ent method) is an indication that the effect of heat and acid has been severe to the point that there is the possibility that some of the non-fatty materials present may be broken down and rendered ether soluble. This condition is caused primarily either by too high fuming temperature or by a high initial temperature so that the acid is vaporized too quickly and achieves the same result. A simple reduction in temperature, therefore, unless carried too far for practical purposes, is not the entire solution. There should also be, in any alteration of the present method, provision for a gradual increase in the temperature of the fuming oven. This would most easily be achieved by ventilating the oven before charging it.

With the use of reduced temperatures, the condition of the lint on the seed becomes an important factor. If due to maximum load or other reason, the oven heat is not great enough to cause the action of the acid to be complete, the lint fibres will still retain some strength and the resultant sample will be "linty" or "fluffy." Such a sample cannot be successfully mixed by present methods; this objection, in fact, was the principal one against the experimental method as originally presented. If, however, a mixing procedure was at hand that would eliminate this objection and allow the use of the safer, lower fuming temperature, it would be of value. The Committee has therefore worked on an alternate mixing procedure to be used at the discretion of the operator but which the majority of the Committee feels to be superior at all times. This suggestion embodies the unoriginal idea of using a small 4-inch straight-sided iron mortar and pestle. The pestle is inverted and used with a minimum of pressure and a rotary motion so that the sample is forced up the sides of the container; thus primarily a mixing rather than a crushing action is achieved, but one which still completely finishes breaking down the lint and also, to a great extent, any fine meat particles. With but little practice it is believed a much improved sample will be produced with a considerable saving in time and energy for the operator.

The Seed Analysis Committee, therefore, makes the following recommendations:

1. That the description of the fuming procedure be changed as follows:

"Place the dried seed in the pot, cover and place in the fuming oven previously opened and ventilated for at least five to ten minutes, and fume for one hour. The oven temperature should gradually rise to but not exceed 115° C."

2. That the following mixing method be added as an alternate:

"Place the sample in an ordinary small straight-sided iron mortar of about 4 inch inside depth. Using the pestle in an inverted position to avoid a crushing action, mix the sample lightly but thoroughly, using a stirring or rotary movement. Brush out the mortar after each sample."

3. That a satisfactory type of fuming pot, properly described, be substituted for the present stipulated flower pot.

Chairman,
Seed Analysis Committee.

REPORT OF THE SMALLEY FOUNDATION COMMITTEE OF THE AMERICAN OIL CHEMISTS' SOCIETY 1936-1937

WE are presenting herewith the 19th report of the Smalley Foundation Committee of the American Oil Chemists' Society. During these past nineteen years considerable progress has been made in the accuracy of the determination of oil and ammonia on cottonseed meal. According to our rules, the cup, which represents the best results in both oil and ammonia determinations, must be won by a collaborator three times before it becomes his permanent possession. This has occurred on two occasions heretofore, the first cup having been won by Dr. H. B. Battle. This cup was presented by the Industrial Chemical Sales Corporation. The second cup, which was presented by Dr. Battle, was won by Dr. W. F. Hand, and he immediately replaced the cup by a third, which now stands as the trophy for the third and last year.

We are pleased to report that the Southwestern Laboratories of Dallas, Texas, of which Mr. N. C. Hamner is President, have the highest score in oil and ammonia for this season. They have had this honor on two previous occasions and thus are entitled to the permanent possession of the cup.

As usual, thirty samples of cottonseed meal were distributed to the collaborators. Although the results are on the same high plane as of preceding years, they are somewhat lower than they were a year ago. However, the differences in percentage of perfection are so small as to be almost negligible.

There are attached to this report four tables, indicating the standing in percentage of the members taking part. Table No. I gives the standing of 49 collaborators who reported oil determinations on all samples. Table No. II gives the standing of 58 collaborators who reported ammonia results on all samples. Table No. III gives the standing of 49 collaborators who reported oil and ammonia on all samples. In these tables we have taken into consideration the results of those reports which were received within the time specified in our original announcement of the Smalley Foundation work. In table No. IV we have given the standing of those collaborators who reported on all samples, but some of whose reports were received too late to be included under the rules.

