3.46	0.25	0.68	2.80	2.51	0.44
	Minimum	6.54	1.68	0.01	0.14	1.50	0.67	0.13
	Average	8.79	2.74	0.10	0.28	2.37	1.28	0.24

¹ The manufacturer advises that a new denicotinizing process is about to be put into operation. Samples of the new product could not be secured in time to include analyses in this report.

² Duplicate sample analyzed later contained 0.97 per cent nicotine.

TABLE IIIA. ANALYSES OF SO-CALLED "DENICOTINIZED" TOBACCOS.
(Water-free Basis)

No.	Brand	Total Nitrogen %	Nitric Nitrogen %	"Ammoniacal" Nitrogen %	Organic Nitrogen %	Nicotine %	"Free" Nicotine %
7070	Sano cigarettes	2.79	0.08	0.30	2.41	2.73 ¹	0.43
8948	Sano cigarettes	..	..	..	..	2.40 ¹	..
7980	Sano cigars	3.59	0.22	0.75	2.62	1.40	0.48
9570	Sano cigars	..	..	..	..	0.98	..
7981	O-Nic-O cigarettes	3.21	0.12	0.27	2.82	1.22	0.21
8892	O-Nic-O cigarettes	..	..	..	..	0.78	..
8893	O-Nic-O cigarettes	..	..	..	..	1.03	..
7982	O-Nic-O cigars	3.81	0.28	0.45	3.08	0.79	0.23
7983	O-Nic-O smoking tobacco	2.99	0.11	0.25	2.63	1.10	0.24
7984	Sackett smoking tobacco	2.92	0.11	0.27	2.54	1.10	0.20
7985	Sackett cigars	3.71	0.18	0.37	3.16	0.74	0.20
7987	Sackett cigarettes	3.01	0.08	0.28	2.66	1.18	0.22
7988	Sackett cigarettes	2.80	0.01	0.22	2.57	1.15	0.14
7986	Dormy Blue Riband Turkish cigarettes (Cestrada)	2.81	0.04	0.23	2.54	1.28	0.16
7990	Dormy Red Riband Turkish cigarettes (Cestrada)	2.83	0.03	0.23	2.58	1.28	0.20
7991	Cestrada Virginia cigarettes	1.80	0.04	0.15	1.61	2.25	0.35
7989	Dormy smoking tobacco (Cestrada)	2.79	0.08	0.26	2.45	2.52	0.31
	Maximum	3.81	0.28	0.75	3.16	2.73	0.48
	Minimum	1.80	0.01	0.15	1.61	0.74	0.14
	Average	3.00	0.11	0.31	2.59	1.41	0.26

¹ See note Table III.

Analyses of "denicotinized" tobaccos are given in Table III. By combining the data upon ordinary tobacco as given in Tables I and IIA, also that upon "denicotinized" products as given in Table IIIA, giving due weight to the number of samples analyzed by the several investigators in the case of the unprocessed products, we have the following comparative summary:

	Nicotine in Ordinary Tobaccos, moisture-free. (58 analyses) %	Nicotine in "Denicotinized" Tobaccos, moisture-free. (17 analyses) %
Maximum	3.63	2.73
Minimum	0.47	0.74
Average	1.96	1.41

From this summary it is clear that, on the basis of averages, these "denicotinized" products, as a group, contain about 30 per cent less nicotine than is likely to be found in ordinary unprocessed tobaccos. If we may assume 2 per cent as a fair approximation of the average nicotine content (dry basis), which may be expected in the various forms of ordinary smoking tobaccos, a reference to Table IIIA shows that four "denicotinized" samples contain more than this average and that four contain less than one-half as much. For the remainder it seems fair to conclude that approximately 1/3 to 1/2 of the original nicotine has been removed.

It is of interest to compare these processed tobaccos so far as possible with ordinary tobaccos of corresponding types on the basis of nicotine content, assuming as fairly representative nicotine values 2.5 to 3.5 per cent for Virginia tobacco, 2.0 to 3.0 per cent for various other domestic leaf, 1.1 to 2.4 per cent for Havana, and 1.0 to 1.5 for Turkish.

7979. *Cigarettes*. Claimed Turkish and Domestic. Nicotine found 2.6 per cent.¹ Compare Turkish 1.0 to 1.5, and domestic 2.0 to 3.0 per cent.

7980. *Cigars*. Claimed Havana filler and Sumatra wrapper. Nicotine found 1.2 per cent.¹ Compare Havana 1.1 to 2.4 per cent.

