In submitting his report, which is here attached, Mr. Agee states in substance: That the proposed rules for sampling cottonseed and cottonseed hulls are based on ideas drawn from some of the practical men in the business, from his own engineers who have made a careful study of oil mill problems, and as a result of their own laboratory experience. He further adds that he is making no report on the method of sampling linters, since linters are seldom analyzed in the factory and commercial laboratories connected with the cotton oil industry; that linters sampling of course is of interest to the paper pulp and explosive chemists, but no doubt they have methods of their own for sampling linters, and furthermore that the Interstate Cottonseed Crushers Association has at the present time a special Committee of linter samples and grades.

Mr. H. P. Banks, of the Oil Cake and Meal Section, with his intimate knowledge and experience with Oriental commodities, has furnished a useful contribution of a descriptive character, governing sampling of imported commodities, such as soya bean and linseed cake, fish meal, peanuts, etc. The data furnished in Mr. Banks' report will serve as a basis on which to perfect concrete rules governing these commodities, that future Sampling Committees may wish to cover, which would probably belong to Chapter 16 of the Interstate Cottonseed Crushers Association rules now covering trade in imported oils.

Mr. Thos. C. Law's report, representing the Miscellaneous Section, is not yet at hand, but is hoped will be presented directly in time for consideration by the Association.

Mr. W. D. Richardson, to whom we are looking for a most interesting report on tank car sampling, will probably submit it directly, as it has not yet been received. Mr. Richardson, as Chairman of the A. C. S. Committee on Sampling and Analysis of Commercial Fats and Oils, has the opportunity to coördinate rules which should make them uniform for both organizations.

The chairman feels that a measure of success at least has been obtained by the system of individual sponsorship for definite subjects, and probably as much if not more than would have been accomplished by the older custom.

Committee: P. W. TOMPKINS (Curtis & Tompkins, San Francisco), D. WESSON, W. D. RICHARDSON, H. P. BANKS, G. W. AGEE, T. C. LAW.

Bibliography of Sampling, DAVID WESSON

It has been said that three things are essential to a correct analysis. First, obtaining a correct sample, second, using a correct method of analysis and applying it correctly, and third, drawing the correct reference from the results.

Thousands of pages have been written on methods of analyses as compared with a few hundred on methods of sampling. It has seemed advisable to collect so far as convenient such references to literature of sampling as would be of use to the Committee on Sampling, and to others interested in the subject. References are given and where desirable, brief abstracts or comments are furnished along with them.

J. Soc. Chem. Ind., **2**, 411 (Nov. 29, 1883). "International Methods of Sampling and Testing Commercial Products."—Hurter.

This started a discussion which lasted through the following year. Lunge read report of efforts to secure an international agreement between England, France, Germany and Austria.

J. Soc. Chem. Ind., **3**, 210 (1884).—"Standard Methods of Sampling and Analysis."

Liverpool Section after considerable discussion resolved: That in the opinion of the meeting it would be practicable and very desirable to attain a national agreement on Standard Methods of Sampling ores, raw products, and chemicals, but that an international agreement would be at this time impracticable.

J. Soc. Chem. Ind., **3**, p. 17. "International Methods of Sampling and Testing."—John Pattinson.

J. Soc. Chem. Ind., **3**, p. 339. "On Methods of Sampling."—A. Norman Tate.

Paper before the Liverpool Section goes very fully into the subject in general.

J. Soc. Chem. Ind., **3**, 307 (1884). "On the Practicability of Internationally Establishing and Maintaining Standard Methods of Sampling and Analysis."—Robt. R. Tatlock.

J. Soc. Chem. Ind., **3**, 345–356 (1884). Adjoined discussion on "Standard Methods of Sampling and Analysis and Stating the Results."—Manchester Section.

J. Soc. Chem. Ind., **3**, 650 (1884). "Sampling Apparatus."—H. Augenstein.

German patent 26,680, 1883.

J. Soc. Chem. Ind., **11**, 268; *Eng. Mining J.*, **1892**, 275. "Mixer and Divider for Ore Samples and Small Sampling Machine."—H. L. Bridgerman.

J. Soc. Chem. Ind., **12**, 547; *School of Mines Quarterly*, **13**, 364–368 (1892). "Notes on Sampling."—H. R. Wood.

J. Soc. Chem. Ind., **13**, 214 (1894). "The Sampling of Materials."—T. Clarkson.

A very full paper describing theory of sampling and mechanical appliances to secure accuracy.

J. Soc. Chem. Ind., **13**, 197. "Some Notes on Sampling."—David Sorley.

J. Soc. Chem. Ind., **13**, 277.—"Sampling by Quartation." *J. Am. Chem. Soc.*, **15**, 260–265 (1893).—P. W. Shimer and S. K. Reifsuyder.

