Committee requested be studied and some action taken on the use of more than 6% earth in the bleach test and the filtering of the oil before bleaching. These tables were too long to be printed in this the last number of our journal.

PORTSMOUTH COTTON OIL CO.,
PORTSMOUTH, VIRGINIA

REFINING TEST COMMITTEE REPORT FOR 1924-25

BY C. B. CLUFF

A consideration of the situation regarding refining tests showed that little improvement has been made for many years. Enormous differences are still commonly reported, by different chemists, on duplicate samples, to the great annoyance of buyers of crude oil. It appeared necessary, as was indicated by the chairman of a previous committee, to either find such modifications in our method as would give reasonably concordant results, or discard it altogether and find some other way of evaluating crude oil. It was, therefore, determined to make an intensive study of details of the present method, limiting the tests to a very few members who have had wide refining experience, in the endeavor to run down and eliminate possible causes of discrepancies.

A list was first prepared, showing no less than twenty-three points of manipulation which could account for differences in the results obtained by different chemists. Certain modifications of the present rule were then written up in the endeavor to limit, or eliminate altogether, any chances for the use of personal discretion in making the refinings. Each member of the committee was asked to test three samples by adhering strictly to these specifications without any modification whatever.

The procedure specified on the three samples varied from the usual rule principally in four particulars, as follows:

1. The exact amount of NaOH to be used was specified and determined by analysis of the lye, and not by a hydrometer. The exact Baumé of the lye was considered relatively unimportant. A limit was placed on Na_2CO_3 at 5% of the NaOH.
2. The rates of heating and cooling during the refining were standardized by using two separate water baths and transferring the sample from the cool bath directly to the hot bath. This served to definitely fix the rate of heating and time of heating. The same applies to the subsequent cooling of the refining, by transferring directly from the hot to the cold bath.
3. Only two different speeds were permitted.
4. Soap stock in all cases was remelted and recooled under standardized condition.

Samples of each of three oils were sent to five laboratories and in each case tested by the new specifications with two different lyes and by the official method with one lye which was the same as one of those used in the new method. Samples of the refined oil produced in each case were forwarded to the Ivorydale laboratory so that the color of all samples could be read by the same individual under identical conditions. Unfortunately, however, not all of these samples arrived safely. The accompanying tables show a summary of the results reported.

Sample No. 1, Prime Oil, shows very good results both by the official method and the new method. Sample No. 2, Off Oil, shows decidedly better agreement in both color and loss by the new method, and it should be particularly noted that both of these factors are lower in the new method when using approximately the same lye as in the official method. Sample No. 3, Off Oil, shows similar results with only 0.25% difference in loss among four operators on the new method against 1.5% variation on the official method. This is the most remarkable agreement we have ever seen on oil with F. F. A. as high as 5%. There is also a better agreement on color, and the average color and loss are both slightly lower than by the official method.

The necessity is shown of reading all colors by the same man, in the same apparatus, when checking refining results. The differences are much less when so read than when read by different individuals.

SAMPLE NO. 1

Method Lye { Amt. Lye { Strength		New 0.472% NaOH Approx. 14° Bé.		New 0.472% NaOH Approx. 18° Bé.		Official 5% of 14° Bé.	
	F.F.A.	Color	Loss	Color	Loss	Color	Loss
Average (5)	1.81	6.66R	4.16%	6.32R	4.42%	6.65R	4.25%
Maximum	2.2	6.8	4.3	6.7	4.6	6.9	4.4
Minimum	1.65	6.4	4.0	6.2	4.2	6.3	4.2
Max. dif.	0.55	0.4	0.3	0.5	0.4	0.6	0.2

SAMPLE NO. 2

Method Lye { Amt. Lye { Strength		New 1.15% NaOH Approx. 16 ° Bé.		New 1.15% NaOH Approx. 20° Bé.		Official 8% of 20° Bé.	
	F.F.A.	Color	Loss	Color	Loss	Color	Loss
Average (5)	5.29	8.60R	12.18%	7.76R	12.00%	8.52R	12.98%
Maximum	5.40	9.6	12.5	8.9	12.4	10.1	14.4
Minimum	5.10	7.3	11.9	7.0	11.5	7.1	12.0
Max. dif.	0.30	2.3	0.6	1.9	0.9	3.0	2.4

Same (sample No. 2) with colors of all ref. oils read by a single individual to eliminate personal differences, etc. Samples from Barrow not received.

