

U. S. DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS

REPORT OF THE
TWENTY-FOURTH NATIONAL CONFERENCE
ON
WEIGHTS AND MEASURES

ATTENDED BY REPRESENTATIVES
FROM VARIOUS STATES

HELD AT THE BUREAU OF STANDARDS
WASHINGTON, D. C., JUNE 2, 3, 4, AND 5, 1931

MISCELLANEOUS PUBLICATIONS—No. 129

U. S. DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary

BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1931

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(Serving during twenty-fourth national conference)

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President, GEORGE K. BURGESS, Director, Bureau of Standards, Washington, D. C.

First vice president, ALBERT B. SMITH, director, State bureau of standard weights and measures, Harrisburg, Pa.

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 GEORGE M. ROBERTS, superintendent of weights, measures, and markets, Washington, D. C.
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 ALBERT B. SMITH, director, State bureau of standard weights and measures, Harrisburg, Pa.
 C. P. SMITH, sealer of weights and measures of Suffolk County, Riverhead, N. Y.

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NORMAN L. KNAUSS, Bureau of Standards, Washington, D. C.

LIST OF PERSONS ATTENDING THE CONFERENCE

DELEGATES—STATE, COUNTY, AND CITY OFFICIALS

ARIZONA

City: Phoenix..... D. P. KIMBALL, sealer of weights and measures,
City Hall.

CALIFORNIA

City and County: San Fran-
cisco..... THOMAS FLAHERTY, sealer of weights and meas-
ures, room 6, City Hall, San Francisco.

CONNECTICUT

State..... PHILIP T. PILON, inspector of weights and meas-
ures, 100 Washington Street, Hartford.

City:
Hartford..... LOUIS ELSNER, sealer of weights and measures,
550 Main Street.

New Haven..... EDWARD J. MARONEY, sealer of weights and
measures, City Hall.

County:
Fairfield..... WILLIAM H. BROWN, sealer of weights and meas-
ures, Courthouse, Bridgeport.

Hartford..... MILO C. GRIFFIN, sealer of weights and measures,
95 Washington Street, Hartford.

New Haven..... WILLIAM P. TYLER, sealer of weights and meas-
ures, Courthouse, New Haven.

DISTRICT OF COLUMBIA

District..... GEORGE M. ROBERTS, superintendent of weights,
measures, and markets, District Building,
Washington.

W. C. DILLER, chief inspector of weights, meas-
ures, and markets, District Building, Washing-
ton.

GEORGE A. HOWE, inspector of weights, measures,
and markets, District Building, Washington.

G. STUART REEDER, inspector of weights, meas-
ures, and markets, District Building, Washing-
ton.

GEORGE C. WRIGHT, inspector of weights, meas-
ures, and markets, District Building, Washing-
ton.

FLORIDA

City: Jacksonville..... HOWARD E. CRAWFORD, inspector of weights and
measures.

GEORGIA

State..... S. H. WILSON, State oil chemist, room 134, State
Capitol, Atlanta.

ILLINOIS

State..... W. T. FOSSETT, superintendent of standards,
State Capitol, Springfield.

W. A. CARLETON, inspector of standards, 207
North Street, Hinsdale.

INDIANA

State-----	I. L. MILLER, commissioner of weights and measures, room 201, Statehouse Annex, Indianapolis.
City: Fort Wayne-----	C. B. TOLAN, inspector of weights and measures, City Hall.
City and County: Huntington-----	DEFOREST MC LIN, inspector of weights and measures, Huntington.

MAINE

City: Portland-----	C. V. FICKETT, sealer of weights and measures, City Building.
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MARYLAND

City: Baltimore-----	S. T. GRIFFITH, chief, division of weights and measures, City Hall.
	CHARLES G. CROCKETT, inspector of weights and measures, City Hall.
	LOUIS G. EBERHARDT, inspector of pharmaceutical scales, City Hall.
	JAMES T. EVERETT, inspector of weights and measures, City Hall.
	WILLIAM H. LARRIMORE, inspector of weights and measures, City Hall.
	GEORGE H. LEITHAUSER, inspector of weights and measures, City Hall.
	THOMAS J. NAPFEL, inspector of weights and measures, City Hall.
	ELMER E. NICHOLSON, inspector of weights and measures, City Hall.
	ELMER S. PIERPONT, inspector of weights and measures, City Hall.
	CHARLES RUSTEBERG, inspector of weights and measures, City Hall.
	HENRY SLITZER, assistant inspector of weights and measures, City Hall.
County: Washington-----	D. FRANK MILLER, inspector of weights and measures, Boonsboro.

MASSACHUSETTS

State-----	FRANCIS MEREDITH, director of standards, room 194, Statehouse, Boston.
City:	
Belmont-----	ELDORUS A. CASTNER, sealer of weights and measures, 612 Grapelo Road.
Beverly-----	ROBERT J. RAFFERTY, sealer of weights and measures, City Hall.
Boston-----	JAMES A. SWEENEY, sealer of weights and measures, room 105, City Hall Annex.
Danvers-----	JOHN D. BRUMMITT, sealer of weights and measures, Town Hall.
Medford-----	JOHN J. CAREW, sealer of weights and measures.
Natick-----	CHARLES H. HOLLIS, sealer of weights and measures, 20 Waban Street.
Taunton-----	EDWARD C. WARD, sealer of weights and measures.
West Newton-----	ANDREW PRIOR, sealer of weights and measures, City Hall.

MICHIGAN

State-----	L. P. STRONG, chief, division of weights and measures, Lansing.
City:	
Detroit-----	GEORGE F. AUSTIN, Jr., supervising inspector of weights and measures, 1300 Beaubien Street.
Lansing-----	CARL A. BUNDENTHAL, sealer of weights and measures, Municipal Market Building.

MINNESOTA

State----- D. F. JURGENSEN, chief engineer, railroad and warehouse commission, State Capitol, St. Paul.

MISSOURI

City: St. Louis----- WILLIAM H. HUBELE, commissioner of weights and measures, City Hall.

NEVADA

State----- S. C. DINSMORE, sealer of weights and measures, Reno.
W. B. ADAMS, deputy sealer of weights and measures, Reno.

NEW HAMPSHIRE

State----- H. A. WEBSTER, commissioner of weights and measures, Statehouse, Concord.
E. P. JONES, inspector of weights and measures, Chester.
City: Manchester----- ARTHUR J. PROVENCHER, sealer of weights and measures, 180 Franklin Street.

NEW JERSEY

State----- JOSEPH G. ROGERS, assistant superintendent of weights and measures, 187-189 West Hanover Street, Trenton.
FRANCIS LEO BRUGGY, assistant superintendent of weights and measures, 187-189 West Hanover Street, Trenton.
ELLIOTT B. HOLTON, assistant superintendent of weights and measures, 187-189 West Hanover Street, Trenton.
HARRY S. PROVOST, assistant superintendent of weights and measures, 187-189 West Hanover Street, Trenton.

City:

Clifton----- GARRET N. DEVRIES, superintendent of weights and measures.
Elizabeth----- WILLIAM J. BENDER, superintendent of weights and measures, Harmonia Building.
Jersey City----- JOHN S. BURKE, superintendent of weights and measures, City Hall.
Kearny----- JOHN D. CASTLES, superintendent of weights and measures.
Newark----- PATRICK J. CAUFIELD, superintendent of weights and measures, City Hall.
Trenton----- FRANCIS J. BLACK, superintendent of weights and measures, City Hall.

County:

Bergen----- A. F. BARNARD, superintendent of weights and measures, 29 Main Street, Hackensack.
Cape May----- GILBERT S. SMITH, superintendent of weights and measures, Avalon.
Gloucester----- WILLIAM P. ABDILL, superintendent of weights and measures, Woodbury.
Hudson----- THOMAS J. WALDRON, superintendent of weights and measures, Courthouse, Jersey City.
Mercer----- RALPH M. BODENWIESER, superintendent of weights and measures, Trenton.
Middlesex----- JOSEPH FERTIG, superintendent of weights and measures, 184 Livingston Avenue, New Brunswick.
Monmouth----- GLENN L. BERRY, superintendent of weights and measures, Asbury Park.
ROBERT M. MARKS, assistant superintendent of weights and measures, Manasquan.

County—Continued

Morris.....	HENRY S. WORMAN, superintendent of weights and measures, Boonton.
Somerset.....	MELVIN H. CLEAVES, superintendent of weights and measures, Somerville.
Sussex.....	R. LEE SLATER, superintendent of weights and measures, Newton.
Union.....	ISAAC SEELEY, superintendent of weights and measures, Courthouse, Elizabeth.

NEW YORK

City:

Buffalo.....	CHARLES J. QUINN, sealer of weights and measures, 757 East Ferry Street.
Rochester.....	J. H. STEPHENSON, sealer of weights and measures, 34 Court Street. MARTIN J. MACK, assistant sealer of weights and measures, 34 Court Street.
White Plains.....	RICHARD HARDING, sealer of weights and measures, 19 Waldo Avenue.

County:

Eric.....	ORAL F. GAYLORD, sealer of weights and measures, 210 County Hall, Buffalo.
Monroe.....	WILLIAM A. PAYNE, sealer of weights and measures, 305 Terminal Building, Rochester. RICHARD STANTON, deputy sealer of weights and measures, 305 Terminal Building, Rochester.
Nassau.....	ROBERT WILLIAMS, sealer of weights and measures, Courthouse Annex, Mineola.
Suffolk.....	C. P. SMITH, sealer of weights and measures, Riverhead.

NORTH CAROLINA

State.....	WILLIAM A. GRAHAM, commissioner of agriculture, Raleigh. C. D. BAUCOM, acting superintendent of weights and measures, Raleigh.
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OHIO

State.....	J. C. TINKEY, deputy State sealer of weights and measures, Hartman Building, Columbus.
City: Columbus.....	M. A. BRIDGE, sealer of weights and measures.
County:	
Licking.....	C. R. MCFADDEN, deputy sealer of weights and measures, Pataskala.
Trumbull.....	WILLIAM O. WILLIAMS, deputy sealer of weights measures, 802 North State Street, Girard.

PENNSYLVANIA

State.....	PHILIP H. DEWEY, secretary of internal affairs, Harrisburg. ALBERT B. SMITH, director, bureau of standard weights and measures, Harrisburg. L. A. THORNTON, mechanic, department of internal affairs, Harrisburg.
City:	
Allentown.....	B. FRANK RINN, inspector of weights and measures, City Hall.
Altoona.....	W. B. DUNN, inspector of weights and measures.
Harrisburg.....	GEORGE B. NEBINGER, inspector of weights and measures, City Hall.
York.....	D. L. STOUCH, inspector of weights and measures, 460 West Market Street.

County:

Dauphin-----	JOHN E. BOWERS, inspector of weights and measures, 13 South Third Street, Harrisburg.
Lehigh-----	HARRY E. BIERY, inspector of weights and measures, Courthouse, Allentown.
Philadelphia-----	PHINEAS T. GREEN, chief, bureau of weights and measures, room 308, City Hall, Philadelphia. CONYERS B. GRAHAM, chief clerk, room 306, City Hall, Philadelphia. WOODWARD ABRAHAMS, district supervisor, bureau of weights and measures, room 305, City Hall, Philadelphia. JACOB M. VANDERSLICE, district supervisor, bureau of weights and measures, room 305, City Hall, Philadelphia.