J. Soc. Chem. Ind., **17**, 694 (1898), Eng. patent 7021, Mar. 23, 1898. "Improved Apparatus for Taking Samples of Pulverized and Granulated Materials."

J. Soc. Chem. Ind., **21**, 724, *Eng. Mining J.*, **1902**, 73–514. "Sampling—Automatic System of."—P. Johnson.

J. Soc. Chem. Ind., **20,** 992, Eng. patent 14,353, Aug. 10, 1900. "Sampling, Averaging, Mixing, and Storing Material (Portland Cement) in Bulk. Process and Apparatus."—T. A. Edison.

J. Soc. Chem. Ind., **24,** 183 (Feb. 28, 1905). "Standard Methods of Sampling—a Review with Some Suggestions."—Martin L. Griffin.

A careful review of the whole subject.

J. Soc. Chem. Ind., **28,** 194 (1902). Martin L. Griffin goes into the "Mathematics of Sampling" and concludes:

"We may therefore conclude that if a chemist is conversant with the history of the product which he is about to sample and knows how to draw proper samples, the number may be very limited, perhaps 10, not more than 20 or 25. If he lacks the knowledge and ability to do this part of the work, the drawing of almost any number of samples will be untrustworthy."

J. Soc. Chem. Ind., **28,** p. 357. "Sampling Coal—Accuracy in."—E. G. Bailey. Abstract from *J. Ind. Eng. Chem.*, **1909,** pp. 1, 78, 161.

Bailey discusses relation between sizes of sample, size of pieces for each quartering or dividing, there being a direct relation between the size of lumps in the car and the size of particles in the final portion weighed out.

J. Soc. Chem. Ind., **29,** p. 138. "Sampling of Ores—Element of Chance in the."—L. T. Wright; *Mining Magazine*, **3,** 353, 358 (1910).

The author deals mainly with the question of the safe weight in the minimum quantity which shall be truly representative of the whole of the ore and shows relation between size of particles and weight of samples.

J. Soc. Chem. Ind., **30,** 1018 (1911). "Sample—Preparation for Assay."—L. D. Huntoon; *Eng. Min. J.*, **91,** 1249 (1911).

Weights to be taken for different sizes of particles to secure accurate samples—$^1/_2$" 50 lbs.; $^1/_4$" 25; 10" 6 lb.; 20" 3 lb.; 40" 24 oz.; 60" 5 or 6 ozs.

J. Soc. Chem. Ind., **30,** 556 (1911). "Crude Glycerine—Sampling of."—O. Hehner and others.

J. Soc. Chem. Ind., **30,** 1103 (1911). "Directions for Sampling Oil and Natural Gas."—I. C. Allen, U. S. Bureau of Mines, *Tech. Paper*, **1–13,** 3 pp. (1911).

J. Soc. Chem. Ind., **30,** 984. "Gases—Methods U. S. Steel Corporation for Sampling;" *Met. Chem. Eng.*, **9,** 302–306, 356–361 (1911).

J. Soc. Chem. Ind., **30,** 547. "Sampling Ores from Cobalt Mines."—F. W. Pagsley; *Eng. and Min. Journal*, **1911,** 91–776.

J. Soc. Chem. Ind., **30,** 278. "Comparison of Methods of Sampling Wood Pulp."—J. Persoz.

J. Soc. Chem. Ind., **31,** 1011 (1912). "Samples of Gas—Means for Collecting Average."—H. J. Westover, N. Y., U. S. patent 1,037,695, Sept. 3, 1912.

J. Soc. Chem. Ind., **30,** 743. "Air, New Apparatus for Sampling, for Dust."—E. J. Laschinger, *Jour. Chem. Met. and Min. Soc. S. Africa*, **1912,** pp. 443–447.

J. Soc. Chem. Ind., **30,** 927. "Pig Iron—Methods of U. S. Steel Corporation, Chemists' Committee U. S. Steel Corporation."—*Eighth Int. Cong. Applied Chem.*, **1912.**

J. Soc. Chem. Ind., **30**, 928. "Gold Bullion—Sampling of."—F. P. Dewey, *Eighth Int. Cong. Applied Chem.*, **1912.**

J. Soc. Chem. Ind., **30**, 880. "Silver Ores—Sampling and Assaying."—J. O. Handy, *Eighth Int. Cong. Applied Chem.*, **1912.**

J. Soc. Chem. Ind., **32**, 590 (1913). "Sampling Coal Deliveries, Types Govt. Specifications."—G. S. Pope, Bureau of Mines, *Dept. Int. U. S. A.*, Bulletin, 63, 1913, Washington Govt. Printing Office.

J. Soc. Chem. Ind., **32**, 928. "Apparatus for Sampling Fine Powder or Liquids."—T. Roberts.

J. Soc. Chem. Ind., **32**, 1092. "An Automatic Gas Sampling Apparatus with Some Observations on Sampling."—Thomas Gray.

J. Soc. Chem. Ind., **32**, 664. "Plant or Apparatus for Sampling Ores."—A. S. Cleft, London, U. S. patent 1,062,636, May 27, 1913.