Average (4)	5.26	7.80	12.18	6.98	11.98	7.68	12.73
Maximum	5.35	8.2	12.5	7.1	12.4	9.3	14.4
Minimum	5.10	7.2	11.9	6.8	11.5	7.0	12.0
Max. dif.	0.25	1.0	0.6	0.3	0.9	2.3	2.4

CRUDE OIL SAMPLE NO. 3

		"A" 1.37% NaOH, 16°				"B" 1.37% NaOH, 20°				"C" 9.5% of 20° Lye			
		Color				Color				Color			
	F.F.A.	X	Y	Z	Loss	X	Y	Z	Loss	X	Y	Z	Loss
Average (4)	5.23%	12.22R	12.00R	11.43R	13.25%	11.55R	11.15R	10.78R	14.01%	11.60R	11.35R	11.10R	14.08%
Highest	5.35	14.3	13.8	11.8	13.8	13.2	12.6	11.6	14.15	13.0	13.4	12.2	14.9
Lowest	5.1	10.4	10.3	10.9	12.2	9.9	10.6	10.2	13.9	10.2	10.0	10.2	13.4
Max. dif.	0.25	3.9	3.5	0.9	1.6	3.3	2.5	1.4	0.25	2.8	3.4	2.0	1.5

X—Filtered at 180°F.
Y—Filtered at 70°F.
Z—P. & G. reading of samples "Y."

The results under No. 3 also show the necessity of filtering oil cool; heating to facilitate filtering gives darker color readings.

Our conclusions and recommendations are as follows:

1. The present method for determining refining loss and color, as a means of evaluating crude cottonseed oil should not be condemned as fairly concordant results on duplicate samples can be obtained by different chemists, if variations in manipulation are avoided.
2. Work should be continued in the direction of further eliminating possible variations in manipulation.
3. Further tests should be made giving particular attention to crude oils that refine and settle with difficulty when subjected to the usual treatment.
4. As the present rules omit all reference to filtering the refined oil, a sentence should be inserted in rule No. 272—Section 7 (*a*) at the beginning of the section, reading as follows:

"If the refined oil is not clear and brilliant, it must be clarified before reading the color, by filtering through white filter paper at a temperature of 20° to 24°C., without the application of heat or addition of any material to facilitate filtration."

THE PROCTER & GAMBLE CO.,
IVORYDALE, OHIO

STANDARDIZATION OF COLOR READINGS, REPORT FOR 1924-25

BY H. P. TREVITHICK

The color committee this year has confined its efforts to a test of the Bailey tintometer. Six samples were sent out to the members and were read by the use of the Wesson instrument, the Bailey instrument, and with the old-fashioned Daylight machine. The results were averaged and the maximum and minimum deviations determined on each sample. Strange to say, the total deviation from the mean by natural daylight was less than by either the Wesson or the Bailey instrument. This, I believe, was due to the fact that the orifices in the natural instrument are much larger. A copy of these readings are attached herewith. In five out of six readings the mean of the Wesson is much less than the Bailey instrument.

The members were also asked to make comparative readings on samples of their own and report them. Mr. James has sent in a list of cottonseed oils only; the other three gentlemen have not sent theirs in yet. There is also attached a list of readings made on oils and greases, made by your chairman.

Some of the members of the committee are much in favor of the Bailey instrument while others are not. Two of the major criticisms are the size