City and County:

Beaver Falls and Beaver County-----	CHESTER RIMBY, inspector of weights and measures, Beaver Falls.
Easton and Northampton County-----	JOHN J. WEPPEL, inspector of weights and measures, Courthouse, Easton.

RHODE ISLAND

City: Providence-----	JOHN H. HENNESSEY, superintendent of weights and measures.
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VERMONT

State-----	H. N. DAVIS, deputy commissioner of weights and measures, Montpelier.
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VIRGINIA

State-----	J. H. MEEK, director, division of markets, 1030 State Office Building, Richmond. H. G. COVILLE, field representative, division of markets, Richmond.
City: Richmond-----	B. W. RAGLAND, chief, bureau of weights and measures, 314 City Hall Annex. C. D. GARDER, deputy sealer of weights and measures, 314 City Hall Annex.

WEST VIRGINIA

State-----	HOWARD S. JARRETT, commissioner of weights and measures, Charleston.
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WISCONSIN

State-----	GEORGE WARNER, chief inspector of weights and measures, Capitol Building, Madison.
City: Milwaukee-----	WILLIAM F. STEINEL, sealer of weights and measures, 1331 North Fifth Street.

OTHER DELEGATES, AND GUESTS APPEARING ON THE PROGRAM

BEAN, H. S., Bureau of Standards, Washington, D. C.
 BEARCE, H. W., Bureau of Standards, Washington, D. C.
 BEATON, CLARENCE V., manager, lubricant division, Shell Eastern Petroleum Products (Inc.), 122 East Fourth-second Street, New York, N. Y.
 BOUSFIELD, A., chief engineer, E. & T. Fairbanks & Co., St. Johnsbury, Vt.
 BRAITHWAITE, W. E., Bureau of Standards, Washington, D. C.
 BURGESS, Dr. GEORGE K., Director, Bureau of Standards, Washington, D. C.
 CLARK, W. G., chief lubrication engineer, The Pure Oil Co., Chicago, Ill.
 FRISBIE, W. S., principal chemist, Food and Drug Administration, United States Department of Agriculture, Washington, D. C.

FULLMER, I. H., Bureau of Standards, Washington, D. C.
 GOULD, R. E., Bureau of Standards, Washington, D. C.
 HARRISON, M. J. J., general scale inspector, Pennsylvania Railroad, Chicago, Ill.
 HOLBROOK, F. S., Bureau of Standards, Washington, D. C.
 HUBBARD, H. D., Bureau of Standards, Washington, D. C.
 JUDSON, L. V., Bureau of Standards, Washington, D. C.
 MCCARTY, J. G., Bureau of Standards Master Scale Depot, Clearing Station, Chicago, Ill.
 McLEAN, D. J., superintendent, weights and measures inspection service of Canada, Ottawa, Ontario, Canada.
 PARRY, WILLIAM, Bureau of Standards, Washington, D. C.
 PEEFFER, E. L., Bureau of Standards, Washington, D. C.
 PIENKOWSKY, A. T., Bureau of Standards, Washington, D. C.
 REGAR, R. S., administrative assistant to Postmaster General, Post Office Department, Washington, D. C.
 RICHARD, C. L., secretary, National Scale Men's Association, Bureau of Standards Master Scale Depot, Clearing Station, Chicago, Ill.
 RICHARDS, W. S., chairman, standardization committee, Glass Container Association, 965 Wall Street, Toledo, Ohio.
 ROESER, H. M., Bureau of Standards Master Scale Depot, Clearing Station, Chicago, Ill.
 RUSSELL, H. H., Bureau of Standards Master Scale Depot, Clearing Station, Chicago, Ill.
 SMITH, RALPH W., Bureau of Standards, Washington, D. C.
 SOUDER, WILMER, Bureau of Standards, Washington, D. C.
 SPILMAN, H. A., senior marketing specialist, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.
 WEST, Hon. CHARLES, Member of Congress, seventeenth district, Ohio.

GUESTS REPRESENTING MANUFACTURERS OF WEIGHING AND MEASURING DEVICES

American Kron Scale Co.: ERNST OHNELL, president, 422 East Fifty-third Street, New York, N. Y.
 Aqua Systems (Inc.): CHARLES F. BECKWITH, president, 2 Lafayette Street, New York, N. Y.
 Barnes Scale Co.: W. J. BARNES, president, Detroit, Mich.
 Bennett Pumps Corporation: L. A. PRESCOTT, vice president and general manager, Muskegon, Mich.
 Black & Decker Manufacturing Co.:
 FRED J. TROLL, manager, loadometer department, Towson, Md.
 E. E. POWELL, traffic engineer, Towson, Md.
 H. L. PRINCE, testing engineer, Towson, Md.
 Boe Manufacturing Co.: WALTER H. JOHNSON, vice president, 941 East Hennepin Avenue, Minneapolis, Minn.
 Buffalo Meter Co.: H. F. BARRETT, 2917 Main Street, Buffalo, N. Y.
 Buffalo Scale Co.: C. G. MENG, 1056 Book Building, Detroit, Mich.
 Caille Bros. Co.: T. L. SMITH, general manager, Detroit, Mich.
 Chatillon, John, & Sons: P. T. BORTELL, sales manager, 89 Cliff Street, New York, N. Y.
 Continental Scale Works: M. J. WEBER, vice president, 5701 South Claremont Avenue, Chicago, Ill.
 Dover Stamping & Manufacturing Co.: LOUIS S. CLEAVES, vice president and sales manager, Cambridge, Mass.
 Exact Weight Scale Co.: JOHN G. SIMS, vice president, 944 West Fifth Avenue, Columbus, Ohio.
 Fairbanks, E. & T., & Co.: A. BOUSFIELD, chief engineer, St. Johnsbury, Vt.
 Fairbanks, Morse & Co.: C. A. HENNIE, manager, scale department, 115 East Lombard Street, Baltimore, Md.
 Ferro Machine & Foundry Co.: E. W. KEWITZ, 3155 East Sixty-sixth Street, Cleveland, Ohio.
 Gilbert & Barker Manufacturing Co.:
 G. C. ROBERTS, sales manager, Springfield, Mass.
 W. A. WALKER, eastern district manager, Springfield, Mass.
 A. L. GUTTERSON, sales engineer, Springfield, Mass.

Hazel-Atlas Glass Co.:

A. T. GARDEN, sales department manager, Wheeling, W. Va.
 EVERETT S. GREER, plant superintendent, Zanesville, Ohio.

Hersey Manufacturing Co.:

WILLIAM H. FARROW, chief engineer, 381 E Street, South Boston, Mass.
 WINTHROP P. HERSEY, assistant secretary, 381 E Street, South Boston, Mass.

Howe Scale Co.: C. A. LINDSAY, branch manager, 415 Arch Street, Philadelphia, Pa.**International Business Machines Corporation:**

J. C. MILNER, sales manager, 270 Broadway, New York, N. Y.
 S. M. TEMPLETON, vice president and sales manager, Dayton Scale Co. division, Dayton, Ohio.
 H. S. EVANS, Washington manager, 816 Fourteenth Street, Washington, D. C.
 W. G. EGERTON, sales agent, 816 Fourteenth Street, Washington, D. C.

Jacobs Bros. Co. (Inc.):

H. M. JACOBS, secretary and treasurer, 32 Walton Street, Brooklyn, N. Y.
 JOHN E. WOODLAND, sales manager, detectogram division, 32 Walton Street, Brooklyn, N. Y.

Jennings, O. D., & Co.: G. F. HALEY, director, 4309 West Lake Street, Chicago, Ill.**Kellogg Manufacturing Co.:** J. K. GILCHRIST, sales promotion manager, 97 Humboldt Street, Rochester, N. Y.**L N S Corporation:**

HARRY T. GOSS, president, 71 Murray Street, New York, N. Y.
 BJORNULF JOHNSEN, secretary, 71 Murray Street, New York, N. Y.

Ludlow Valve Manufacturing Co.: WILLIAM H. LOLLEY, president, Troy, N. Y.**Merit Equipment Corporation:**

A. L. WERTZ, president and general manager, 6616 Morgan Avenue, Cleveland, Ohio.
 E. W. ALLINGTON, eastern representative, 135 East Forty-second Street, New York, N. Y.

Moore & Kling (Inc.): ELMER M. KLING, treasurer, 221 High Street, Boston, Mass.**National Pipe Products Corporation:** LYON McCANDLESS, chief engineer, Rochester, Pa.**National Store Specialty Co.:** W. E. FINCH, chief engineer, Bareville, Pa.**National Vending Corporation:** H. C. TURNER, president, 876 Maccabee Building, Detroit, Mich.**Neptune Meter Co.:** R. K. BLANCHARD, vice president, 50 East Forty-second Street, New York, N. Y.**Oil Products Appliance Co.:** J. T. GOSSETT, vice president, 17 Battery Place, New York, N. Y.**Owens-Illinois Glass Co.:** PAUL MULLER, New York manager, 11 Park Place, New York, N. Y.**Peerless Weighing Machine Co.:**

NEAL W. FOSTER, assistant to the president, 245 Fifth Avenue, New York, N. Y.

E. M. SCHIEMER, 245 Fifth Avenue, New York, N. Y.

Pittsburgh Equitable Meter Co.:

W. H. PARKER, assistant chief engineer, Pittsburgh, Pa.
 HORACE CHRISMAN, engineer, Pittsburgh, Pa.
 J. A. FORSYTHE, Pittsburgh, Pa.

Roy Manufacturing Co.: FRANK J. OLDFIELD, vice president, 230 Water Street, Quincy, Mass.**Rush Manufacturing Corporation:** JOSEPH H. RUSH, Lafayette, Ind.**Screw Machine Specialty Co.:**

R. P. SUESS, 7721 Susquehanna Street, Pittsburgh, Pa.
 J. W. WELCH, 7721 Susquehanna Street, Pittsburgh, Pa.

Seedrer-Kohlbusch (Inc.): EDWIN C. SMITH, sales manager, Jersey City, N. J.**Seraphin Manufacturing Co.:** THEO. A. SERAPHIN, president, 1314 North Seventh Street, Philadelphia, Pa.**Sharpsville Boiler Works Co.:** CHARLES D. FAGAN, president, Sharpsville, Pa.**Sheffler Bros.:** EARL RITZERT, distributor, 2121 New York Avenue, Washington, D. C.**Standard Computing Scale Co.:** M. D. RIBBLE, vice president in charge of sales, Detroit, Mich.

Tokheim Oil Tank & Pump Co.:

CHESTER C. OBERLY, sales manager, Fort Wayne, Ind.

W. M. FRAZIER, district manager, Maryland Trust Building, Baltimore, Md.
Toledo Scale Co.:

CHARLES C. NEALE, special representative, Toledo, Ohio.

FRANK J. DAVIS, Toledo, Ohio.

Triner Scale & Manufacturing Co.: JAMES C. EDGERTON, agent, 1395 National Press Building, Washington, D. C.

Universal Lubricating Systems (Inc.): WILLIAM P. FARRELL, treasurer, 919 Fulton Building, Pittsburgh, Pa.

