

patd. Jan. 10, 1939. (CA 33:3079.) (Similar to Brit. pat. 452,442, Waterman.)
 Anon. Synthetic Organic Chemicals (Eastman Kodak Co.) 2, No. 3 (1929). Tackling difficult distillations.

Accessory Apparatus and Technique

*Baxter, James G. (to Distillation Products, Inc.). U. S. pat. 2,147,479. Condensation pumps using organic liquids. Feb. 14, 1939. (CA 33:3635.)
 *British Thomson-Houston Co., Ltd. Brit. pat. 488,162. Diffusion pumps. July 1, 1938. (CA 33:14.)
 Copley, M. J., Simpson, O. C., Tenney, H. M., and Phipps, T. E. Rev. Sci. Instruments 6, 265 (1935). A study of the speed of divergent nozzle pumps.
 Dunicz, Boleslaw L. Ind. Eng. Chem., Anal. Ed. 11, 28 (1939). Improvement of vacuum distillation. (CA 33:1545.)
 *Eastman Kodak Co. Brit. pat. 495,109. Organic liquids for use in condensation pumps. Nov. 7, 1938. (CA 33:2774.)
 Ebert, H., and Gielesen, J. Glass u. App. 20, 167, 177, 189 (1939). Progress in vacuum technique. (CA 34:5702.)
 *Embree, Norris D. (to Distillation Products, Inc.). U. S. pat. 2,139,740. Sorption pumps for producing high vacuum. Dec. 13, 1938. (CA 33:1997.)
 Etzrodt, A. Chem. App. 25, 51 (1938). General principles of vacuum technic. (CA 32:4016.)
 Etzrodt, A. Chem. App. 25, 321 (1938). Pressure measurement in vacuum technic. (CA 33:438.)

*Hickman, K. C. D. (to Distillation Products, Inc.). U. S. pat. 2,150,685. Condensation pumps for high-vacuum distillation. Mar. 14, 1939. (CA 33:4744.)
 *Hickman, K. C. D. (to Distillation Products, Inc.). U. S. pat. 2,153,189. Condensation pump using organic liquids. Apr. 4, 1939. (CA 33:4828.)
 *Hickman, K. C. D., and Baxter, James G. (to Distillation Products, Inc.). U. S. pat. 2,147,488. Organic liquids for use in condensation pumps. Feb. 14, 1939. (CA 33:3635.)
 Hughes, A. L. Rev. Sci. Instruments 8, 409 (1937). A simple Knudsen gage. (CA 32:1520.)
 Lockenvitz, Arthur E. Rev. Sci. Instruments 9, 417 (1938). A radio-meter-type vacuum gage. (CA 33:902.)
 Matricom, M. J. phys. radium 10, 385 (1939). High-speed oil-vapor condensation pumps. (CA 34:4308.)
 More, K. R., Humphreys, R. F., and Watson, W. W. Rev. Sci. Instruments 8, 263 (1937). Trap for use with an oil diffusion pump. (CA 31:6513.)
 Nikliborc, J. Acta Phys. Polon. 6, 19 (1937). A new quartz manometer. (CA 32:6508.)
 Penning, F. M. Physica 4, 71 (1937). New manometer for low gas pressures, especially between 10⁻³ and 10⁻⁵ mm. (CA 31:2866.)
 Rosenberg, Paul. Rev. Sci. Instruments 10, 131 (1939). The design of an accurate McLeod gage. (CA 33:4467.)
 Van Atta, C. M., and Van Atta, L. C. Phys. Rev. 51, 377 (1937). Highspeed multijet oil diffusion pumps of metal construction. (CA 32:5262.)
 Werner, Sven. Z. tech. Physik. 20, 13 (1939). A simple Knudsen manometer. (CA 33:3211.)

Pot Cook Cellulose Yield Committee Report

OBJECT

The object of this committee was (1) to study the pot cook yield method and recommend improvements to same and (2) to collect data as to its accuracy.

IMPROVEMENTS IN METHOD

Lint Mixing

In the method as published in Oil and Soap, August issue 1937, the lint mixing is done by hand. By the hand mixing procedure some bran is dusted out if the operator is not careful. It also is a dusty, time consuming job. In view of this a mechanical mixer has been developed in the Pulp Plant Chemical Division, Buckeye Cotton Oil Co., which does a good mixing job in less time, with no dust and no separation of the hull pepper.

A comparison of yields obtained using the hand mix and mechanical mixer is given below.

For the present either the hand or mechanical mixing is permissible. To do a foolproof mixing job the mechanical procedure is superior. A blueprint of this mixer is available.