The winning collaborators are as follows:

The "Mississippi State Chemical Laboratory Cup" for the highest efficiency in the determination of both oil and ammonia on all samples is awarded to Analyst No. 18, Mr. N. C. Hamner, Southwestern Laboratories, Dallas, Texas, with an average of 99.944 per cent. The average efficiency is lower than that of last year, which was 99.953 per cent. There was a virtual tie for second place. The certificate goes to analysts No. 25 and 29, the Armour and Company Laboratory at Chicago, the work having been done by Mr. L. E. Norem, who had an efficiency of 99.930 per cent, as compared with 99.933 per cent for last year, and Mr. T. L. Rettger, Buckeye Cotton Oil Company, Memphis, Tenn., who had an efficiency of 99.928 per cent.

The certificate for the highest efficiency in determination of the oil only is awarded to Analysts No. 18 and No. 41, Mr. N. C. Hamner, Southwestern Laboratories, Dallas, Texas, and Mr. J. B. McIsaac, International Vegetable Oil Company, Savannah, Ga., with an average of 99.915, as compared with 99.931 for last year. The certificate for second place goes to Analyst No. 25, Armour and Company Laboratory at Chicago, with an efficiency of 99.898, as compared with 99.925 for last year.

The certificate for the highest efficiency in the determination of ammonia is awarded to Analyst No. 29, Mr. T. L. Rettger, Buckeye Cotton Oil Company, Memphis, Tenn., with an average of 99.985 per cent, as compared with 99.988 for last year. The certificate for second place goes to Analyst No. 18, N. C. Hamner, Southwestern Laboratories, Dallas, Texas, with an average of 99.973, as compared with 99.980 for last year. Mr. Hamner won second place in the ammonia determination last year also.

During the past year we tightened up on our rules for reporting of analyses and are pleased to say that the collaborators responded excellently and that less trouble was encountered in handling the reports through our office.

Some time ago it was suggested by Dr. G. S. Fraps, State Chemist of Texas, that we change the method of reporting our results, expressing our final figures as percentage of nitrogen rather than ammonia. This was put to a vote of the Smalley Foundation Committee and the majority were of the opinion that no change be made and unless the society votes differently we shall continue reporting our results as formerly.

We thought it might be well to include in this report a list of the previous winners of the highest award for both oil and ammonia. They are as follows:

1918-1919, G. C. Hulbert, Southern C. O. Co., Augusta, Ga.
1919-1920, G. C. Hulbert, Southern C. O. Co., Augusta, Ga.
1920-1921, C. H. Cox, Barrow-Agee Lab's, Memphis, Tenn.
1921-1922, Battle Laboratories, Montgomery, Ala.
1922-1923, Battle Laboratories, Montgomery, Ala.
1923-1924, L. B. Forbes, Memphis, Tenn.
1924-1925, E. H. Tenent, International Sugar Feed Co. No. 2, Memphis.
1925-1926, Battle Laboratories, Montgomery, Ala.
1926-1927, W. F. Hand, Mississippi State College, State College, Miss.
1927-1928, E. H. Tenent, International Sugar Feed Co., Memphis.
1928-1929, Geo. W. Gooch Laboratories, Los Angeles, Calif.
1929-1930, Southwestern Laboratories, Dallas, Texas.
1930-1931, W. F. Hand, Mississippi State College, State College, Miss.
1931-1932, J. N. Pless, Royal Stafolife Mills, Memphis, Tenn.
1932-1933, J. B. McIsaac, International Veg. Oil Co., Savannah, Ga.
1933-1934, W. F. Hand, Mississippi State College, State College, Miss.
1934-1935, W. F. Hand, Mississippi State College, State College, Miss.
1935-1936, N. C. Hamner, Southwestern Lab's., Dallas, Texas.
1936-1937, N. C. Hamner, Southwestern Lab's., Dallas, Texas.

We wish again to commend the careful and painstaking work of Mr. T. C. Law in the preparation and distribution of samples. As we have stated previously, few of us realize the amount of work required to handle this phase of our collaborative endeavors, and members as a whole should be grateful to him for assuming this burden.