7981. *Cigarettes*. Claimed imported and domestic. Nicotine found 1.0 per cent.² Compare Turkish 1. to 1.5, Havana 1.1 to 2.4, domestic 2.0 to 3.0.

7982. *Cigars*. Claimed Havana filler, Sumatra wrapper. Nicotine found 0.8 per cent. Compare Havana 1.1 to 2.4 per cent.

7983. *Pipe Tobacco*. Claimed Havana, Turkish and Virginia. Nicotine found 1.1 per cent. Compare Havana 1.1 to 2.4, Turkish 1.0 to 1.5, and Virginia 2.5 to 3.5 per cent.

7984, 7985, 7987. Ingredient tobaccos not stated. Nicotine found 1.1, 0.7, and 1.2 respectively.

7988. *Cigarettes*. Claimed imported and domestic. Nicotine found 1.2 per cent. Compare Havana 1.1 to 2.4, Turkish 1.0 to 1.5, and domestic 2.0 to 3.0 per cent.

7986, 7990. *Cigarettes*. Claimed Turkish. Nicotine found 1.3 per cent in each brand. Compare Turkish 1.1 to 1.5 per cent.

7991. *Cigarettes*. Claimed Virginia. Nicotine found 2.3 per cent. Compare Virginia 2.5 to 3.5 per cent.

7989. *Pipe tobacco*. Ingredient tobaccos not stated. Nicotine found 2.5 per cent.

¹ Average of two samples.
² Average of three samples.

Another comparison may be made on the basis of the classes of products examined. The unprocessed cigarettes, as shown by analyses in Table IIA, have a range of nicotine content from 1.1 to 3.2 per cent whereas "denicotinized" cigarettes range from 1.2 to 2.7 per cent. Pipe tobacco, unprocessed, ranges from 1.6 to 2.3 per cent as compared with 1.1 to 2.5 per cent for the denicotinized article. The data on cigars is rather limited but the range is 1.3 to 2.1 for ordinary cigars and 0.7 to 1.4 for processed cigars.¹

From these data it is quite obvious that, in general, the denicotinized products here represented contain but little less nicotine than do ordinary tobaccos of corresponding leaf types. Notwithstanding considerable reductions which may be indicated in certain instances, it is not difficult to find among ordinary tobaccos brands in which nicotine is not greatly in excess of that present in the most thoroughly processed of these denicotinized products.

While it is not the purpose of this study to discuss the merits or demerits of "denicotinized" tobacco it may be noted in passing that these processed products are quite likely to be used in such a way as to defeat the purpose for which they are intended. Granting the deleterious effects of nicotine, this substance is not the only constituent of tobacco reputed to be injurious to health, but it is, on the other hand, generally regarded as an important, if not the chief, factor contributing to the satisfying effects which are derived from smoking. It seems reasonable to anticipate then that the consumer having recourse to denicotinized tobacco as a means of reducing his customary nicotine ration will consume more of such tobacco, partly because he believes it to be largely or entirely freed from its objectionable nicotine and partly also, if the tobacco is greatly reduced in nicotine, in an unconscious effort to secure the satisfying effects which he is accustomed to derive. Consequently, by reason of his increased indulgence, his actual nicotine intake may equal or exceed his usual consumption.

FREE NICOTINE.

Another feature of this work upon tobacco is of quite as much interest as the comparisons of total nicotine content. Garner² has observed that nicotine in the tobacco leaf is, or may be, of two types, the one combined with the organic acids of the leaf and the other free, or very loosely combined. This "free" nicotine he found to be readily volatile and, moreover, easily extractable with solvents, notably petroleum ether. He further showed that if the tobacco were first treated with an organic acid, citric acid for example, this nicotine became fixed and yielded very little to petroleum ether thereafter.

¹ Howard, Loc. cit., reports 1.54 per cent nicotine in *Girard* cigars, (denicotinized), Manfr. Roig & Langsdorf, Phila.
² U. S. Dept. Agr., Bur. Plant Ind., Bull. 141. 1909.

With these observations in mind it seemed quite probable that the denicotinizing processes would serve to remove only that portion of the nicotine which was free or in a loosely combined state, and that, consequently, denicotinized tobaccos would show very little, if any, free nicotine. The following summary taken from Tables IIA and IIIA however shows that such is not the case. There is no very significant difference between the ordinary tobaccos and the denicotinized products as regards their free nicotine content.