Oven

No mention of drying ovens were mentioned in the method of August 1937 under "apparatus." Drying oven specifications are given in the revised pot cook procedure. This is not a change of procedure but merely giving more details.

Laboratory Preparation of Sample

The old lint preparation procedure was modified to include the mechanical mixer so that either the hand mix or the mechanical mixer could be used.

Other Changes in Method

In order to clarify the old procedure a few words have been added here and there. They do not change the procedure in any way.

Results of Check Analyses by Different Laboratories

Samples were not sent out by the committee as this has been done previously to most of the laboratories equipped with mechanical washers. Five of the six men on this committee received samples and reported their results at that time. These analyses are given below.

The following table gives the average yields obtained on samples of lint sent out to various laboratories. All results calculated to 8.0% moisture lint or hull fibre.

TABLE II

LABORATORY	Lint			Hull Fibre		Aver.
	A	B	C	D	E	
Lab. No. 1	79.4	74.2	63.6	69.7	55.3	68.44
Lab. No. 2	79.7	73.9	63.9	70.0	56.1	68.72
Lab. No. 3	79.4	74.0	62.5	69.8	55.0	68.14
Lab. No. 4	79.6	74.1	62.7	69.4	55.2	68.20
Lab. No. 5	79.2	73.6	62.9	69.3	55.0	68.00
Lab. No. 6	79.6	74.0	63.4	69.9	56.4	68.66
Lab. No. 7	79.3	74.1	63.3	69.7	61.6	69.60
Lab. No. 8	78.4	72.8	63.1	68.7	57.4	68.08
Overall Aver.	79.33	73.84	63.18	69.56	56.50	68.49
Av. omitting Lab. No. 8						
A, B, D, E, & Sample E						
Lab. No. 7	79.46	73.99	63.18	69.69	55.50	68.36

The following table gives (1) the points deviation from the overall average for each mill on each sample and (2) the points deviation from the average obtained omitting Lab. No. 8 results on sample A, B, D, & E and Lab. No. 7 Sample E.

TABLE III

POINTS DEVIATION

LABORATORY	A		B		C		D		E		A.	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Lab. No. 1	.07	.66	.36	.21	.42	.42	.14	.01	1.20	.20	.05	.08
Lab. No. 2	.37	.24	.06	.09	.72	.72	.44	.31	.40	.60	.23	.36
Lab. No. 3	.07	.06	.16	.01	.68	.68	.24	.11	1.50	.50	.35	.22
Lab. No. 4	.27	.14	.26	.11	.48	.48	.16	.29	1.30	.30	.29	.16
Lab. No. 5	.13	.26	.24	.39	.28	.28	.26	.39	1.50	.50	.49	.36
Lab. No. 6	.27	.14	.16	.01	.22	.22	.34	.21	.10	.90	.17	.30
Lab. No. 7	.03	.16	.26	.11	.12	.12	.14	.01	5.10	...	1.11	...
Lab. No. 8	.93	...	1.0408	.08	.869041	...
Av. Deviation Points	<.27	.15	.32	.13	.38	.38	.32	.19	1.50	.50	.39	.25
Av. Deviation Per Cent	<.34	.19	.43	.18	.60	.60	.46	.27	2.65	.90	.57	.37

TABLE I

Type	No. of Tests each mix	Yield Hand Mix		Average % Deviation	Yield Machine Mix		Aver. % Deviation
		Average	Maximum Deviation		Average	Maximum Deviation	
Lint 1	24	77.79	<1.79	<0.475	77.70	<0.80	<0.285
Lint 2	24	75.36	<0.94	<0.662	75.07	<0.73	<0.430
Lint 3	12	71.54	<0.84	<0.690	71.65	<0.65	<0.454
Fiber 1	12	73.68	<0.98	<0.600	74.31	<0.59	<0.393
Fiber 2	24	65.56	<0.56	<0.450	65.91	<0.61	<0.346
Fiber 3	24	61.42	<1.38	<0.655	61.34	<0.76	<0.597
Average	120	70.90	<0.915	<0.588	70.99	<0.690	<0.418
Lint Average	60	74.89	<1.19	<0.609	74.81	<0.73	<0.389
Fiber Average	60	66.89	<0.973	<0.568	67.18	<0.653	<0.445

It might be added that the samples sent out were hand mixed and were not mixed by the mechanical mixer. Each laboratory received a part of the same sample after mixing.

The results checked very closely with the exception that in the case of one analyst the results on the lint were probably a little off, but even then the difference was less than one per cent. Hull fibre, sample E, contained large hulls and difficult to wash and of little commercial value.

