THE CRUDE MILL OPERATIONS COMMITTEE REPORT

The Crude Mill Committee worked on four problems this year. With the quantities of high acid seed increasing and the difficulty encountered by using phenolthalein as an indicator, it was necessary to try and find another indicator whose end-point was more pronounced. We also needed an indicator that could be used with expeller oils. We tried the indicators which Mr. Shuey had worked and reported on namely, Thymol Blue, Aniline Blue, Thymolphthalein and Phenolphthalein. We were not aware of the fact that Mr. Mayfield was chairman of the Indicator Committee; however, we believe there is a better indicator and sincerely hope that Mr. Mayfield has a recommendation for at least an alternate indicator and that the society will adopt it.

In regard to recleaning seed which Mr. Bedell mentioned in his paper, we found that about 50 pounds of trash was removed from 10 tons of seed, this being our tonnage through the cleaning equipment. While the actual percentage of trash removed may seem small, it made a very noticeable difference in the quality of lint cut. However, unless the mill is producing its own power we do not believe this second cleaning will be profitable.

With the thought that by blending varying amounts of expeller oil with hydraulic we could lower the refining loss, we made tests using 10%, 20% and 30% expellor oil mixed with 90%, 80%, and 70% hydraulic. The expeller oil had F.F.A. of 2.6% while the hydraulic had 1.3%, 1.7%, 2.0%, 3.0% and 4.2%. The results:

		Loss	Color
Expeller Oil.			
F.F.A.	2.6	9.0	24.6
		10.8	15.7
Hydraulic			
F.F.A.	4.2	14.5	7.9
10% Exp. 90% Hy.			
F.F.A.	3.8	14.2	8.8
20% Exp. 80% Hy.			
F.F.A.	3.7	14.7	9.5
30% Exp. 70% Hy.			
F.F.A.	3.6	15.1	10.4

This is the best set of results obtained and with the lower acid oils the results were very much higher and so blending our oils would not be beneficial.

As Mr. Bedell stated in his paper, at his suggestion we worked on lint determination using a 30-mesh seive, through which to remove the lint we use a vigorous rotary motion. If one cc. of HCl is used on the seed as they come from the second linters there will not be such a great breaking down of the hull. What hull is broken will remain on the sieve and may be reweighed with the seed. As is to be expected this gives a small amount of pepper which is in our estimation very near the mill cut lint or even less.

A. G. BEDELL,

J. L. MAYFIELD,

H. L. THOMAS, Chairman.

REPORT OF THE MOISTURE COMMITTEE 1937-38

AT the Spring convention in Dallas in May, 1937, the society adopted the Freas Horizontal Flow forced-circulation oven No. 601-233 as a tentative and alternate standard oven. A complete description of this oven will be found in the committee report as published in OIL & SOAP, August, 1937, pages 242-44.

Since the adoption of the oven, the committee has considered the advisability of substituting for the specific oven recommended at that time, an oven described in terms of performance, realizing that there may be other pieces of equipment on the market that would do the work of the Freas oven. The committee recommends, therefore, that the following oven, described in terms of functional performance, be substituted for the now recommended Freas oven No. 601-233: "A forced circulation oven designed to produce a temperature of circulative air which can be controlled between the limits of 100-105° C. The sensitivity of the thermostat shall be such that the maximum variations of the temperature at the position of the thermo-regulator in the oven shall be ± 1° C. at any one setting. However, no oven is approved for use with a greater number of seed or meal samples than the number of empty containers of approved type which can be placed in the oven without causing a variation of more than 4° C. within the usable space of the oven in the range 100-105° C.

"The rate and direction of the flow of air shall be such that proper drying will be obtained without danger of finely divided materials blowing from the sample container."

The society's methods now require that a 5-hour drying interval for cottonseed and a 3-hour drying interval for cottonseed meal be used in both the standard jacketed glycerin oven and in the Freas forced-circulation oven. The committee this year has investigated the feasibility of reducing this drying interval when the forced circulation oven is used. Two members of the committee, Messrs. A. D. Rich and C. P. Brenner, have conducted tests in their laboratories designed to establish what drying interval can be used. Their separate reports are attached and constitute a part of this committee report.

Based on these two reports, the committee recommends that a drying interval of three hours be required for meal samples, and a drying interval of four hours for cotton seed samples where the forced-circulation oven is used.

This committee was organized for the purpose of studying the application of the forced-circulation principle to cottonseed and cottonseed meal moisture problems. It is felt that this work has been completed. The committee, therefore, requests that it be discharged from further duty.

C. P. BRENNER,

N. C. HAMNER,

A. D. RICH,

H. L. ROSCHEN, Chairman.

A. D. RICH REPORT

The new type of Freas Forced Draft oven (No. 601-233) was set up with the temperature adjusted at 101° C. For comparative results, a regular air drying Freas type oven was used. This was also set at 101° C.