Universal Pump & Tank Corporation: CHARLES SPAETH, treasurer, 2860 East Ninety-first Street, Cleveland, Ohio.

Wayne Co., The:

A. D. CARRIGER, vice president, 30 East Forty-second Street, New York, N. Y.

A. P. HITZEMAN, chief engineer, Fort Wayne, Ind.

C. B. HARWELL, district manager, 4030 North Broad Street, Philadelphia, Pa.

M. C. BROWN, salesman, 608 American Building, Baltimore, Md.

Worthington Pump & Machinery Corporation:

FRANK W. HANKINS, merchandising manager, Harrison, N. J.

ROBERT J. WARD, Harrison, N. J.

GUESTS REPRESENTING TRADE ASSOCIATIONS

American Petroleum Institute: PAUL E. HADLICK, secretary, division of marketing, 250 Park Avenue, New York, N. Y.

Glass Container Association:

VICTOR L. HALL, 19 West Forty-fourth Street, New York, N. Y.

W. S. RICHARDS, chairman, standardization committee, 965 Wall Street, Toledo, Ohio.

GUESTS REPRESENTING BUSINESS AND INDUSTRY

BAHOR, RUD J., technical director, Richfield Oil Corporation of New York, 122 East Forty-second Street, New York, N. Y.

BAKER, B. E., Standard Oil Co. of New York, 230 Park Avenue, New York, N. Y.

BARTRAM, A. M., Shell Eastern Petroleum Products (Inc.), 122 East Forty-second Street, New York, N. Y.

BEATON, C. V., manager, lubricant division, Shell Eastern Petroleum Products (Inc.), 122 East Forty-second Street, New York, N. Y.

BOHART, J. G., Sinclair Refining Co., 45 Nassau Street, New York, N. Y.

BOYD, PAUL C., Atlantic Refining Co., 260 South Broad Street, Philadelphia, Pa.

CLARK, W. G., chief lubricating engineer, The Pure Oil Co., Chicago, Ill.

DAVIS, W. L., sales manager, Crown Cork & Seal Co., Baltimore, Md.

ELGAR, QUESTED L., Standard Oil Co. of New York, 26 Broadway, New York, N. Y.

FRENCH, G., Sinclair Refining Co., 45 Nassau Street, New York, N. Y.

GALLAGHER, BERT L., sales promoter, Standard Oil Co. of New Jersey, 15 Washington Street, Newark, N. J.

HASKELL, RAYMOND, industrial engineer, The Texas Co., 135 East Forty-second Street, New York, N. Y.

KELLER, C. W. Jr., purchasing agent, Sherwood Bros. (Inc.), 1430 Baltimore Trust Building, Baltimore, Md.

KERNS, F. C., superintendent, lubricating sales, The Texas Co., 135 East Forty-second Street, New York, N. Y.

LYONS, JOHN F., supervisor weights and measures, American Stores Co., 421 West Nineteenth Street, Philadelphia, Pa.

SAYBOLT, J. W., sales manager, Standard Oil Co. of New Jersey, 26 Broadway, New York, N. Y.

SHARP, J. E., vice president and general manager, Aluminum Seal Co., New Kensington, Pa.

GUESTS REPRESENTING RAILROADS AND WEIGHING DEPARTMENTS

DEAN, T. O., superintendent of scales, Texas & Pacific Railway, Dallas, Tex.

EDWARDS, C. R., supervisor of scales and work equipment, Wabash Railway Co., Decatur, Ill.

- EPRIGHT, A. W., superintendent scales and weighing, Pennsylvania Railroad, Altoona, Pa.
- GOE, R. B., supervisor weighing and inspection, Illinois Central System, Chicago, Ill.
- HARRISON, M. J. J., general scale inspector, Pennsylvania Railroad, Chicago, Ill.
- HICKS, B. L., supervisor of weights, Western Weighing and Inspection Bureau, 1800 Transportation Building, Chicago, Ill.
- HOSFORD, C. C., general scale inspector, Pennsylvania Railroad, room 1015, Pennsylvania Railroad Station, Pittsburgh, Pa.
- KLOTZ, WILLIAM G., superintendent of scales, Missouri Pacific Lines, 204 Union Station, Houston, Tex.
- LAWRENCE, E. KENT, general scale inspector, Baltimore & Ohio Railroad, B. & O. Central Building, Baltimore, Md.
- MACGREGOR, GEORGE B., assistant scale inspector, Delaware & Hudson Railroad Corporation, Albany, N. Y.
- MACRITCHIE, A. D., supervisor of scales and weighing, Grand Trunk Railroad Co., Battle Creek, Mich.
- PETTIS, C., general scale inspector, New York Central Railroad, N. Y. C. Railroad Station, Rochester, N. Y.
- TATE, H. A., general scale inspector, Norfolk & Western Railway, Roanoke, Va.
- TAYLOR, JOHN E., chief inspector, weighing bureau, Chesapeake & Ohio Railway, Richmond, Va.
- WELSH, R. C., general scale inspector, Pennsylvania Railroad, Harrisburg, Pa.
- ZEIBEL, A. G., scale inspector, American Bridge Co., Ambridge, Pa.

GUESTS REPRESENTING GOVERNMENT DEPARTMENTS

- CAREY, L. C., marketing specialist, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.
- FRISBIE, W. S., principal chemist, Food and Drug Administration, United States Department of Agriculture, Washington, D. C.
- HARING, JOHN W., superintendent, division of post-office scales, Post Office Department, Washington, D. C.
- REGAR, R. S., administrative assistant to Postmaster General, Post Office Department, Washington, D. C.
- SMITH, W. W., assistant superintendent, division of post-office scales, Post Office Department, Washington, D. C.
- SILMAN, H. A., senior marketing specialist, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

OTHER GUESTS

- BELANGER, S. F., standards adjuster, weights and measures inspection service of Canada, Ottawa, Ontario, Canada.
- JACOBS, EDITH G., secretary, Scale Journal Publishing Co., 7152 Ridgeland Avenue, Chicago, Ill.

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REPORT OF THE TWENTY-FOURTH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

HELD AT THE BUREAU OF STANDARDS, WASHINGTON, D. C.,
JUNE 2-5, 1931

FIRST SESSION (MORNING OF TUESDAY, JUNE 2, 1931)

The conference was called to order at 10.58 o'clock a. m., by Dr. George K. Burgess, president of the conference.

OPENING ADDRESS BY THE PRESIDENT, DR. GEORGE K. BURGESS

It is always with the greatest pleasure that I welcome to Washington and to the Bureau of Standards the delegates and guests attending this conference. I am particularly pleased this year that so many of you are able to be present. In this year of rather heavy trials it is very satisfactory to see that the activities in weights and measures, as represented by this gathering, are being carried out in the same spirit of cooperation that has always been in evidence in the past.

It has been customary for your presiding officer in his opening address to call attention to the activities of Congress with respect to weights and measures legislation. At the past session of Congress very little was done in that field. There were no bills relating to weights and measures introduced since the twenty-third conference on weights and measures.

Of the bills mentioned at the last meeting, two passed—House bill 730 and Senate bill 108. These are now known as Public No. 538 and No. 325, respectively.

The former is in relation to canned food and is an amendment to the national food and drugs act. It is made unlawful for canned food to fall below the standards of quality, condition, or fill of container, promulgated by the Secretary of Agriculture, unless it is plainly indicated on the package that such canned food falls below such standard. This law will be discussed on Friday, when Doctor Frisbie, of the United States Department of Agriculture, will address the conference on that subject.

Public No. 325 relates to the suppression of unfair and fraudulent practices in the marketing of perishable agricultural commodities in interstate and foreign commerce, and embraces fruits and vegetables of every kind and character.

The following laws relating to bureau activities may be of interest to the conference:



Official photograph of delegates and guests attending the Twenty-fourth National Conference on Weights and Measures, assembled at the entrance of the East Building, National Bureau of Standards

Public, No. 219 provides for a hydraulic laboratory at the bureau. Before closing my talk this morning I will tell you something about that laboratory, which is just being established.

Public, No. 414 provides for the purchase of approximately 11 acres of land to enlarge the grounds of the bureau. That purchase has been made; the land acquired is to the north and west of the bureau.

Public, No. 700 authorizes the acquisition of land, not exceeding 200 acres, and buildings and equipment for the propagation and reception of radio signals.

I may say in this connection that the work of the radio section can not be carried out in its entirety on the bureau grounds because, on the one hand, certain radio signals interfere with other work going on and, on the other, other activities we carry on here interfere with some kinds of radio work. So provision is to be made for two new stations, one for continuous sending of standard frequency signals, the other for experimental research on radio phenomena.

We are interested in this conference in the matter of accuracy and tolerances and it may be of some interest to you to know the extreme accuracy which we are able to attain in the radio field. It may surprise some of you to learn that the primary standards of frequency maintained at the bureau are kept constant and controlled to one or two parts in ten millions, which is perhaps as high a degree of accuracy as is obtained in practically any work, equivalent to one two-hundred-and-fifty-thousandth of an inch on a yardstick. Our secondary standards, which are used in connection with this control work, are kept in a condition of constancy almost, if not quite as good, as our primary standards.

Your presiding officer has now to report the death, since our last conference, of three of its very active and distinguished members.

William F. Cluett, chief deputy inspector of weights and measures of the city of Chicago, Ill., who for many years has been a member of the conference committee on specifications and tolerances, passed away on October 16, 1930. Last year he was not able to be present on account of his illness. We will all remember Mr. Cluett as a most thorough and conscientious worker and fearlessly efficient, and we all regret his passing.

A. W. Schwartz, assistant superintendent of weights and measures of New Jersey, who also was a member of the conference committee on specifications and tolerances, died January 12, 1931. Mr. Schwartz, you will remember, was also a very active worker in the conference and was always very ready to take a most helpful part in matters under discussion.

Within the last few weeks has occurred another death in the State organization of New Jersey, that of J. Harry Foley, State superintendent of weights and measures, who passed away on May 22, 1931. Mr. Foley, you will remember, was a past vice president and treasurer of this conference. I am sure the conference will extend its sympathy to the families of these coworkers of ours by suitable resolutions.

I have made appointments to fill the vacancies on the committee on specifications and tolerances. The new members are Joseph G. Rogers, assistant State superintendent and secretary of the New

Jersey department of weights and measures, and William A. Payne, sealer of weights and measures of Monroe County, N. Y. Both of these gentlemen have participated in the deliberations of the committee this year.

The program which has been arranged by the executive committee for this meeting promises to be an excellent one. This afternoon you will note that attention is to be given to the subject matter of lubricating-oil bottles. On Wednesday morning we have a very fine program of a general nature, at which we expect to have the honor of an address by the Secretary of Commerce, Mr. Lamont. Also, we expect to be addressed by Congressman West, of Ohio. For the first time a representative of the Canadian Government will be in attendance; he will talk to us on the question of "The Administration of Weights and Measures in Canada." You will recall that we have had speakers and delegates from outlying districts, such, for example, as Porto Rico several years ago, but I believe this is the first time that an independent country has sent its own representative to talk to us.

Thursday will be largely devoted to the subject of scales and weighing. There will be several papers and the question of person-weighing scales will come up. Interest has been evidenced in this subject at the past two sessions of the conference, you will remember, and I believe this year the subject matter will be brought into more systematic condition than it has been hitherto, through the introduction of a code of specifications and tolerances for these machines.