	Free Nicotine	
	Ordinary tobaccos	Denicotinized tobaccos
	%	%
Maximum.....	0.86	0.48
Minimum.....	0.15	0.14
Average.....	0.43	0.26

In some preliminary experiments it was found, in confirmation of Garner's experience, that free nicotine can be substantially reduced by treating tobacco with citric acid. Free nicotine as that term is used here is that which is liberated from tobacco by distillation with steam without previous treatment with alkali, nicotine being determined in the distillate by precipitation with silicotungstic acid as in the determination of total nicotine. The treatment with citric acid did not serve to hold all of the nicotine in combination; from 0.14 to 0.26 per cent of free nicotine was found after such treatment. Oxalic acid was found to be somewhat more effective, but again some free nicotine was found, 0.09 to 0.14 per cent. On treatment with sulphuric acid, however, no free nicotine could be recovered. This experience suggested that the nicotine salts of the organic acids in the leaf are dissociated to a greater or less extent depending upon the acid strength of the leaf fluids. It was found that the pH value of the sulphuric acid which held nicotine completely in combination was 3.7 whereas the oxalic acid used in the experiment cited had a pH value of 4.7 which degree of acidity was insufficient to hold all of the nicotine in combination. A survey of the results for free nicotine and for the corresponding pH values as given in Table II, shows in general, and with as much consistency as may reasonably be expected under the conditions of the experiment, that with decreasing hydrogen ion concentrations increasingly greater amounts of free nicotine are obtained. As might be expected the highest percentages of free nicotine are observed in those instances where the pH values approach 7.0. With this explanation of the occurrence of free nicotine there appears to be no reason to expect any conspicuous difference in this respect be-

tween ordinary and denicotinized tobaccos. Whatever free nicotine may be removed in the treatment is replaced by further dissociation of the remaining nicotine salts.

The harsh, irritating effects experienced in smoking certain tobaccos are attributed largely, or in part, to the presence of free nicotine. The data here presented indicate no conspicuous advantage of denicotinized products over ordinary tobaccos in this respect.

NITROGEN DISTRIBUTION.

It is interesting to note that the denicotinizing process has effected no change in the nitrogen distribution in the tobaccos so far as are indicated by the several nitrogen partitions determined. The summaries for the two classes of products are practically identical. Nitrate nitrogen is low and quite in contrast with the amounts which are found in tobacco grown with liberal applications of nitrogenous fertilizers.¹ Ammoniacal nitrogen is also lower than is found in leaf grown under the conditions just noted. The values given for this nitrogen fraction are enhanced somewhat by nicotine which distills over under the conditions of the method used and is evaluated as ammonia. The low nitrate nitrogen content of both classes of tobaccos does not support the opinion sometimes expressed that smoking tobaccos are "nitrated" to enhance burning capacity.

CONCLUSIONS.

Seventeen samples of "denicotinized" tobaccos have been compared with ordinary tobaccos with reference to total nicotine, free nicotine and nitrogen distribution.

The "denicotinized" products vary considerably in nicotine content as do ordinary tobaccos. As a group, they were found to contain somewhat less nicotine than tobacco not specially processed, the comparison being based upon averages for each of the two classes.

Some denicotinized products contained as much nicotine as is likely to be found in ordinary tobaccos; a few contained substantially less.

The lowest nicotine content found in any sample was about 0.75 per cent. The lowest value for ordinary tobacco, quoted from analyses made elsewhere, is about 0.50 per cent but this is probably unusual; however, certain types of tobacco, Havana, Porto Rican and Turkish for example, may contain normally as little as 1 per cent of nicotine.

¹ Conn. Exp. Sta., Tobacco Station Bull. 10, 1928.

None of the "denicotinized" tobaccos included in this investigation are sufficiently low in nicotine to warrant unrestricted indulgence on the part of consumers who suffer ill effects from this alkaloid.

It may be found to be commercially possible to make the removal of alkaloid from tobacco practically complete as has been done in the case of coffee for example; but whether the finished product will retain any of the qualities for which tobacco is prized for smoking purposes is an obvious question.

No attempt has been made in this study to determine whether reduction in nicotine has been accomplished entirely, or in part, by the use of fillers.

Free nicotine appears to be due to the dissociation of the nicotine salts of the organic acids in the tobacco leaf. The harsh and irritating effects experienced when smoking certain tobaccos are attributed to this form of nicotine. Denicotinized tobaccos do not differ in any conspicuous degree from ordinary tobaccos in this respect.

Nitrogen in the form of nitrates and of "ammonia" are practically identical in both classes of tobaccos. The amount of nitrate found does not indicate that tobaccos are nitrated to improve burning capacity.

MISCELLANEOUS MATERIALS EXAMINED FOR POISONS, ETC.