TABLE No. I
DETERMINATION OF OIL

Analyst No.	Points Off	Percent Efficiency
18	16	99.915
41	16	99.915
25	19	99.898
43	20	99.893
47	20	99.893
29	24	99.871
46	24	99.871
74	24	99.871
31	26	99.860
12	27	99.855
26	28	99.850
48	30	99.839
15	31	99.834
8	32	99.828
1	34	99.818
68	34	99.818
11	36	99.807
53	38	99.796
5	39	99.791
42	42	99.775
44	44	99.763
24	45	99.759
40	46	99.754
3	47	99.748
27	47	99.748
9	49	99.738
16	51	99.726
17	53	99.715
70	54	99.710
10	59	99.683
19	61	99.673
23	61	99.673
14	61	99.673
75	61	99.673
37	63	99.662
58	65	99.651
4	67	99.641
13	68	99.635
78	85	99.545
45	87	99.533
61	89	99.522
66	93	99.501
2	94	99.496
81	95	99.490
33	99	99.469
77	129	99,308
39	141	99.244
7	161	99.136
60	189	98.899

TABLE No. II
DETERMINATION OF AMMONIA

Analyst No.	Points Off	Percent Efficiency
29	4	99.985
18	7	99.973
12	9	99.965
25	10	99.961
46	12	99.953
23	14	99.945
68	16	99.938
31	17	99.933
7	18	99.929
1-47-80	19	99.926
48	21	99.918
26	22	99.914
11-43-61	23	99.909
5	24	99.906
9-42	25	99.902
24-33	27	99.894
41-57	28	99.890
14-81	29	99.886
2-73-74	31	99.879
37	33	99.870
27	34	99.866
53	35	99.862
15	36	99.859
8-10-58	37	99.855
4-17	41	99.838
19	42	99.835
70	43	99.832
16	46	99.820
78	47	99.815
20	52	99.796
13-69	54	99.788
3	55	99.784
66	60	99.764
40	61	99.761
50	79	99.690
44	80	99.685
45	82	99.678
75	85	99.667
77	87	99.658
39	119	99.532
60	132	99.481
67	141	99.446
52	167	99.343
30	208	99.183

TABLE No. III.—DETERMINATION OF OIL AND AMMONIA

Analyst No.	Percent Efficiency
18	99.944
25	99.930
29	99.928
46	99.912
12-47	99.910
41	99.903
43	99.901
31	99.897
26	99.882
48	99.879
68	99.878
74	99.875
1	99.872
11	99.858
5	99.849
15	99.847
8	99.842
42	99.839
53	99.829
24	99.827
9	99.820
23	99.809
27	99.807
14	99.780
17	99.777
16	99.773
70	99.771
10	99.769
37-3	99.766
40	99.758
19	99.754
58	99.753
4	99.740
44	99.724
61	99.716
13	99.712
81-2	99.688
33	99.682
78	99.680
75	99.670
66	99.633
45	99.606
7	99.533

77	99.483
39	99.388
60	99.190

TABLE No. IV.—SPECIAL TABLE

Determination of Oil

Analyst No.	Points Off	Percent Efficiency
28	67	99.641
35	75	99.598
79	82	99.561
38	86	99.538

Determination of Ammonia

28	21	99.918
35	22	99.914
79	68	99.732
38	109	99.572

Determination of Oil and Ammonia

28	99.780
35	99.756
79	99.647
38	99.555

Personnel of Committee:
Thos. C. Law
E. H. Tenent
B. L. Caldwell
T. B. Caldwell
F. Paquin
J. N. Pless
W. C. Moor
M. E. Whitten
J. J. Vollertsen, Chairman

ABSTRACTS

Oils and Fats

Edited by
W. F. BOLLENS and M. M. PISKUR

Breeding research and oil seed cultivation. W. Rudorf. *Fette u. Seifen* 44, 129-36 (1937). Review.

The refractometric fat determination on oil seeds (benzine process). W. Leithe and H. Lamel. *Fette u. Seifen* **44,** 140-2 (1937). The method is described. Data for use when testing linseeds, soybeans, rape seed, peanuts and coconuts are tabulated.

Refractometric fat acid determination in turkey red oils. W. Leithe and H. Lamel. *Fette u. Seifen* **44,** 111-113 (1937).