The samples used in this work

were a typical cottonseed meal and a cottonseed sample, respectively, prepared according to the approved A.O.C.S. procedure.

Samples in standard sized pans were placed in the oven, a system of four rows deep being employed for each shelf, only the top and bottom shelves being used. Twelve pans were placed in each oven, six to a shelf. At the end of 2, 3, 4, and 5 hours, respectively, three pans were taken from each oven (two from one shelf and one from the other) and weighed. The results, as given in the following table, were on cottonseed and are expressed as per cent of moisture.

(I) FORCED AIR DRAFT OVEN

Location of pan (Row from Back)	The Moisture in Pans taken from Top Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.	Bottom Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.
1	6.15	....	....	6.53	....	....	6.63	6.40
2	....	....	6.50	....	....	....	....	6.48
3	....	6.35	6.30	....	6.33	6.25	....	....
4	6.10	....	....	....	....	6.35	....	....

(II) REGULAR OVEN

Location of pan (Row from Back)	The Moisture in Pans taken from Top Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.	Bottom Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.
1	6.43	....	....	6.58	....	....	7.25*	7.43*
2	....	....	6.45	....	....	....	....	7.13*
3	6.25	....	6.33	....	6.93	6.55	....	....
4	....	5.70	....	....	....	6.60	....	....

*It is believed that these samples were overheated so that the result does not all represent moisture. Lower shelf temperature 120° C.

The test was repeated in the same manner using cottonseed:

(I) FORCED DRAFT OVEN

Location of pan (Row from Back)	The Moisture in Pans taken from Top Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.	Bottom Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.
1	5.83	....	....	6.23	....	....	5.83	6.03
2	....	....	6.05	....	....	....	....	5.75
3	5.88	....	5.88	....	6.33	6.25	....	....
4	....	5.78	....	....	....	6.05	....	....

(II) REGULAR OVEN

Location of pan (Row from Back)	The Moisture in Pans taken from Top Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.	Bottom Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.
1	6.18	....	....	6.48	....	....	6.68	6.57
2	....	....	6.40	....	....	....	....	6.45
3	....	6.28	6.33	....	6.90	6.45	....	....
4	6.20	....	....	....	....	6.50	....	....

It was repeated a third time on cottonseed:

(I) FORCED DRAFT OVEN

Location of pan (Row from Back)	The Moisture in Pans taken from Top Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.	Bottom Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.
1	6.45	....	....	6.80	....	....	6.75	6.70
2	....	....	6.40	....	....	....	....	6.73
3	....	6.75	6.53	....	6.48	6.58	....	....
4	6.38	....	....	....	....	6.55	....	....

(II) REGULAR OVEN

Location of pan (Row from Back)	The Moisture in Pans taken from Top Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.	Bottom Shelf, after 2 hrs.	3 hrs.	4 hrs.	5 hrs.
1	6.25	....	....	6.35	....	....	6.88	6.13
2	....	....	6.43	....	....	....	....	6.05
3	6.03	....	6.18	....	6.55	6.50	....	....
4	....	5.98	....	....	....	6.25	....	....

Ten pans containing cottonseed were now placed in each oven, five on each of two shelves. Those in the forced draft oven were all removed after 3 hours, those in the air drying oven after 5 hours. The pans were spread out on each shelf so that one was in each corner and one in the center. The results follow:

(I) FORCED AIR DRAFT OVEN (3 HOURS)

Row from Back	Top Shelf Left	Center	Right	Bottom Shelf Left	Center	Right
1	6.63	....	6.55	6.68	....	6.75
2	....	6.55	....	....	6.73	....
3	6.48	....	6.60	6.50	....	6.78

(II) REGULAR OVEN (5 HOURS)

Row from Back	Top Shelf Left	Center	Right	Bottom Shelf Left	Center	Right
1	6.38	....	6.53	7.00*	....	7.38*
2	....	6.33	....	....	7.20*	....
3	6.13	....	6.08	6.98	....	7.08*

*These samples, it is believed, were overheated. Lower shelf temperature 120° C.

This test was repeated on cottonseed meal:

(I) FORCED AIR DRAFT OVEN (3 HOURS)

Row from Back	Top Shelf Left	Top Shelf Center	Top Shelf Right	Bottom Shelf Left	Bottom Shelf Center	Bottom Shelf Right
1	3.68	....	3.53	3.88	....	3.78
2	....	3.63	....	....	3.70	3.80
3	3.40	....	3.48	3.63	....	....