It may be of some value to the members of the conference if I mention some of the publications of particular interest from a weights and measures standpoint that have been issued by the bureau during the year.

First is the Report of the Twenty-Third National Conference on Weights and Measures, Miscellaneous Publications, Bureau of Standards, No. 116. That was issued some time ago and you should all have received it.

Then we have Circular of the Bureau of Standards No. 386, Specifications for the Manufacture and Installation of Railway Track Scales for Light Industrial Service. That is of obvious interest.

We have the Annual Report of the Director of the Bureau of Standards, Miscellaneous Publication No. 115, which contains a summary of the bureau's activities, and also the Standards Yearbook, 1931, Miscellaneous Publication No. 119. In the last-named publication an endeavor is made to give a picture not only of the activities in this country in relation to standardization, but the activities in foreign countries as well. The special subject matter in the yearbook for this year deals with standardization in transportation.

We have also a publication covering standard thicknesses, weights, and tolerances of sheet metal, as well as a specification for plain and thread plug and ring gage blanks, and also American national standard screw thread tables for shop use—coarse and fine thread series, and special screw threads.

The bureau has also been concerned with the question of time zones and we have published a chart setting forth the actual location of the time zones of the country. The time zones, although originally designed to be straight, so to speak, nevertheless in practice have

become quite irregular, so that it is of some importance to have available the actual delimitation of these zones.

At the last conference your chairman mentioned certain general international activities. You will recall that the international committee on weights and measures is charged with the function of unifying practices throughout the world, the international committee being set up by a treaty to which the United States subscribed. This international committee held a meeting last April, and among the matters considered was whether 20° C. (68° F.) should be the normal standard temperature for shop-standard practice in the use of gages. That is of very considerable importance from the point of view of international exchange of gages on the one hand and manufactured products on the other, because of the exactness of the work being carried out in a good many of our shops to-day. It has been the custom in this country to use 68° F., while 62° F. was the customary temperature employed in England. As a result, Mr. Johannson, who is a maker of gages as you all know, had a practice of making his gages slightly different for England than for the United States.

In the history of this project Germany and the United States agreed at once that 68° F. or 20° C. should be the normal temperature at which such lengths should be standard. Then France agreed to this temperature, but England demurred. However, in April England agreed to come in, and the international committee then passed the resolution to make 20° C. or 68° F. uniform throughout the world. Consequently all the countries are now in agreement as to an industrial inch being an inch at 68° F. (20° C.).

Under the jurisdiction of the International Committee on Weights and Measures also come matters relating to electrical standards. At this last meeting of the committee the work of the subcommittee, set up some years ago to define more exactly the electrical units and standards, was considered and their activity was approved. This bureau proposed through this subcommittee that there be set up a new standard of light. This standard was first suggested by this bureau some twenty-odd years ago, but due to experimental difficulties the project had not been completed until within about a year. This standard up to the present time has been based on electric lamps which were hoped to remain constant, but we are not quite sure of this. The standard which we hope may be approved at the next meeting of the committee is based on light emitted through an opening of a certain area in a black body from platinum at its freezing point. That standard is absolutely constant, reproducible, convenient to operate, and inexpensive. If this standard is accepted, we will then have for light a standard which can be put into universal use.

It may be of interest to you to know that in connection with the work on standards relating to temperature scales and electrical units there is now going on an interchange between the German National Laboratory and this bureau. In connection with experimental work Doctor Henning, of the German laboratory, has been spending some two months with us on this question of light on the one hand and temperature scales on the other. The temperature scales in the lower region are based on the use of what we call platinum resistance thermometers. They are very sensitive and can indicate temperature

to 0.001 of a degree. The agreement between the German laboratory, the British laboratory, and this bureau is now on the order of one or two hundred-thousandths of a degree from the lowest up to the ordinary temperatures. Then for the higher ranges thermocouples of platinum and an alloy of rhodium and platinum are used, and the current generated can be very exactly measured. The electromotive force generated is used as a measurement of temperatures, and thereby temperatures can accurately be measured up to about 2,500° F. The agreement of the various laboratories should be better than one-tenth of a degree. For the very high temperatures light radiation is used. The highest temperature used as standard is the melting point of platinum, and that is known to an accuracy of about 1 degree.

Thus now on the complete temperature scale from the lowest possible to the highest measurable, the several national laboratories are in substantial agreement.

While Doctor Henning has been here we have sent one of our men, Mr. Vinal, to Europe to effect an intercomparison of electrical units. We also have a proposed standard of X-ray dosage by physicians. This has been a rather troublesome matter; the apparatus formerly suggested has not been portable, and the disagreement in the laboratories has been quite serious. Mr. Taylor, of the bureau, has now devised an apparatus, which he has taken abroad with him, that is only about one-fifteenth the size of the previous apparatus and of greater reproducibility. We hope this standardization apparatus for X-ray measurement will soon come into more common use.

Last year I mentioned several lines of research that were in progress at the Bureau of Standards. This year I will emphasize more particularly the testing work of the bureau. This work of testing covers a very wide field of apparatus and material. The total number of items tested during the last fiscal year was 200,726, having a fee value of nearly \$684,000, so that is a substantial part of the activities of the bureau.

A few of the items which are of some interest to this group may be mentioned: On items connected with gages and gage steels we made 2,714 tests; on miscellaneous dimension items, 5,169; on weights and balances, 7,869; on scales, 1,097; on volumetric apparatus, 15,155; on hydrometers, 1,131; and we made 477 density determinations. We started last year a new type of testing, namely, airplane engines for the aircraft industry. Each manufacturer of a new type of engine, before he can market it, has to submit it to a test at the bureau under stated conditions. We tested some 46 new aircraft engines during the past year.

The radium testing is continuing and 1,240 radioactive materials have been tested. That is an interesting type of work in that the packages of radium coming into this country are sold only on Bureau of Standards certificate of radium content of the radium salts. This is eliminating confusion on the one hand and uncertainty and disputes on the other. Similarly we maintain for distribution several hundred samples of chemical materials which we call our standard chemical samples. These samples are made up, analyzed, and distributed to interested parties. These material standards are widely

used and prevent a great deal of controversy which might otherwise occur.

I will not read the total list of tests, but might mention one or two other items: On cement, concreting materials, and similar items we made 12,070 tests; on miscellaneous ceramic materials, 2,311 tests; on rubber, 1,429; on textiles, 6,933; on paper, 1,785; and so on. As I have mentioned, the total list amounts to over 200,000 items. Provisions have been made for you to visit the laboratories on Wednesday afternoon and you will see some of this testing work being carried on.

During the present fiscal year we will have tested over 1,000 track scales, and the work of calibrating track scale test cars at the master scale at Clearing, Ill., has been very active and effective. I might also state that the new track scale car which we have ordered is to be delivered next month. That will replace our first car, which is now some 18 years old.

In view of the fact that we have a rather long program, it will perhaps be as well if I do not go into further details. I might mention, however, that the cement reference testing laboratory has served very effectively. You may recall that two years ago I called your attention to the fact that this facility was about to be set up to check the testing-cement laboratories of the country, of which there are some 300. We have now checked some 200 of those laboratories and brought them into line from the point of view of uniformity of test and accuracy of their test equipment. This service is of very great importance to the cement industry and the public. Similarly we have started calibrating engineering testing machines and plan this coming year to take a survey of the country from the point of view of accuracy and agreement. Thus, in these two fields—of cement and of testing machines used in engineering—we expect to be able to be on a basis of very much greater uniformity than has been the case in the past.

Two of the rather new pieces of equipment in the bureau are the circular dividing engine and the circle-testing machine for circles used by the geodetic survey and the surveying fraternity. We were requested to rule and test several circles furnished by the Coast and Geodetic Survey. We did this work on our machines and they were mounted on instruments and used in the field. After a time the results obtained seemed to be somewhat inaccurate and it appeared that the circles were to blame. The whole matter was investigated and we think we have run down the trouble. It was not due to error in graduating the circles or to error in measuring the circles, but was due to the fact that the metal of which they were made did not stay constant. The result was that the circles were changing their shape, and consequently the instruments gave progressively different results. We were working to an accuracy of 1 second.

During the past year at the suggestion of the Secretary of Commerce there has been set up what is known as the Federal Fire Council, which has for its object bringing together those responsible for the Government buildings, to function in an advisory and informative capacity on matters relating to protection against fire hazards. Probably before we get through we shall arrange a code for use both from the construction point of view and the operating point

of view. This council has held several meetings and has made surveys of Government occupancy of a considerable number of buildings in Washington, with very gratifying results. Through the aid of the American Fire Protective Association surveys are now being made of several of the Federal prisons from the point of view of better protection.

Before closing I am going to say a few words about our newest activity in the Bureau of Standards which is just getting under way—the new hydraulic laboratory. Some of you may have noticed to the south a rather large excavation which has been made in the side of the hill. That is the location of the new laboratory. By using models of various kinds and streams of water under definitely controlled conditions which can be measured, definite studies of water flow can be made, and this is of very great importance in connection with dams, jetties, spillways, and rivers and harbors work. Often engineers have different designs prepared for structures, and it is not immediately apparent which is the most economical on the one hand and most efficient on the other. Frequently data obtained in studies such as are mentioned above will help in the solution; thus this laboratory is designed to answer those questions for the engineers. This hydraulic laboratory will be finished next March, so when you come here next year you may be prepared to see a new building on the bureau grounds.

That, gentlemen, completes the general remarks that I have to make in opening this conference.

ABSTRACTS OF STATE REPORTS¹

ARIZONA

By D. P. KIMBALL, *Sealer of Weights and Measures, Phoenix*

Mr. Kimball explained that inasmuch as this was the first conference which he had attended he was not accustomed to the form of report usually presented. He was in attendance to obtain information to help in the prosecution of weights and measures work.

CALIFORNIA²

By J. S. CASEY, *Chief, State Division of Weights and Measures*

Mr. Casey expressed appreciation of the effective support rendered by the Bureau of Standards to the weights and measures organization in his State. He cited the necessity of cooperation of the various organizations with each other and to this cooperation attributed the remarkable advances made. He predicted continued improvement in apparatus and in the testing methods of the officials.

¹ For convenience of reference these reports have been arranged in alphabetical order throughout.

² This report was submitted through Thomas Flaherty and was read to the conference by him.

CONNECTICUT

By LOUIS ELSNER, *Sealer of Weights and Measures, Hartford*

Mr. Elsner explained that Mr. Pilon, State inspector of weights and measures, had been incapacitated for a considerable time on account of a long illness. However, weights and measures inspection work in Connecticut had been progressing very satisfactorily through the efforts of the local sealers during this period.

DISTRICT OF COLUMBIA

By GEORGE M. ROBERTS, *Superintendent of Weights, Measures and Markets, Washington, D. C.*

Mr. Roberts reported that Congress had made an appropriation to purchase a large truck to be equipped and utilized in the testing of large-capacity scales in the District of Columbia. This piece of equipment was one the necessity of which had been recognized for some time.