The following materials, fifty-five in number, have been submitted by the Dairy and Food Commissioner, by health officials, police departments, physicians or others interested, to be examined for poisons or deleterious substances or for other purposes.

6181. *Antifreeze Solution* said to be "Hygenite". Sample had an odor of iodoform. It was a solution of calcium chloride colored with a chromium compound.

7580, 7581. *Beer*. Submitted by Police Department, Westville. No evidence of narcotic drugs was found.

7658, 7659. *Beets, Canned*, discolored. No poisons identified but the odor raised doubt as to their fitness for food and the owner was advised not to eat them.

7486. *Boned Chicken, Canned*. Presence of other meat, particularly veal, suspected. Product appeared to be as labelled but no opinion as to presence of other meats could be given.

7677. *Cherry Jelly*. Tests for cyanides and for arsenic negative.

7570. *Chicken carcass*. Owner had lost many chicks and suspected poison. No poison was found. Epidemic disease probably responsible for losses.

7522. Similar complaint as in case of 7570. No evidence of poison found.

37113. *Dr. Fugate's Asthma and Hay Fever Remedy*. Submitted by the Dairy and Food Commissioner.

Analysis (grams per 100 cc.) Solids 4.87; ash 4.48; iodine 3.17; potassium oxide 1.31; arsenic, as trioxide, 0.04; ether present, not determined. Alcohol 19 per cent by volume. Potassium iodide calculated from iodine 4.2, calculated from potassium oxide 4.6 gms per 100 cc. Contained traces of chlorides and carbohydrate. Alkaloids none or trace.

36764. *Ex Lax.* No evidence of any medicament other than phenolphthalein. This was evidently mixed with a chocolate base.

8086. *Fibers from rug.* Fibers were charred and were strongly acid. Sulphates present. Warp fiber not found but wool fibers were intact. Damage evidently caused by sulphuric acid.

7785. *Food, etc.* Submitted by Police Department of Bridgeport. Numerous articles of food suspected of having caused illness. Nothing suspicious was found on examination.

7467. *Food, 7468 and 7469, Stomach contents and organs of two dogs.* Submitted by the Commissioner on Domestic Animals. Strychnine was found in the food and in the organs of the dogs. Identified by chemical and by biological tests.

34796, 34797. *Ginger Ale.* Submitted by the Dairy and Food Commissioner. The samples had no suspicious odor or taste and no evidence of deleterious substances was found.

7939, 7940. *Medicine,* said to have caused unfavorable symptoms and a mistake in compounding the prescription was suspected. Prescription called for Nux Vomica, Gentian and Neurophosphates. Samples as submitted were of different intensity of color which was ground for suspicion on the part of the patient. The greenish color of the solution was due to the neurophosphate constituent and not to the Nux Vomica. Strychnine was present in both samples, the total alkaloid content was substantially the same in both, and there was no conclusive evidence that the dose of alkaloid was in marked excess of that called for by the prescription or that recognized in the U. S. P. as an average dose.

7607. *Milk.* Suspected of having been tampered with, contained 1.03 per cent of alcohol.

37431. *Olive Oil.* Thought to have caused illness. Sample was free from adulterants and no evidence of deleterious ingredients was found.

7778. *Oysters.* Gas was being given off in the sample as received. No putrid odor but a "sour" odor was noted. Their fitness for food was questioned.

7245. *Ointment.* Formula called for salicylic acid, sulphur and petrolatum. No excess of sulphur was found.

37011, 37012. *Oil of Sweet Almond.* Samples conform satisfactorily with standard prescribed for this material and no evidence of foreign substances was found.

36801. *Oil of Wintergreen.* Sold for wintergreen extract. Submitted by Dairy and Food Commissioner. Practically pure methyl salicylate (or oil of wintergreen), by U. S. P. assay. Poisoning from oil of wintergreen is not frequent but it does occur and as a medicine it should be taken only on advice of a physician. The extract used for flavoring purposes contains only 3 per cent of the oil.

37036. *Prescription.* The medicine had a pronounced odor of ammonia and the patient suspected an error in the prescription or in compounding. The prescription called for eight items of medicament, among them magnesium oxide and a proprietary remedy "Neurosine". Examination of the Neurosine used showed the presence of an ammonium compound and of bromides. It contained no free ammonia but 1.1 gms. per 100 cc were liberated on boiling with magnesium oxide. The prescription itself yielded 0.43 gm. per 100 cc on boiling without addition of magnesium oxide. The free ammonia in the

medicine was due to the action between two of the ingredients called for in the prescription viz., magnesium oxide and the ammonium compound contained in Neurosine. The dosage of ammonia when taking the medicine according to the directions given was about 1/25 of a gram or less than 1/2 that contained in the average dose of 10 per cent ammonia water according to the U. S. P., X and about the same as that of the recognized dose of aromatic spirits of ammonia. The quantity of ammonia liberated in this instance cannot be regarded as dangerous but the practice of prescribing "patent" medicines together with other medicaments, particularly when compounded together, is not therapeutically sensible and is open to serious criticism.