(II) REGULAR OVEN (5 HOURS)

Row from Back	Top Shelf Left	Top Shelf Center	Top Shelf Right	Bottom Shelf Left	Bottom Shelf Center	Bottom Shelf Right
1	3.63	....	3.80	4.10	....	4.40
2	....	3.58	....	....	4.15	....
3	3.55	....	3.58	3.88	....	4.13

Conclusions:

The work indicates considerably more uniformity of results for the Forced Draft oven. In the case of the tests where samples were withdrawn hourly, the total average range of all results for the latter was 0.51 per cent; for the regular oven it was 1.04 per cent. A tabulated summary of this follows:

	Forced Draft Oven	Regular Oven
First Test	0.53%	1.73%
Second Test	0.58%	0.50%
Third Test	0.42%	0.90%
Average	0.51%	1.04%

If only the third, fourth, and fifth hour tests are considered (two hours is entirely too short for drying) the total average range for the forced draft oven is only 0.42 per cent while that of the regular oven is 1.01 per cent.

In the tests where all the samples were allowed to remain undisturbed in the respective ovens until the end of the test, the average range for the Forced Draft oven was 0.39 per cent and for the regular oven 1.07 per cent, despite the fact that the pans in the latter were heated for 5 hours whereas they were heated only 3 hours in the other oven.

	Forced Draft Oven	Regular Oven
First Test	0.30%	1.25%
Second Test	0.48%	0.85%
Average	0.39%	1.07%

C. P. BRENNER REPORT

The object of this experiment was to ascertain whether the time required to determine the moisture in meal and seed, with the oven fully loaded (108 standard moisture dishes) and with rather high moisture material, at a temperature of 101 degrees C., may be reduced from five hours to three hours.

It was found that this type of oven would dry 108 samples (full load) of meal, of 7.8 per cent moisture in three hours.

It was also found that this oven would dry 108 samples of seed (five grams each), of 18 per cent moisture in four hours.

It is therefore recommended that when this type of Freas Oven is used, three hours at 101 degrees C. for meal and four hours for seed moistures be used.

Moisture in Meal:

This laboratory does not possess a standard moisture oven so a relation was established between a Dekhotinsky oven and the Freas oven by running twelve meal moistures in each.

It was found that it was necessary to run the Dekhotinsky at 105 degrees C. for three hours to do the same drying as was done in the Freas at 101 degrees C. in three hours.

Dekhotinsky 101 degrees 3 hours 7.62% average 12 samples.

Dekhotinsky 101 degrees 5 hours 7.81% average 12 samples.

Dekhotinsky 105 degrees 3 hours 7.80% average 12 samples

Freas Oven 101 degrees 3 hours 7.80% average 12 samples.

This was repeated with another set of samples, with the following results:

Dekhotinsky 101 degrees 3 hours 7.52% average 12 samples.

Dekhotinsky 105 degrees 3 hours 7.74% average 12 samples.

Freas 101 degrees 3 hours 7.76% average 12 samples.

The Freas oven was then loaded with 108 samples of meal full capacity (three trays, 36 boxes to the tray) and run for three hours at 101 degrees C.

The following results were obtained:

Dekhotinsky 105 degrees C. 3 hours 7.81% average 12 samples.

Freas Oven, 101 degrees 3 hours 7.82% average 12 samples.

Note: The various results in these experiments were due to the fact that different meal samples were used.

Moisture in Seed:

The Freas Oven was then loaded with seed (108 degrees of over 17% moisture) and run for five hours at 101 degrees C.

Dekhotinsky 105 degrees C. 5 hours 17.4% average 12 samples.

Freas Oven 101 degrees C. 5 hours 17.5% average 12 samples.

This was repeated with another sample of seed, allowing the seed to remain three hours in the Freas.

Dekhotinsky 105 degrees C. 5 hours 18.7% average 12 samples.

Freas Oven 101 degrees C. 3 hours 18.3% average 12 samples.

From this data it can be seen that three hours at 101 degrees is not enough. Another sample was prepared and dried for four hours in the Freas.

Dekhotinsky 105 degrees C. 5 hours 18.17% average 12 samples.

Freas Oven 101 degrees C. 4 hours 18.12% average 12 samples.

This is a very close agreement and due to the fact that we would very seldom, if ever, have 108 samples of such high moisture seed, the time of four hours would be enough.

This oven was operated with the air inlet and outlet open ¼ inch. The draft ventilator was wide open. This oven is quite an improvement over the older type, having considerably more moisture removing capacity, quieter in operation, and can be regulated very much closer.

New Applications for Referee Certificates

Second Notice. Mr. Robert H. Acock, of The Oil Mill Laboratory, Austin, Texas, has applied for appointment as Referee Chemist of the American Oil Chemists' Society on cottonseed cake, meal, oil and soap stock. Mr. John T. Boyd, Jr., of Barrow-Agee Laboratories, Inc., Cairo, Illinois, has applied for appointment as Referee Chemist on cottonseed cake, and meal. Information concerning the qualifications of either of these applicants will be gladly received by the Referee Board from any member of the Society. Address A. S. Richardson, Ivorydale, Ohio.