FLORIDA

By HOWARD E. CRAWFORD, *Inspector of Weights and Measures, Jacksonville*

Mr. Crawford reported the establishment of a city department of weights and measures in Jacksonville some months ago. He cited the deplorable condition in which some apparatus was found on first inspection and also the results of a package reweighing survey. He explained that an economy program caused the failure to pass a State weights and measures law at the last session of the legislature.

GEORGIA

(An official was in attendance from Georgia, but no report from the State was presented to the conference.)

ILLINOIS

By W. T. FOSSETT, *State Superintendent of Standards*

Mr. Fossett explained that this year marked the tenth anniversary of the foundation of the Illinois department and briefly outlined the progress made during that time. He noted the fact that a suitable laboratory had been provided for the test of new types of devices which were being submitted in increasing numbers. During the past year especial stress had been laid upon the reweighing of package goods to safeguard the buying public during the depression. A State association was organized during the year.

INDIANA

By I. L. MILLER, *State Commissioner of Weights and Measures*

Mr. Miller reported the completion of an equipment for the testing of large-capacity scales. He also noted that the standard-weight bread law was being attacked in the Federal courts. A law requiring

that duplicate tickets be issued for each sale of coal showing gross, tare, and net weights had been recently enacted at the instance of the coal dealers.

MAINE

By C. V. FICKETT, *Sealer of Weights and Measures, Portland*

Mr. Fickett stated that on account of the size of his State it had been found possible to make but little progress toward securing a state-wide inspection of commercial weighing and measuring devices.

MARYLAND

By S. T. GRIFFITH, *Chief, Division of Weights and Measures, Baltimore*

Mr. Griffith reported the introduction of two bills in the legislature, one requiring the sale of all commodities by weight, and the other providing for a state-wide inspection of gasoline pumps. Neither bill was enacted into law, although they were more favorably received than formerly. He reported the fact that Baltimore was meeting success in its weights and measures administration; in only three other counties in the State was any inspection work being done.

MASSACHUSETTS

By JOHN D. BRUMMITT, *Sealer of Weights and Measures, Danvers*

Mr. Brummitt reported that there was being built by the State an equipment designed for the testing of large-capacity scales up to a capacity of 20 tons.

MICHIGAN

By L. P. STRONG, *Chief, State Division of Weights and Measures*

Mr. Strong explained that the work in his State was progressing as usual. He took the opportunity to express his appreciation for the cooperation of the Bureau of Standards, both through correspondence and through the attendance of a representative at the meetings of the State association.

MINNESOTA

By D. F. JURGENSEN, *Chief Engineer, Minnesota Railroad and Warehouse Commission*

Mr. Jurgensen explained the working of a law passed about two years ago providing for the testing of electricity and water meters upon the filing of a petition by a number of users and the deposit of a sum covering part of the cost of the test. About 16 per cent of the electricity meters inspected had been condemned as inaccurate; the majority of these were found in favor of the consumer. There was no demand for the testing of water meters.

MISSOURI

By W. H. HUBELE, *Commissioner of Weights and Measures, St. Louis*

Mr. Hubele expressed his opinion that the most important work being done by his department was the regulation of coal deliveries through a system of bonded weighers and coal tickets issued by the city. This ordinance had been upheld by the State Supreme Court. He reported surveys of gasoline deliveries and of packages of food-stuffs; he also noted a large increase in complaints in regard to the domestic deliveries of fuel oil.

NEVADA

By S. C. DINSMORE, *State Sealer of Weights and Measures*

Mr. Dinsmore reported the passage of a public weighmaster act which had proven very popular, had the support of many large dealers, and was working out successfully; another recently enacted law provided for gasoline inspection. He stated that under the provisions of the State law the specifications adopted at the conference automatically went into force in Nevada. The department recently added to its equipment for the testing of large-capacity scales.

NEW HAMPSHIRE

By H. A. WEBSTER, *State Commissioner of Weights and Measures*

Mr. Webster reported that especial attention had been given to the enforcement of specifications for apparatus, particularly the code for grease-measuring devices and the specification requiring vis-gauges on gasoline pumps. Satisfactory compliance had now been brought about. Other activities included the reweighing of commodities put up in the stores, the inspection of coal and wood deliveries, and the enforcement of the net-weight law.

NEW JERSEY

By JOSEPH G. ROGERS, *Assistant State Superintendent of Weights and Measures*

Mr. Rogers reported the recent deaths of J. Harry Foley, State superintendent, and of A. W. Schwartz, and paid a tribute to their memory. He summarized the recent activities of the department in relation to approval of type of apparatus, especially gasoline meters, grease-dispensing devices, lubricating-oil bottles, and scales. He also noted a number of special investigations carried on. A law was enacted requiring the weighing of coal deliveries by certified weighmasters.

NEW YORK

By CHARLES J. QUINN, *Sealer of Weights and Measures, Buffalo*

Mr. Quinn gave a brief résumé of the weights and measures organization of the State and of the inspection work accomplished in his city. He also explained the activities of the State department which makes annual surveys covering sales of coal and gasoline, and other-

wise checks the work of the local officials. He referred to the success attending the meetings of the State association of weights and measures officials.

NORTH CAROLINA

By C. D. BAUCOM, *Acting State Superintendent of Weights and Measures*

Mr. Baucom explained the efforts made in his State to support the department by means of a fee system and later by means of a franchise tax on manufacturers, neither of which worked out in a satisfactory manner. At the last session of the legislature both of the earlier laws were repealed and the work was put upon an appropriation basis. The new law provides that the specifications adopted by the conference automatically take effect in the State; approval of type of apparatus is also provided for.

OHIO

By J. C. TINKEY, *Deputy State Sealer of Weights and Measures*

Mr. Tinkey reported that the State was now enforcing a regulation forbidding the use of scales having a beam and poise not in sight of the customer. He stated that the code for grease-measuring devices was now being enforced. Some confusion exists in the State in relation to the fee system which is now being enforced in several counties and the bread law, which was recently declared unconstitutional in respect to tolerances in excess.

PENNSYLVANIA

By ALBERT B. SMITH, *Director, State Bureau of Standard Weights and Measures*

Mr. Smith reported that the code of specifications for grease-measuring devices had been adopted and these devices were now subject to serialization under the State law. A bill was passed by the State legislature which legalizes the short ton of 2,000 pounds for the sale of anthracite coal instead of the long ton of 2,240 pounds formerly required; this was now in the hands of the governor for approval.

RHODE ISLAND

(An official was in attendance from Rhode Island, but no report from the State was presented to the conference.)

ANNOUNCEMENT

The CHAIRMAN. Gentlemen, if it is your pleasure, we will adjourn for lunch, but before adjournment, the secretary has an announcement to make. Mr. Holbrook.

Mr. HOLBROOK. Mr. Chairman, I desire to say that copies of the Report of Committee on Specifications and Tolerances on Modification of Specifications for Lubricating-Oil Bottles are now available for distribution on my table. That report will come up this afternoon.

The CHAIRMAN. The conference will stand recessed until 2 o'clock. (At this point, at 1 o'clock p. m., the conference took a recess until 2 o'clock p. m.)

SECOND SESSION (AFTERNOON OF TUESDAY, JUNE 2, 1931)

The conference reassembled at 2.17 o'clock p. m., Howard S. Jarrett, first vice president, in the chair.

ABSTRACTS OF STATE REPORTS—Continued

VERMONT

By H. N. DAVIS, *Deputy State Commissioner of Weights and Measures*

Mr. Davis reported the promulgation of the code of specifications for grease-measuring devices and of the specification requiring the use of visigauges on gasoline-dispensing units. He also reported the passage of two new laws by the legislature; the first has to do with the sealing of standards, the second regulates the sale of paint and requires that it be labeled. The reweighing of maple sirup and the checking of commodities had had special attention during the year.

VIRGINIA

By J. H. MEEK, *Director, State Division of Markets*

Mr. Meek described the organization of the weights and measures administration in his State with particular reference to financial cooperation with the various jurisdictions so that the system of inspection was gradually being expanded to cover all sections of the State. A special effort had been made to require packages to be marked with their net contents; cooperation had been procured with other jurisdictions and gratifying results had been obtained.

WEST VIRGINIA

By HOWARD S. JARRETT, *State Commissioner of Weights and Measures*

Mr. Jarrett laid particular stress on the importance of coal-mining operations and on the testing of mine scales in the State. Since the mines were not operating at full capacity and wages received were consequently smaller there had been received an increasing number of serious complaints in regard to the accuracy of the scales used in weighing the output of the various workers. It had been found possible to handle these complaints in a satisfactory manner and disputes had largely been avoided.

WISCONSIN

By GEORGE WARNER, *Chief State Inspector of Weights and Measures*

Mr. Warner reported that a bill designed to protect the station operator from being charged for shrinkage of gasoline was intro-

duced in the legislature but was not enacted. The department had been active in making "try outs" of service stations through purchasing gasoline delivered to a "dummy" tank on an automobile, and, as a result of experience, he strongly recommended this method of combating short-measure deliveries.

ABSTRACTS OF REPORTS OF REPRESENTATIVES OF STATE ASSOCIATIONS OF WEIGHTS AND MEASURES OFFICIALS

CALIFORNIA WEIGHTS AND MEASURES ASSOCIATION

By THOMAS FLAHERTY, *Sealer of Weights and Measures, San Francisco*

Mr. Flaherty reported that the State and local sealers of California had held a very successful weights and measures conference.

ILLINOIS WEIGHTS AND MEASURES ASSOCIATION

By W. A. CARLETON, *State Inspector of Standards*

Mr. Carleton reported the formation of a State association in December, 1930. As a result of this it had already been found that closer cooperation existed between the State and local officials and that the work of inspection in some of the smaller jurisdictions was being stimulated. The membership of officials was now between 40 and 50.

INDIANA ASSOCIATION OF INSPECTORS OF WEIGHTS AND MEASURES

By I. L. MILLER, *State Commissioner of Weights and Measures*

Mr. Miller reported the constructive nature of the meetings of the Indiana association and noted the cooperation extended by the Bureau of Standards in having a representative present at the meetings. The next meeting of the association will be held in the latter part of June.

MAINE STATE SEALERS' ASSOCIATION

By C. V. FICKETT, *Sealer of Weights and Measures, Portland*

Mr. Fickett reported that the Maine association experienced difficulty in assembling the local officials of the State at the meetings on account of the large size of the State. As a result the progress being made by the association was slow, but it was doing the best work possible under the circumstances.

MASSACHUSETTS ASSOCIATION OF SEALERS OF WEIGHTS AND MEASURES

By JOHN D. BRUMMITT, *Sealer of Weights and Measures, Danvers*

Mr. Brummitt noted that the Massachusetts association was the oldest association of weights and measures officials in the country, having held 36 conferences. There was a fine spirit of cooperation manifest among the State director and his inspectors and the local officials. The next convention will be held at Westfield, and Mr. Brummitt extended an invitation to those in attendance.

MICHIGAN STATE, COUNTY, AND CITY SEALERS' ASSOCIATION

By GEORGE F. AUSTIN, Jr., *Supervising Inspector of Weights and Measures, Detroit*

Mr. Austin stated that the next convention of the Michigan association would be held next September at Grand Rapids, a constructive program had been arranged, and a cordial invitation was extended to all in attendance to visit their meeting.