In order to show how closely a lint buyer and seller can check, if the procedure is followed closely, the following yield analyses are given, calculated to 7.5 per cent moisture. For obvious reasons the producing mill buyer's and seller's names are omitted.

TABLE IV

Mill No.	No. Cars	Seller	Buyer
1	39	72.6	72.9
2	43	73.0	73.1
3	26	72.2	72.3
4	50	74.5	74.4
5	16	71.8	71.2
6	25	74.7	74.7
7	19	73.5	73.5
8	4	72.1	72.9
Wtd. Av.	222	73.3	73.3

The above results are almost perfect. Even on the large number of cars it is quite probable that the average will be as far apart as 0.5 points, especially if the sample is not taken and mixed properly.

Table V below gives the analysis of several hundred car loads of lint calculated to 8.0 per cent moisture lint for comparison. The analyses were run by commercial laboratories and by the buyer. For obvious reasons all

TABLE V

LINT Mill No.	Number of Samples (1)	Analyst No. 1	Analyst No. 2	Points Spread
1	1	73.6	73.0	.6
2	9	73.8	73.5	.3
3	28	69.4	69.7	.3
4	46	69.5	70.1	.6
5	7	73.6	73.3	.3
6	9	75.8	75.2	.6
7	27	72.4	72.5	.1
8	28	76.0	76.4	.4
9	21	74.2	74.9	.7
10	16	73.4	73.4	.0
11	4	76.2	75.4	.8
12	12	75.5	75.1	.4
13	12	74.7	75.1	.4
14	3	74.4	75.1	.7
15	14	72.2	71.6	.6
16	9	74.8	75.3	.5
17	20	74.0	73.4	.6
18	2	73.3	73.8	.5
19	2	73.8	74.4	.6
20	20	72.5	72.4	.1
21	32	72.2	71.7	.5
22	8	72.2	72.4	.2
23	30	71.0	71.1	.1
24	78	73.9	73.5	.4
25	5	71.5	71.2	.3
26	22	74.3	74.5	.2
27	29	72.8	73.4	.6
28	23	75.6	75.5	.1
29	40	71.6	72.0	.4
30	6	72.1	72.2	.1
31	92	72.1	72.0	.1
32	27	73.4	73.5	.1
33	54	73.8	73.8	.0
34	51	73.4	73.5	.1
Wtd. Aver.	787	72.93	72.96	.29

names are omitted. One of the columns gives the commercial laboratories results and one gives the buyers results not necessarily respectively. These are not picked results but include all tests available.

CORRECTION IN POT COOK METHOD AS PUBLISHED AUGUST, 1937

Under the heading "Mechanical Washer" two errors were made. First the water spray line was described as one-fourth inch and should have been one-eighth inch brass pipe. Second, the holes in this pipe were said to be 1/64 inch openings and it should have been given as 1/32 inch openings. All machines made and in use conform to the correct specifications as given above. These have been corrected in the revised procedure.

BLUEPRINTS OF EQUIPMENT, ETC.

Blueprints of all equipment can be obtained at present from the chairman of the pot cook yield method committee. So far all washing machines have been made by the Pulp Department of The Buckeye Cotton Oil Co. Next year some company or firm will be designated by the committee to build this equipment.

As this method of analysis is relatively new to the trade this year's work has been mostly of trying it out between laboratories. A question of a wetting out agent for the lint has been suggested and is being worked out at present. Such wetting agents as soap flakes used in washing and turkey red oil can be used without changing the yield. These are, however, not absolutely necessary and are not included in the procedure.

RECOMMENDATIONS

The following recommendations are made:

- (1) That the revised pot cook procedure be substituted for that published in Oil and Soap in August in 1937. The revised procedure being the same as the old one with the exception that it gives the optional use of the lint mixer, gives more oven specifications and other points clarified. The resulting lint yield is not changed.
- (2) That the method be accepted as a tentative method by the American Oil Chemical Society if it has not already. If it is a tentative method that this status be maintained until more laboratories are familiar with its use.
- (3) That the present committee be reappointed because:
 - (A) The number of laboratories which have washing equipment are limited at present.
 - (B) It is desired to turn over equipment blueprints to the committee and thereby to the Society, said committee is to designate the builder of the equipment and see that the lowest cost is obtained.

Mr. E. C. Ainslie Mr. Boulware
 Mr. C. H. Cox Mr. W. S. Hude
 Mr. E. H. Tenent Mr. L. N. Rogers—Chairman