

Report of the Smalley Foundation Committee

Co-operative Meal Samples for the 1927-1928 Season

BY H. C. MOORE, CHAIRMAN

IN tables Nos. I to V following will appear a summary of the results of co-operative analytical work of the Smalley Foundation for oil and ammonia for the past year. This work was concluded with sample No. 30, reported on April 11, 1928. During this year 91 collaborators have participated, as compared to 81, 75, 78 and 88 for the four preceding years.

Table No. I gives the standing of the 42 collaborators who reported oil determinations on all samples. In the previous year 43 collaborators reported on all of the samples, as compared to 35, 29 and 36, respectively in the three preceding years.

In Table No. II appears the corresponding standing of the 63 collaborators who reported ammonia results on all samples. In the previous year 65 reported on all of the samples, as compared to 52, 42 and 50 in the three preceding years.

Table No. III gives the combined laboratory average standing for both oil and ammonia for the 42 collaborators who reported both oil and ammonia on all of the samples. In the previous year 43 collaborators reported oil and ammonia results on all samples, as compared to 34, 28 and 36 for the three preceding years.

Table No. IV gives the summary of the results of other collaborators who have failed to report on all

samples, but whose results deserve recognition.

Table No. V gives briefly an idea of the range of agreement of results for oil and ammonia separately on the 30 samples. For example, the best general agreement among the collaborators for oil is found in the case of sample No. 12, and for ammonia on sample No. 11; likewise the poorest agreement among all collaborators for both oil and ammonia is in the case of sample No. 9. This table is interesting in showing the maximum, minimum and average number of collaborators in the case of oil and ammonia within the three ranges chosen for all samples.

The committee decided not to count sample No. 9 in the tabulation of results, as announced on the report for sample No. 15, so this year's average is based on 29 samples. The committee is generally opposed to eliminating any of the samples from the final tabulation, but the complaints on No. 9 came from so many of the collaborators, and further investigation indicated some justification for making an exception in this case, that the committee decided not to include it in the final tabulation. The results in Table V will tend to confirm the committee's judgment in this action.

The prize awards for the best work done on the 29 samples are the same as for the past several

years, and as published in the Cotton Oil Press in 1923. The winners of these awards for the past year are as follows:

The laboratory cup for the highest efficiency in the determination of both oil and ammonia is awarded to No. 78, E. H. Tenent, International Sugar Feed Co., Memphis, Tenn., whose average is 99.934 per cent. The certificate for second place is awarded to No. 77, L. B. Forbes Laboratories, Memphis, Tenn., whose average efficiency is 99.919½ per cent. The corresponding percentages for the two previous years were 99.899½ and 99.892½, 99.901 and 99.869, respectively.

The collaborators are reminded again that the present cup was generously furnished the Society by Dr. H. B. Battle of Montgomery, after he had won permanently the original cup, having won it on three different occasions. This year is the second award of this cup, being awarded the previous year to Dr. W. F. Hand, State Chemist, A. & M. College, Mississippi. The chairman believes that this present cup should be hereafter referred to as the Battle cup.

The certificate for the highest efficiency in the determination of oil is awarded to No. 78, E. H. Tenent, International Sugar Feed Co., Memphis, Tenn., whose average is 99.920 per cent, and the certificate for second place is awarded to No. 77, L. B. Forbes Laboratories, Memphis, Tenn., whose average is 99.895 per cent. The corresponding percentages for the two previous years were 99.878 and 99.852 per cent, and 99.871 and 99.786 per cent, respectively.

The two certificates for the highest efficiency in the determination of ammonia are awarded to No. 24, Southwestern Laboratories, Dallas,

Texas, and No. 73, George K. Redding, The Larrowe Milling Co., Rossford, Ohio, who are tied for first place, their average efficiency being 99.979 per cent. The certificate for second place is awarded to No. 12, W. R. Austin, Armour Fertilizer Works, Nashville, Tenn., whose average is 99.965 per cent. The corresponding percentages for the two previous years were 99.996 and 99.988 per cent, and 99.966 and 99.966 per cent (tied for first place) and 99.956 second place, respectively.

In accordance with the resolution adopted by the American Oil Chemists' Society, the identity of the other collaborators will not be disclosed.

It will be observed from the foregoing that the percentage efficiency for oil and for the combined oil and ammonia work is higher than for last year, although the average for ammonia is slightly under last year's result.