MINNESOTA ASSOCIATION OF INSPECTORS OF WEIGHTS AND MEASURES

(An official was in attendance from Minnesota, but no report of the activities of this association was given at the conference.)

NEW JERSEY WEIGHTS AND MEASURES ASSOCIATION

By JOSEPH G. ROGERS, *Assistant State Superintendent of Weights and Measures*

Mr. Rogers reported that the New Jersey association was accustomed to hold two meetings a year, one in the summer at which officials, equipment manufacturers, and other guests were regularly present; the other in winter, which was limited to officials only, and at which the legislative program was discussed. The next meeting will be held in Atlantic City early in September to which everyone was invited.

NEW YORK ASSOCIATION OF SEALERS OF WEIGHTS AND MEASURES

By C. P. SMITH, *Sealer of Weights and Measures, Suffolk County*

Mr. Smith briefly reviewed the accomplishments of the last meeting of the New York association and cited some of the principal subjects which were discussed. He noted that this meeting was very well attended and was a very successful one. He invited everyone to attend the next meeting which would be held in July at Canton.

OHIO STATE SEALERS' ASSOCIATION

By C. R. MCFADDEN, *Deputy Sealer of Weights and Measures, Licking County*

Mr. McFadden explained the organization of the Ohio association which functioned somewhat differently than those in other States. A regular annual meeting is held in December in Columbus. Additional district meetings are held frequently throughout the year which are attended by State department representatives and by the local officials of the district in question. At these meetings decisions are reached as to what apparatus should be sealed and thus uniformity of action is fostered.

PENNSYLVANIA ASSOCIATION OF INSPECTORS OF WEIGHTS AND MEASURES

By ALBERT B. SMITH, *Director, State Bureau of Standard Weights and Measures*

Mr. Smith stated that at the last convention held by the Pennsylvania association 130 persons were in attendance, the program was

very good, and keen interest was manifested. The next convention will be held in the city of Allentown and it was hoped to equal or surpass the successful meetings of the past.

VIRGINIA WEIGHTS AND MEASURES ASSOCIATION

By B. W. RAGLAND, *Chief, Bureau of Weights and Measures, Richmond*

Mr. Ragland stated that the Virginia association was not functioning at the present time.

WISCONSIN WEIGHTS AND MEASURES ASSOCIATION

By GEORGE WARNER, *Chief State Inspector of Weights and Measures*

Mr. Warner explained that formerly it was the practice to hold State conferences, but for several years these have been omitted and smaller sectional meetings in various parts of the State have been held instead. It is the intention again to revive the state-wide meetings and it is expected that a conference will be held during the coming year.

The ACTING CHAIRMAN. The next items on our program refer to the general subject of Lubricating-Oil Bottles. You will recall that the question of lubricating-oil bottles has been receiving much attention during the past year by bottle manufacturers, oil distributors, weights and measures officials, and the Bureau of Standards. There appears to have been a certain amount of misunderstanding among these various groups, and the developments of the year have made it advisable for the conference committee on specifications and tolerances to recommend to you some modification of your present code for lubricating-oil bottles.

The importance of this subject and the widespread interest which it has aroused indicate the desirability of this conference hearing and considering the views of all interested groups, after which it is to be anticipated that such misunderstandings as may exist at present will be eliminated.

LUBRICATING-OIL BOTTLES

THE VIEWPOINT OF THE BOTTLE MANUFACTURER

By W. S. RICHARDS, *chairman, standardization committee, Glass Container Association of America.*

Mr. Chairman and gentlemen, as a representative of the Glass Container Association of America and chairman of its standardization committee, I have with me to-day representatives of the manufacturers of glass containers, also of metal closures. We feel that we have definite ideas as applied to containers for lubricating oil; in fact, we came here to present certain views. We find what appears to be a tentative recommendation by a committee of the conference making revisions in the code of regulations which has prevailed for the past year. Now I do not think it is fair for me to stand here and take the time of this meeting to outline or to go into details of

the glass container for lubricating oil. I would much prefer to leave that to the discussion that will come later. We do want to say this, and say it very definitely, that the glass-container manufacturers of this country have cooperated to the fullest extent, and intend to cooperate, to make the glass container for lubricating oil, which has come to stay, comply with the requirements that may be set down either by the Federal regulations or the State laws. Thank you very much.

The ACTING CHAIRMAN. We come now to that angle of the question which can best be discussed by the people actually distributing their product in the bottles which are under consideration. Several oil distributors were invited to describe their marketing methods and demonstrate the type of bottle used; two companies accepted this invitation, the Pure Oil Co. and the Shell Eastern Petroleum Products (Inc.).

METHODS OF MERCHANDISING MOTOR OIL IN SEALED BOTTLES

PAPER OF W. G. CLARK, CHIEF LUBRICATION ENGINEER, PURE OIL CO.

Mr. Chairman, members of the conference, and guests, the adoption of the sealed-bottle idea for merchandising motor oil has become of increasing interest to weights and measures officials during the past year or two. Since oil bottles were the subject of a resolution of the twenty-third national conference last year, we believe that the reason for the adoption of this type container, so far as our company is concerned, and the methods used in its handling, should be of further interest especially to those members of the conference who are not entirely familiar with it.

The Pure Oil Co. has long recognized deficiencies in the present methods of dispensing motor oils in bulk to customers, both at service stations and at retail dealers. Most current methods utilize a measuring device of some kind, either a calibrated bottle or a metal measure. The deficiency of these methods, so far as insurance to the public against short measure is concerned, lies in the fact that responsibility for accurate measure and delivery of oil to the customer rests entirely in the hands of the service station attendant and is subject to his possible dishonesty or carelessness.

In addition to this human element the measures used for oil at service stations are required by most State regulations to have a calibration or fill line on them, indicating, in the case of quart measures, a volume of one quart. However, oil is a viscous fluid and sticks to the interior surface of a measure or container to a varying degree, depending on the temperature and body of the oil. In every case oil will adhere to the container so that if the measure is initially filled to a capacity of exactly one quart, less than a quart can be delivered from it in the time normally consumed by such an operation in service-station practice. This deficiency in delivery will vary from 2 to 4 per cent, depending on conditions, which means that the customer receives less than he pays for to the extent of 2 or 4 per cent.

Since most of the motor oil purchased by the motorist is handled in this manner, it means a large amount of deficiency in the aggregate, both in oil and money. The oil company, however, does not profit by this short measure to customers since the service-station attendant may be fully aware of the condition and take advantage

of it for his personal profit. He knows the approximate amount of this short measure and by keeping record of his transactions and by checking his inventory of oil in the bulk tank he can sell the accumulated excess, pocket the money, and still check out perfectly with the company auditor.

As said before the Pure Oil Co. has long deplored this condition and has sought for a means to correct it. This was difficult, since in most States the regulations would not permit the use of any measures except of the type referred to above. The obvious solution, therefore, lay in the development of a sealed container, the contents of which could be measured before placing in the package and enough extra oil added so that a full quart could be delivered.

The company engineers experimented for three years with a variety of metal and glass containers, and finally, after much labor and expense, developed the present Tiolene bottle, which is exhibited here to-day. A clear glass container offers distinct advantages from a sales standpoint over opaque containers. It displays the oil well, shows its color, and is its own gage glass in showing the customer when the container is empty.

This particular bottle is small enough in diameter to be easily grasped in the hand, and is also small enough so that light will pass through the oil, which helps in detecting substitution, due to the readily recognizable color and cast of our premium oil. In large-diameter bottles all oils are more or less opaque and appear very similar. The small diameter of this bottle, its length, and the large opening in the neck, together with the generous air space above the oil level, make this bottle pour very easily and quickly and retain a minimum of oil.

Another of the great evils of present methods of oil dispensing is that of substitution. We have had our share of this trouble and it is one of the main factors influencing us in the development of this bottle. You are well aware how substitution is practiced, and how difficult it is to prevent, even at well-supervised stations, especially when oils of more than one quality and price are dispensed in bulk by the usual methods. Substitution of one oil for another prevented us from carrying more than one-price oil at our service stations. This was detrimental to our business as we could not satisfy all classes of trade with one oil. The use of the sealed container for our premium-grade oil allows us to carry two oils in stock with a negligible chance of substitution. The color of our premium Tiolene oils and our other motor oils is sufficiently different that we can detect substitution of one for the other in this slender bottle. It would be impossible in a thicker and shorter bottle in which all oils look more or less alike.

The special opener we use was developed to destroy the cap at the time it is removed from the bottle. This opener punctures the cap and so distorts it that it can not be replaced. All service station operators and dealers are required to use this opener.

We feel that the assistance of this bottle in preventing substitution is alone a sufficient justification for its use. The bottle is filled at company-operated bulk plants and is received at the service stations sealed, so that the responsibility for the contents rests with the Pure Oil Co. and not with a possible irresponsible service-sta-

tion attendant. The service-station attendant or dealer opens the bottle seal in the presence of the customer and then usually pours the oil into the customer's car. Our advertising asks the customer to insist on this point and to refuse any bottle that has been opened or tampered with before he sees it. If a customer wants oil to take away with him without putting it into his engine, it is customary to sell him a sealed metal container, charging him for the container and the oil.

This bottle is a sealed container, the amount and quality of the contents being controlled by the Pure Oil Co. and not by the service-station operator. Herein lies the big difference between this container and the ordinary oil measure or measuring bottle which is filled by the service-station operator, at the service station, with practically no supervision.

The oil is placed in our bottles by means of a distinct and separate measuring device, and the quantity delivered to the bottle is not in any way determined by the capacity of the bottle. The filling and measuring device will deliver the same quantity by each operation, whether it is to one of these bottles or any other container. There is nothing in the way these bottles are handled to indicate that there is the slightest intention to consider the bottles as a measure.

The pumps and filling machines used at the Pure Oil Co. plants for filling these bottles are accurately adjusted to pump the exact amount necessary into each bottle to insure that a full quart can be delivered from the bottle. These pumps, in most instances, have been checked and sealed by the State or local sealer, and our plant superintendents also make frequent checks of their accuracy. They are accurate measures, subject to any or all regulations pertaining to such devices. They are adjusted to throw approximately 3 per cent over 1 quart, which is more than sufficient to permit the delivery of a full quart from every bottle without using any more time for draining than is ordinarily used with other bottles or with measures.

Because this bottle is merely a dispensing and transporting medium, and is not used as a measure, no fill line is put on the bottle. The nature of the contents are indicated by the words "Tiolene motor oil" blown in the glass and the quantity shown by the words, "Contents when sealed sufficient to deliver one liquid quart," also blown in the glass, with the Pure Oil Co. name below it.

Fill lines on bottles are inaccurate at best, since bottles even from the same mould will vary in thickness of glass and hence in their interior capacity. This means that a fill line placed at a uniform height on a bottle will indicate a variable quantity. The quantity of oil in our bottle is independent of variations in manufacture, since the contents are measured by an accurate pump or filling machine before being placed in the bottle.

Dealers to whom this sealed service is extended must sign agreements binding them to use these bottles only as we direct. They are also under constant supervision of our salesmen, tank-wagon drivers, and inspectors who are on the lookout for possible substitution and mishandling. Please bear in mind that no one is authorized to fill these bottles except the Pure Oil Co. or its subsidiaries.