8083. *Pyramidon Tablets.* Five grain tablets. Submitted by Dr. Silverberg, New Haven. Patient had shown symptoms not noted upon former administrations of the same medicament. The tablets weighed 5.56 grains each and the percentage of pyramidon found was 85.53 making a dosage of 4.76 grains which was not in excess of the declared dose.

7743. *Rubbing Solution,* said to be used for hernia and for strengthening muscles, etc. Sold by an itinerant vendor whose present whereabouts was unknown to the purchaser. Solution was a dilute alcoholic fluid containing methyl salicylate with probably a little eucalyptol, menthol and thymol.

8029. *Salve.* Supposed to contain nutgalls and opium. Tannic acid was present in quantity, and hence probably nutgalls; but no evidence of opium was found.

31609. *Sausage.* Submitted by the Dairy and Food Commissioner. (Bacteriological examination made by State Board of Health). No evidence of metallic poisons found.

8064. *Shampoo Soap.* Thought to have caused falling hair. A palm oil or coconut oil soap solution containing a little alcohol but no free alkali. No appreciable extraneous material found.

7780. *Stomach contents and organs of a dog.* Submitted by Dr. DeVita, New Haven. No evidence of alkaloids or of metallic poisons was found.

7714. *Stomach contents of dog.* Submitted by Commissioner on Domestic Animals. No evidence of poisons found.

7069. *Stomach contents of dog.* Found to contain about 1/2 grain of barium soluble in dilute acid and about 1/4 grain of insoluble barium. Soluble barium is a poison but it is sometimes administered by veterinaries as a purgative.

8084. *Stomach contents etc. of dog.* No alkaloidal or metallic poisons found.

7377, 7378, 7379 and 7380. *Stomach contents of cows.* Submitted by Commissioner on Domestic Animals. Suspected arsenic poisoning. No arsenic was found.

6519. *Stomach contents of cow.* No evidence of poison found.

6685. *Vanishing Cream.* Examined for potassium (0.34%), and sodium (0.09%).

6178. *Vegetable powder* for identification. Found to contain large amount of ground caraway seed and some ginger. Could not identify as corresponding to any complete U. S. P. or N. F. formula.

6833. *Viscera of chicks.* No poisons were detected.

34423. *Weatherup's Germ Destroyer, Nos. 1 and 2.* The medicament in both these articles is absorbed upon cotton in small vials. No. 1 is to be inhaled through the nose, and No. 2 through the mouth. The "germ destroyer" is, or resembles, a mixture of mustard oil and kerosene. The odor is extremely pungent and irritating, particularly No. 1, and both should be inhaled with caution.

6303. *White Blotting Paper.* Used for germination tests. No mineral impurities found excepting traces of chloride and sulphate.

6384, 6385, 6386, 6387. *Wine, cider and beer,* and a piece of hose used as a siphon to remove beverages from kegs. Submitted by the State Board of Health in connection with a case of lead poisoning. Less than 1 part of lead per million was found in the wine and in the cider. None was found in the beer. The hose contained about 1.9 per cent. of lead.

7762, 7763, 7764. *Wine, Mineral water and a bottle containing residue of white powder.* No evidence of poisons found. The white powder was magnesium carbonate.

WATER ANALYSES FOR STATE WATER COMMISSION.

Seventeen samples of water have been submitted by Mr. Copeland, engineer to the State Water Commission, for chemical examination. Reports have been made to the Commission in all cases and no discussion is called for in this report. Methods of the American Public Health Association are employed in this work wherever such are applicable.

DAIRY GLASSWARE.

The station is required to check the calibration of all pipettes, milk test bottles and cream test bottles used in the State for the testing of milk and cream by the Babcock method. Since July 1, 1927 the station has also been required to test thermometers which are to be used in pasteurizing plants for checking recording thermometers.

The following table summarizes work of this sort which has been done during the past year.

	GLASSWARE EXAMINED.			
	Total	Broken	Accurate	Inaccurate
Cream test bottles	369	2	341	26
Milk test bottles	2055	1	2017	37
Pipettes	442	17	424	1
Thermometers	229	3	216	10
Totals.....	3095	23	2998	74

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