The method for determining the standing of the various collaborators and their per cent efficiency is the same as has been used for several years past, and is fully described in the January, 1923, issue of the Cotton Oil Press, Vol. VI, No. 9, Page 33. The same rule also has been used as heretofore in calculating the accepted averages. As there have been several requests recently for a description of this method, it is given here as follows:

All results are listed in an ascending order from the lowest to the highest and a preliminary average calculated after omitting results which are obviously extreme. Next, all results within plus or minus 0.10 per cent from the preliminary average are taken and a new average called "A" is calculated. In other words, if 7.50 is

the preliminary average, then all results from 7.40 to 7.60 inclusive are taken. Next is found the largest number of results within the "A" group which are within a range of 0.10 per cent, (that is, say, 7.40 to 7.50 inclusive, 7.41 to 7.51 inclusive, or 7.45 to 7.55 inclusive, etc.) and the results in this group used to calculate average "B". The accepted average is the average of "A" and "B" taken to the nearest 0.01. In case this calculated average should be exactly half way between two values 0.01 apart, then the "B" result is favored, that is, in case the "A" result is 7.500 and "B" 7.510 and the average of "A" and "B" 7.505, the average would be 7.51.

It is hoped that there is no mistake in the results appearing in Tables I to V inclusive. These have been mostly double checked and yet as there are so many figures involved, there may be some slight error.

With the exception of Sample No. 9, there have been very few complaints on the samples, and the chairman feels that a vote of thanks and appreciation is due Thomas C. Law for his care and painstaking work in the preparation and handling of the samples. The collaborators generally probably do not realize the amount of work and care required for the proper handling of these samples. This work is done without profit, and if one's time is counted, is done at a distinct loss. An unselfish interest in the American Oil Chemists' Society and its collaborative work and a desire to be of service in its promotion is the motive power of this office.

The average of the efficiencies for both oil and ammonia on the 29 samples for the ten highest collaborators this year was 99.888, as

compared to 99.862 for the previous year.

The average of all accepted results for oil for the 29 samples is 6.85 per cent. The similar average for the previous year was 7.63. The average number of points off in oil for the ten highest collaborators this year is 33.4 points and for the previous year 46.9 points. The average efficiency in oil for the ten highest collaborators was 99.832 and 99.795, respectively.

Likewise for the ammonia results, the average of the accepted values is 8.03 per cent. The similar average for the previous year was 8.16 per cent. The average number of points off for the ten highest collaborators this year is 10.5 points and for the previous year 8.1 points. The average efficiency in ammonia for the ten highest collaborators was 99.955 and 99.967 respectively.

An opportunity has been afforded all collaborators to be advised by wire collect, in case their reports are not received in time each week, or in case there seems to be a typographical error in their reports. Only 38 of the collaborators have taken advantage of this offer, while one or two others have been disappointed in finding their results omitted from some report. According to our rule, only results which are received up to and including Tuesday of each week are to be accepted; however all results which have been received up to Wednesday morning of each week before the final copy is sent to the printer have been accepted. These last results, however, have not been included in calculating the accepted average. It is possible that the number of results received after the average has been calculated might change the accepted average as much as 0.01 per cent, although

this condition would rarely arise.

This year's report of the Smalley Foundation shows much progress. More collaborators were enrolled than in any previous year, while the efficiency of the analysts is improving. The value of this work is unquestionable and is being more fully appreciated each year. The committee has requested no additional work from the collaborators this past year, and the foregoing summarizes the year's activity.

It should be noted again that the purpose of the Smalley Foundation is not to provide a contest to win a prize, but through co-operation to improve the quality and the standard of the analytical work of all analysts engaged in making oil and ammonia determinations. That it is succeeding in its purpose is shown by the continually increasing number of analysts participating in the collaborative analytical work and also by the improvement in the general agreement of their results, as shown by the annual reports for several years back. It is to be hoped that future years will show still more progress.

In concluding, the chairman wishes to thank the collaborators and the members of the committee for their co-operation, and to add that he feels this important work will be best served another year under the direction of a new chairman, and recommends such an appointment. He wishes to thank the American Oil Chemists' Society for the opportunity of serving in this capacity for a number of years past, and is grateful indeed if this service has helped in some measure in promoting this important work.

Personnel of committee: H. C. Moore, Chairman; C. A. Butt, L. B. Forbes, H. B. Battle, E. H. Tenen, M. G. Boulware.

TABLE I—Oil Results, All Samples

(Average analysis, Oil 6.85)

Rank	An. No.	Points off	Av. per sample	Efficiency
1	78	16	.0055	99.920
2	77	21	.0072	99.895
3	25	25	.0086	99.875
4	24	29	.0100	99.854
5	74	31	.0107	99.844
6	45	33	.0114	99.834
7	33	36	.0124	99.819
8	57	38	.0131	99.809
9	41	40	.0138	99.799
10	{ 20	49	.0169	99.753
	{ 23	49	.0169	99.753
12	73	59	.0203	99.704
13	3	68	.0234	99.658
14	49	73	.0252	99.632
15	39	75	.0259	99.622
16	21	76	.0262	99.618
17	61	85	.0293	99.572
18	6	86	.0297	99.566
19	37	88	.0303	99.558
20	2	90	.0310	99.547
21	55	91	.0314	99.542
22	22	95	.0327	99.523
23	52	100	.0345	99.496
24	67	109	.0376	99.451
25	85	111	.0383	99.441
26	43	124	.0428	99.375
27	8	126	.0434	99.366
28	89	129	.0445	99.350
29	38	132	.0455	99.336
30	46	148	.0510	99.255
31	84	152	.0524	99.235
32	70	160	.0552	99.194
33	68	177	.0610	99.110
34	7	182	.0627	99.085
35	4	192	.0662	99.034
36	71	218	.0752	98.903
37	40	259	.0893	98.696
38	82	260	.0896	98.692
39	42	298	.1028	98.499
40	58	339	.1169	98.292
41	63	439	.1514	97.790
42	91	497	.1714	97.498