You can see from the above that these bottles are handled strictly as sealed containers or transporting units and are not in any sense used like the ordinary Rhodes type of oil-measuring bottle which is filled and refilled by the service station attendant or dealer. In addition to our supervision, which we have found adequate to date, our advertising requests the customer to reject bottles when the seals are not removed in the customer's presence. We also have a signed contract with every dealer in which he agrees not to refill the bottle or to use it for any other purpose.

We believe that this bottle, as we handle it, is a true sealed container, even though common trade practice in dispensing oil necessitates the emptying of the container rather than selling it as a unit. Although the contents are dispensed into customers' cars, this is common trade practice for this commodity, so that comparisons with sealed containers or sealed packages of other commodities should be judged from the viewpoint of common trade practice for the specific commodity.

In Ohio the question arose with the department of weights and measures as to whether or not our bottle was a measure or a container and it was submitted by the director of agriculture to the attorney general of Ohio for decision. The attorney general rendered a decision at length in answer to the director of agriculture's request, from which I quote in part as follows:

In view of the conclusions reached by me, the bottles described by you in your letter are not liquid measures, or bottles used for the sale of lubricating oil within the meaning of the regulations of the director of agriculture, nor is a person putting up such bottles, where the contents are sold without the bottle, required to comply with the provisions of section 13128, General Code. (This is the section of the Ohio General Code that refers to packages.) I am, therefore, of the opinion that the use of the bottles in the manner indicated by you is not in violation of law.

We have quoted from this decision merely to remove any misunderstanding which has arisen in some cases over bottles of this type and use. This misunderstanding, we believe, is due to the somewhat ambiguous wording of the regulations in many States regarding lubricating-oil bottles. This wording usually begins as follows: "Bottles used for the sale of lubricating oil," which can be interpreted as meaning all bottles, whereas it must be obvious that regulations of a weights and measures department are intended only for weights and measures devices and can be validly applied only to weights and measures devices. This regulation would have been clearer if it had read, "Measuring bottles used for the sale of lubricating oil."

The very wide use of sealed packages and containers proves that the public want their merchandise in that form. The day of the open cracker barrel is gone and there is even more reason why oil should be handled in a sealed container than many other commodities. The average car owner can rarely tell one oil from another by looking at them. This makes substitution of an inferior product much easier than in the cases of other commodities. Therefore, any means which tends to assure the purchaser of getting the genuine article that he wants is worthy of employment and should merit the approval and enlist the cooperation of weights and measures officials generally.

We have used this plan of merchandising oil for about two years, and its instant success and approval has shown us that the motoring public appreciates what we are trying to do in their interest and has well repaid us, at least in good will, for our investment. However, the plan is so new that it is still largely experimental, and the large investment in equipment will necessarily restrict its wide use.

Other oil companies have now adopted similar plans and we are confident that weights and measures officials everywhere will give them their best of cooperation, since after all, the sealed bottle idea is intended primarily to carry out the very purpose for which departments of weights and measures are instituted, namely, the protection of the public.

PAPER OF G. V. BEATON, MANAGER, LUBRICANT DIVISION, SHELL EASTERN PETROLEUM PRODUCTS (INC.)

Mr. Chairman, delegates, and visitors, during the latter part of 1930 the Shell companies in America decided to market a Shell brand of pure Pennsylvania motor oil in addition to their regular line of lubricants to meet the requirements of customers who prefer a motor oil of this type.

It is the intention of the Shell companies to market this Pennsylvania oil on a premium price basis, and every effort has been made to produce a product possessing the finest quality and specifications in its particular class. In placing this premium type motor oil on the market they were faced with the fact that during recent years a certain amount of publicity had been given to the fraudulent substitution of branded motor oil by some unreliable resellers. Therefore, in order to protect the consumer and eliminate any doubt of the genuineness of the product in the minds of the motoring public, it was decided by the management of the Shell Eastern Petroleum Products (Inc.) in the East and the Shell Petroleum Corporation in the Middle West to retail the Shell-Penn motor oil in sealed containers.

A thorough investigation was made of the various types of sealed containers available for this purpose, such as cans, fiber containers, and glass bottles. The bottle-dispensing method was finally accepted as the most satisfactory, for the reason that it appears to be the only system of marketing a premium-priced motor oil, which meets the requirements for visibility and convenience of handling and positively guarantees protection against substitution to the purchaser. In addition it provides a clean and attractive method of dispensing the product, which in itself increases consumer acceptance.

As soon as the method of distribution was decided upon we consulted F. S. Holbrook, secretary of the National Conference on Weights and Measures, for complete information covering the latest code requirements applying to sealed-bottle containers for motor-oil dispensing. We then started a search for the most suitable type of bottle and found two of them already in use by other marketers, neither of which, however, appeared to meet the requirements of the code adopted last year by the National Conference on Weights and Measures.

As it was our desire to develop a bottle that would meet the requirements of the 1930 code in every way and also, if it were at all

possible, prove acceptable as a measure in all States in which we operate, the heads of the departments of weights and measures in the various States were contacted for definite information on the laws and regulations governing glass containers for motor-oil dispensing. While the regulations in the majority of States were based upon or closely approximate the requirements of the national code, several of the States and cities possessed laws or ordinances that made it somewhat difficult for us to devise a glass container of standard type that would prove acceptable as a measure in all States and cities throughout the territory in which we operate.

We finally succeeded in perfecting a bottle which we feel conforms in all respects to the national code, with the exception of the vent, which is, of course, impossible to provide in a sealed container made wholly of glass. In our opinion the vent is unnecessary, as it serves no useful purpose.

The bottle is $14\frac{1}{2}$ inches high, 3 inches in width, and weighs about 28 ounces. The neck of the bottle is so designed that the contents will not pour until the bottle is practically in a horizontal position, thus permitting easy pouring of the oil directly into the fill pipe of the motor. In addition to the company's name and trade-mark and the brand name of the product, there is also blown into the glass, at the base of the neck of the bottle a line one-tenth of an inch in width, designating the full quart level. Beneath this line are the words "Liquid contents 1 quart" and an arrow pointing vertically to the line with the inscription "Fill to line." The bottle also bears the manufacturer's name near the bottom, and on the breast are the words "Look for refiner's cap—it must correspond."

Lubricating oils, of course, are subject to expansion and contraction by changes in temperature, and it was deemed advisable, in order to avoid any questions arising as to the contents of the bottles, to make suitable allowance for this by filling them 3 per cent in excess of the full quart. A fine line has been blown into the neck of the bottle, above the full-quart mark, to designate the point to which they should be filled during the bottling operation, in order to provide for the desired excess tolerance. This extra quantity of oil also compensates for the small amount that clings to the inside surface of the bottle, thus assuring the customer of receiving the quantity purchased.

Vertical ribs about three-sixteenths of an inch in width and about half an inch apart provide a good hand grip and tend to reduce breakage of bottles in handling. These ribs also serve to strengthen the container.

The caps used by the Shell Eastern Petroleum Products (Inc.) for sealing the bottles after filling are of the Goldy type and are manufactured from aluminum, with a metal disk and cork gasket, and when properly applied with a suitable capping machine will hold an internal pressure of 35 to 40 pounds per square inch. These caps bear the company's name, the grade of oil contained in the bottle, and the SAE viscosity number of the same. The contents of the bottle can not be removed without destroying the sealing cap, thus eliminating the possibility of substitution.

The bottles are filled only at the company's own terminals. All empty bottles are drained on special conveyors and then carefully

cleansed internally and externally in washing machines and thoroughly drained and inspected prior to refilling. The filling operation is performed with pumps that are adjusted to deliver 3 per cent in excess of a full quart. After capping, the bottles are distributed in light steel carrying crates, which hold 16 bottles each. These carrying crates are also sealed prior to shipment with a special wire seal.

A number of people have already raised the question as to why we do not market all of our motor oil in the sealed glass containers. The answer to this is the additional cost involved. While we are not prepared to give any definite figures at the present time on the actual cost of dispensing motor oil in bottles, in comparison with the conventional method, we have found during the short time that we have employed the sealed-bottle system that the additional cost is quite considerable. We are of the opinion, however, that this additional cost is worth while in marketing a premium priced product, in view of the added protection it gives to the consumer and ourselves.

I take this opportunity of extending to Mr. Holbrook and the executive committee my company's sincere thanks for the opportunity given us to address you on this occasion. Also to thank the directors of the departments of standards, weights, and measures in the various States and cities, whom we have contacted, for the consideration and cooperation given us while working out the various problems concerning the bottling of our oil.

DRAINAGE CHARACTERISTICS OF LUBRICATING-OIL BOTTLES OF VARIOUS TYPES, BY F. S. HOLBROOK, BUREAU OF STANDARDS

As you have noted, lubricating-oil bottles occupy an important place on the program of this conference. This is for the reason that new methods and apparatus for the sale of lubricating oil are rapidly developing, much interest has been manifested in the matter during the year just passed, and the subject is one that is pressing for solution. It was naturally desired that action should be taken only when all the pertinent facts were in mind, and therefore interested parties have been given the opportunity of presenting their viewpoints to you.

In following out this general course of procedure my function is to give you the results of an investigation on lubricating-oil bottles which the Bureau of Standards has conducted during the past year.

This investigation was occasioned by the fact that two requirements in the code of specifications have largely engaged the attention of those interested in the general subject, and definite data on their necessity were lacking. The first concerns the maximum height requirement for the bottles. A number of bottles on the market exceed the height restrictions contained in the present conference code, which—it may be mentioned in passing—was included before the tall all-glass bottles were developed; the second concerns the necessity from a weights and measures standpoint of the vent which is now required by the code. That requirement was also included before the advent of the all-glass bottle, which is the type in which it is difficult to incorporate this feature.

There seemed to be considerable confusion and difference of opinion as to the propriety of these requirements. Consequently, in order to

clarify the situation and gain authoritative data upon the various types—their merits and demerits from a weights and measures standpoint—the weights and measures division of the Bureau of Standards procured bottles of the various types in use and made a study of their drainage characteristics by determining the quantities of oil retained in the bottle at various periods after delivery was begun. One or two types very recently appearing have been studied in the same way, so that the information has been kept up to date. This information has been made available to the committee on specifications and tolerances and has been used by it in reaching the conclusions that will shortly be presented to you in specification form.

Now let us consider the types of bottles included in the investigation.

(At this point the speaker exhibited and described the bottles which were included in the investigation. For the purposes of the record they may be described as follows:

No. 1. Black band, $9\frac{1}{4}$ -inch bottle, with detachable metal spout, equipped with long vent pipe extending nearly to bottom of bottle.

No. 2. Red band, $8\frac{1}{2}$ -inch bottle, with detachable metal spout, with short vent in base of spout.

No. 3. Green band, $14\frac{1}{2}$ -inch all-glass bottle, neck diameter 1 inch, no vent.

No. 4. Narrow black band, $14\frac{1}{2}$ -inch all-glass bottle, neck diameter $1\frac{1}{4}$ inches, no vent.

No. 5. Brown band, 18-inch all-glass bottle, neck diameter three-fourths inch, no vent.

No. 6. Purple band, 18-inch all-glass bottle, neck diameter $1\frac{1}{8}$ inches, no vent.)