Determination of the hydroxyl number of hydroxy fat acids. K. Hinsberg. *Biochem. Z.* **289,** 294 1937); c. *C. A.* **30,** 4888^3.—Measure 1.0-1.6 g. fat into a 25-cc. vol. flask provided with a glass stopper and a ground in tube and add an *exact* 20.0 cc. 5 *N* Ac_2O-pyridine mixt. Add 20 cc. of the mixt. to a second flask. Set both flasks on the water bath and reflux for 7 hrs. Cool, make up to vol. with pyridine. The calcn. is made on the basis of the difference between the 2 titrations. (*Chem. Abs.*)

Research on detection of cruciferae oils in food oils. J. Grossfeld. *Z. Untersuch Lebensm.* **73,** 409-26 (1937). The method depends on the presence of erucic acid. To a 500 mg. sample of oil are added 500 mg. of lauric acid and 10 cc. alco.—KOH (40 cc. H_2O soln. of KOH, sp. gr. 1.5, plus 40 cc. H_2O with 96% alc. to 1 L.). The mixt. is saponified 10 min. under reflux condenser; then 50 cc. Pb-acetate soln. (50 g. Pb-acetate + 5cc. HAc with 80 vol.—% alc. to 1 L.), 2.5 cc. 96% HAc and 10 cc. H_2O are added. The soln. is heated and allowed to stand several days at 20° to crystallize. The I uptake of the ppt. is detd. and expressed in cc. of 0.1 N thiosulfate soln. In tests on graded mixt. of erucic acid with olive oil, the relation between the titration (x) and mg. of erucic acid (y) was found to be $y = 52.1x - 0.9x^2 - 217.2$. When y = O, the amt. of erucic acid can be as high as 4.52. The calculation to erucic acid is accurate to ± 11 mg. or ± 2.2%. A table for converting titration to mg. erucic acid is presented. The author also proposed that crucifierae oils be characterized by a new characteristic which he named the "erucic acid value." Values for several oils are presented.

The detection of animal fats and oils especially hardened train (marine animal) oil in fat mixtures. S. H. Betram. *Ole, Fette, Wachse, Seife, Kosmetik* 1937, No. 2, 13-14. In an investigation on the Tortelli-Jaffe reaction the author noted that (1) the green color reaction with hardened train oil occurred when the prescribed AcOH was omitted; and (2) when the prescribed $CHCl_3$ was replaced with CCl_4, CH_3CHCl_2, or MeI, the reaction was negative; when it was replaced with MeBr or C_6H_5COCl the color reaction was weak; while replacing the $CHCl_3$ with perchloroethylene (C_2Cl_4) or $C_2H_2Cl_2$ the reaction was significantly stronger. With a purified $C_2H_2Cl_2$ the reaction was weak. Because of the weaker reaction in this purified solvent, a check was made to ascertain whether $CHCl_3$ acted similarly. When pure $CHCl_3$, prepd. from alc., was used in the test on train oil, the reaction was negative. Use of impure $CHCl_3$ solvents, *i.e.,* contg. aldehydes yielded excellent positive reactions. A new procedure proposed for the detection of animal oils (except hog fat) was: 1 cc. of oil or fat is mixed with about 3 g. crystd. trichloroacetic acid in a test tube and heated 5 mins. at 60° in an oil bath. The tube is removed from the oil bath and 10 cc. $CHCl_3$ are added. Development of a violet color indicates the presence of animal oil or fat except for hog fat, for which the reaction is negative. An intense violet color is obtained with whale, seal, herring, pilchard, shark and egg oils; the reaction being equally good for the partially hardened and unhardened oils. Beef fat, butter fat, sperm oil and horse fat give weak reactions. A green color with strong fluorescence occurs with ergosterol. Pure cholesterol and pure phytosterol yield no color with the procedure. (*Chem. Abs.*)

Less-known constituents of milk and their examinations. Some minor component acids of milk-fats and their possible significance. T. P. Hilditch. *Analyst* 62, 250-258 (1937). The fat acid compn. of milk fat of various localities are tabulated.

The lipids of steer hide. IV. The effect of liming on the lipids of steer hide. R. M. Koppenhoefer. *J. A. L. C. A.* **32,** 210-230 (1937). This work presents the results of a detailed study of the effect of straight liming on the lipids of a 30 day cured steer hide. Liming does not effect either the saponification or the removal of the corium triglycerides. Liming results in the almost complete neutralization of the free fatty acids of both the corium and epidermal regions. Through the action of the soak solution and by washing and saponification in the lime, the quantity of epidermal wax in the limed hide was reduced to one-third its quantity. Analyses of lipids extd. by several solvents and fractions of these and analyses of remaining lipids in the various hide layers are tabulated.