TABLE II—Ammonia Results, All					29	8	36	0124	99.846	
Samples					30	(21	37	.0128	99.841	
(Average analysis 8.03)						(44	37	.0128	99.841	
Rank	An. No.	Points		Av. per sample	Efficiency					
		off	sample							
						32	(35	38	.0131	99.837
							(42	38	.0131	99.837
1	(24	5	.0017	99.979		34	40	41	.0141	99.825
	(73	5	.0017	99.979		35	17	42	.0145	99.820
3	12	8	.0028	99.965		36	(11	44	.0152	99.811
4	(39	10	.0034	99.958			(38	44	.0152	99.811
	(78	10	.0034	99.958			(55	44	.0152	99.811
6	25	11	.0038	99.953		39	22	45	.0155	99.807
7	59	12	.0041	99.949		40	85	46	.0159	99.802
8	(41	13	.0045	99.944		41	91	47	.0162	99.798
	(77	13	.0045	99.944		42	(26	54	.0186	99.768
							(70	54	.0186	99.768
10	(57	14	.0048	99.940						
	(74	14	.0048	99.940		44	67	57	.0197	99.755
12	89	15	.0052	99.935		45	27	59	.0204	99.746
13	23	18	.0062	99.923		46	6	61	.0210	99.738
14	3	20	.0069	99.914		47	(37	62	.0214	99.734
							(82	62	.0214	99.734
15	19	22	.0076	99.905						
	(4	23	.0079	99.902		49	84	64	.0221	99.725
						50	15	66	.0228	99.716
16	(20	23	.0079	99.902		51	65	67	.0231	99.713
	(33	23	.0079	99.902		52	51	70	.0241	99.700
19	(10	25	.0086	99.893		53	(61	74	.0255	99.683
	(49	25	.0086	99.893			(68	74	.0255	99.683
21	52	27	.0093	99.884		55	30	85	.0293	99.635
22	(2	28	.0097	99.879		56	46	100	.0345	99.570
	(75	28	.0097	99.879		57	54	101	.0348	99.567
24	45	30	.0103	99.872		58	7	104	.0359	99.553
						59	66	106	.0366	99.532
25	(13	31	.0107	99.867		60	58	121	.0417	99.481
	(43	31	.0107	99.867		61	34	139	.0479	99.403
27	14	33	.0114	99.858		62	63	140	.0483	99.398
28	32	35	.0121	99.849		63	71	144	.0497	99.381

TABLE III—Oil and Ammonia Results, All Samples			20	22	99.665
Rank	Analyst	Efficiency	21	6	99.652
			22	37	99.646
			23	89	99.642½
1	78	99.934	24	61	99.627½
2	77	99.919½	25	85	99.621½
3	24	99.916½	26	43	99.621
4	25	99.914	27	8	99.606
5	74	99.892	28	67	99.603
6	57	99.874½	29	38	99.573½
7	41	99.871½	30	70	99.481
8	33	99.868	31	84	99.480
9	45	99.853	32	4	99.468
10	73	99.841½	33	46	99.412½
11	23	99.838	34	68	99.396½
12	20	99.833½	35	7	99.319
13	39	99.790	36	40	99.260½
14	3	99.786	37	82	99.213
15	49	99.762½	38	42	99.168
16	21	99.729½	39	71	99.142
17	2	99.713	40	58	98.886½
18	52	99.690	41	91	98.648
19	55	99.676½	42	63	98.584

TABLE IV—Results of Other Collaborators Whose Results Deserve Recognition				31	28	...	23
				36	28	...	65
				47	20	134	302
Analyst	No. samples reported on	Points off		50	28	127	97
		Oil	Ammonia	54	28	186	*
1	23	...	33	64	28	...	99
5	26	280	99	69	26	214	34
16	28	...	89	80	26	...	75
18	25-27	299	51	83	28	...	107
28	21	...	82	87	26	455	58
29	28	249	82	* 29 samples; reported in Table II.			

TABLE V

	No. Collaborators reporting	No. Results ±.10	No. Results ±.05	No. Results ±.02	Sample No.
<i>OIL</i>					
Max. uniformity	52	44	34	22	12
Min. uniformity	51	30	20	6	9
Average uniformity	51	40	30	15	..
<i>AMMONIA</i>					
Max. uniformity	83	79	73	46	11
Min. uniformity	82	70	49	23	9
Average uniformity	80	77	65	40	..