J. Soc. Chem. Ind., **32**, 154. "Sampling Sugar Cane Juices."—W. C. Nilboer.

J. Soc. Chem. Ind., **33**, 809 (1914). "Method and Apparatus for Sampling Gases."—E. W. Brown, U. S. patent 1,100,171, Oct. 7, 1912.

J. Soc. Chem. Ind., **32**, 714. "Sampling Liquids—Apparatus for."—R. L. Chambers, English patent 17,828, August 5, 1912.

J. Soc. Chem. Ind., **32**, 905. "Apparatus for Sampling Liquids in Tanks."—E. Schmitz. See *Matiere Grassè*, **7**, 1914–4494 (1914).

J. Soc. Chem. Ind., **34**, 1915.

J. Soc. Chem. Ind., **35**, 896 (1916). "Apparatus for Taking Samples of Flowing Pulp, Slimes, Ores, etc."—P. Davien.

J. Soc. Chem. Ind., **36**, 544 (1917). "Sampling Device for Pulp Digestors."—P. Tuttle.

J. Soc. Chem. Ind., **38**, 59 R (1919). "New Sample Device for Sampling."—L. J. Riley.

J. Soc. Chem. Ind., **39** (1920). Nothing.

J. Soc. Chem. Ind., **40** (1921). Nothing.

J. Soc. Chem. Ind., **41** 611 A (1922). "Sampling Horn."—Kellogg.

New York Produce Exchange has definite rules for sampling materials which are set forth in annual report from July 1, 1921 to July 1, 1922.

Rules and By-Laws of the Chicago Board of Trade give no definite rules as to how samples should be drawn.

Rules of the New Orleans Cotton Exchange do not specify methods of sampling.

Charter, By-Laws and Rules of the Savannah Cotton Exchange do not specify methods of sampling.

Interstate Cottonseed Crushers Association has very full set of the rules for drawing samples. There are opportunities, however, for improving on some of them.

Railroads: Correspondence with a number of railroads indicated in several cases that methods of sampling had never been heard of. On the other hand, The New York Central Railroad Company issued booklet entitled "Instructions Concerning Sampling of Material for Test, May 1, 1917." The Pennsylvania Railroad gives instructions for drawing samples in connection with specification of materials. The same seems to be the case with the Chicago and Northwestern Railway Company.

Specifications for inspection of materials for the Navy Department: General instructions only are given without specifying details as to how sampling should be taken.

General Supply Committee of the Government issue specifications but do not state how materials should be sampled.

Cotton Oil Press, **4**, No. 3, p. 87. "Report of Sub-committee on Sampling Cottonseed—Recommendations for the Sampling of Cottonseed, Peanuts, Soya Beans and Copra."

Cotton Oil Press, **4k**, No. 9, p. 50. "Errors in Official Methods of Sampling Tank Cars."—P. W. Tompkins and E. S. McElligott of Curtis and Tompkins.

Cotton Oil Press, **5**, No. 10, p. 29. "Notes on Sampling Deep-Sea Tanks."—P. W. Tompkins, of Curtis and Tompkins.

Cotton Oil Press, **5**, No. 10, p. 32. "Are Cottonseed Samples Representative?"—A. C. Goetz.

Cotton Oil Press, **6**, No. 1. "Sampling Committee Report, 1921–1922."—M. J. Falkenburg.

Cotton Oil Press, **6**, No. 10, p. 32. "Standard Methods for the Sampling and Analysis of Commercial Soaps and Soap Products."

Cotton Oil Press, **6**, No. 11, p. 33. "Standard Methods for the Sampling and Analysis of Commercial Soaps and Soap Products" (*continued from No. 10*).

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"Min. Sampling and Valuing."—Herzig and Purington, San Francisco, Mining and Scientific Press.

"Standard Methods of Sampling for Check Analysis," *Met. Chem. Eng.*, **10**, pp. 701–2.

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"The Value of Coal Mine Sampling."—M. R. Campbell, *Econ. Geol.*, pp. 2–48–57.

"Sampling of Liquids—Specifications for." Report of Sub-Committee of American Soc. for Testing Materials. *Drugs, Oil and Paint*, **1915**, 31–47.

"New Sampling Plant—Hamburg," *Eng. Min. J.*, **100**, 140–1(1915).

"Standard Methods of Sampling and Analysis of Standard Samples."—W. F. Hillebrand, *J. Ind. Eng. Chem.*, **8**, 466–9 (1916).

"Establishment of Uniform Methods of Sampling."—H. W. Wiley, *Report of International Com. on Analysis to the 8th Int. Cong. of Applied Chem.*, pp. 42–69.

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