The manner in which the data were collected may be described as follows: The bottle under investigation was filled with 1 quart of a medium grade of lubricating oil, at ordinary room temperature. The contents were then discharged by first tilting the bottle to an angle of about 60° until the flow started, after which it was up-ended vertically. The oil flowed out in a virtually solid stream until the bottle was nearly empty, when the stream broke down into what may be described as a trickle flow. The delivery was immediately halted at this point and it was determined how much oil remained in the bottle when this breakdown of the flow took place. The time elapsing from the beginning of the delivery to this breakdown of the flow was noted by a stop watch. These figures determine the first point plotted on the drainage curve for the bottle in question. (See fig. 1.)

The bottle was refilled with oil and a delivery made as before except that this time the oil was allowed to flow for a predetermined period which was longer than before; that is, after the main flow broke down the trickle flow was allowed to continue for some seconds before the delivery was stopped and the oil retained in the bottle measured. The length of this period, and the amount of oil retained, fix the position of the second point on the drainage curve for this bottle.

This process was repeated several times, each time the period from the beginning of the delivery to the measurement of the amount retained being lengthened until it reached 60 seconds, at which time the experiments were discontinued on this bottle.

Each of the above determinations was repeated three times and the average value was used so that accidental errors of manipula-

tion and observation would be avoided. All determinations were made by weight instead of by measure for the obvious reason that while the measurement of the oil retained would have been a difficult task and a relatively inaccurate one at best, the weight method was both speedy and accurate. The tare weight of the bottle and the weight per unit volume of the oil having once been established, the amount of oil adhering to the sides of the bottle at any time was determined by the weighing of the bottle in its condition at that time, the difference between this weight and the tare weight obviously being the weight of the retained oil. This figure was then translated into terms of measure.

On the graph (fig. 1) a continuous line of a certain character represents the results obtained on a certain bottle. Distances measured horizontally from the left-hand side of the graph represent the number of seconds elapsing from the start of the delivery of 1 quart of lubricating oil. The elapsed times are shown on the scale along the bottom of the chart. Distances measured vertically from the base line of the chart represent the amounts of oil retained in the bottle according to the scale of cubic inches shown on the left-hand edge of the chart. The several lines sloping downward and to the right show graphically the speed of delivery of the oil from the various bottles.

It results from the method of plotting the graphs that the more nearly vertical the line representing the delivery the faster the oil is being delivered; the more nearly horizontal the line the slower the oil is being delivered. At the end of the 60-second period the line is nearly horizontal, indicating that the rate of delivery is almost zero; that is, the amount being delivered is very small at that time in all cases.

By comparing the characteristics of the deliveries from the bottles of various types, one with another, the comparative efficiency with which each performs its function can be determined. By comparing the deliveries from one type in which a special feature is incorporated with the deliveries from types not embodying this feature, the advantages or disadvantages of the type are disclosed. For our present purposes the deliveries from bottles with vents and from bottles without vents can be studied; also the behavior of bottles of differing heights can be observed.

In the light of the data gained we may first consider the necessity of a vent from a weights and measures standpoint: There is no question that a vent speeds up the delivery of the bulk of the oil in the bottle—the main flow breaks down to a partial flow more quickly when a vent is provided than would otherwise be the case. In the case of bottle No. 1 the main flow breaks down into a trickle flow sooner than in the case of any other bottle tested, the period being 5 seconds after the start of the delivery; in the case of bottle No. 2 the period is 7 seconds, and only one out of the four bottles not vented has a shorter period. When the vents on these two bottles were closed and the experiment was repeated the periods increased to 16 seconds and 35 seconds, respectively.

However, it is not believed that the speed of operation of the device is of particular importance from a strict weights and measures standpoint—rather, this consideration is of importance from the

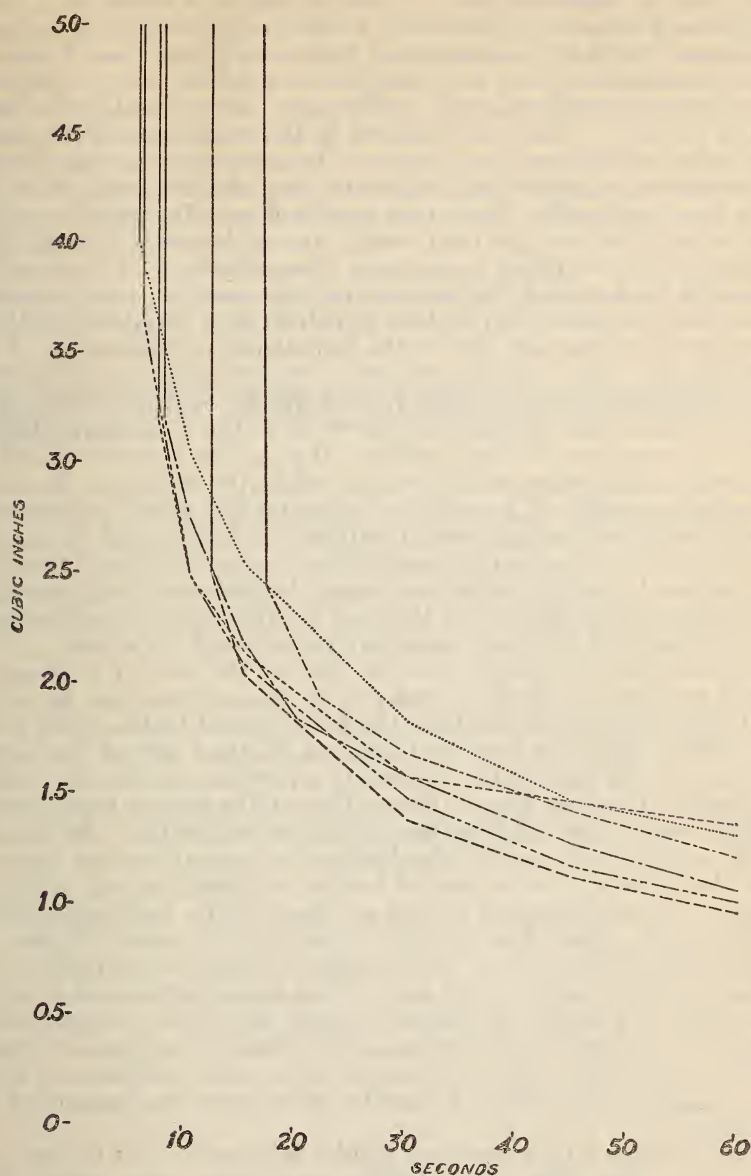


FIGURE 1.—Drainage characteristics of lubricating-oil bottles

-, metal spout, long vent (No. 1).
- , metal spout, short vent (No. 2).
- , all glass, 14½ inches tall, neck diameter 1 inch (No. 3).
- , all glass, 14½ inches tall, neck diameter 1¼ inches (No. 4).
- , all glass, 18 inches tall, neck diameter ¾ inch (No. 5).
- , all glass, 18 inches tall, neck diameter 1⅛ inches (No. 6).

standpoint of merchandising. Speed of delivery would only be of weights and measures interest if as a result of slow delivery the operation were likely to be interrupted before completion and a portion of the measured oil were to be retained as a result. One might suppose that this would ordinarily be the case. But consider how these bottles are used. They are upended in the crank case of the motor vehicle and the delivery commences. It seems obvious that it is not convenient to withdraw the bottle and stop the flow until after the main flow has broken down to a trickle flow. To attempt to halt the delivery before this time would almost inevitably result in a spillage of oil, resulting in customer dissatisfaction. Moreover, the oil would not be saved for the operator but would be wholly wasted. Therefore it appears that failure to deliver at a rapid rate will not result in short measure due to the impatience or dishonesty of the operator.

The important consideration from a weights and measures standpoint is that a full quantity be delivered to the consumer. Assuming the correctness of the container, the smaller the amount of oil retained in it the more nearly correct will be the delivery. To determine the necessity of a vent the curves on the graph representing those bottles not having vents (bottles Nos. 3, 4, 5, and 6) may be compared with those having vents (Nos. 1 and 2); if the former retain more oil than the latter then it may be indicated that the vent is a justifiable requirement; if the fact is otherwise it would appear that there should not be a mandatory requirement for a vent.

Referring to the graph, we find that at the end of a 10-second period one bottle without a vent retains the same amount as one of the vented bottles and less than the other vented bottle, while a second bottle without a vent contains less oil than one of the vented bottles. At the end of the 15-second period two bottles not vented are found to contain less oil than either of the vented bottles, while a third retains less oil than one of the vented bottles. At the end of 30 seconds only one of the bottles not vented retains more oil than the better of the two vented bottles; while at the end of the 45-second and the 60-second period all four of the nonvented bottles are found to retain less oil than either of the vented bottles. It appears that there is on the average no greater quantity of oil retained in the bottle in the case of the bottles examined in which vents are not present. During the longer periods the amounts of oil retained in the nonvented bottles are less than the amounts in vented bottles. Therefore, there appears to be no such weights and measures necessity for a vent as to justify its inclusion in the code of this conference.

The limitation on maximum height falls somewhat in the same category. The tallest glass bottles may drain more slowly than some of the other types. The curves seem to demonstrate, however, that the tall glass bottles do not retain more oil after the main flow has broken down to a trickle flow. To demonstrate the validity of this conclusion we may again turn to the graph. The tallest glass bottles are Nos. 5 and 6. Comparing the curves of these bottles with those of the other four bottles we find that at the end of the 20-second period one of them retains as little oil as any bottle, while the other retains less than one of the others and more than three of

them. At the end of the 45-second and 60-second periods these two bottles are average—both of them retain more oil than two of the shorter bottles and less than the remaining two. As a result it does not appear that from a weights and measures standpoint the height requirement can be justified. Consequently the deletion of this specification seems to be in order.

As suggested above, these data were made available to the committee on specifications and tolerances and doubtless assisted the members in formulating their conclusions, as will be indicated when that report is presented.

The data on the drainage of the various bottles were collected in the volumetric section of the division of weights and measures under the direction of E. L. Peffer.

**REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES
ON MODIFICATION OF SPECIFICATIONS AND TOLERANCES FOR
LUBRICATING-OIL BOTTLES, PRESENTED BY F. S. HOLBROOK,
CHAIRMAN**

Your committee on specifications and tolerances has to report that the present code for lubricating-oil bottles has been thoroughly reviewed in the light of performance data collected by the Bureau of Standards, and of suggestions received from other sources. As a result of this study your committee is recommending a number of modifications of the code, chief among which may be mentioned the deletion of the maximum height requirement and of the requirement for a vent.

One of the moot questions in relation to the use of oil bottles which are sealed at a central station and delivered in this form to the service station is whether they are to be considered as measures or as containers (packages). Of the oil companies which have addressed you this afternoon, one uses a measure type, one a package type. You have heard their arguments, have seen their bottles. Whether the package type should be allowed is one of the questions to be settled by you to-day.

The proponents of the package type say their bottle is not used as a measure—that it is filled by a machine which measures a predetermined quantity into the bottle, and it is sealed at a distributing plant—that it is to be regarded in the same way as lubricating oil in sealed cans, or as a package of any other liquid, as a beverage, for instance is regarded—and that it need not comply with specifications.

The proponents of the measure theory insist, on the contrary, that the lubricating-oil bottle differs from the ordinary package in at least one vital respect—that it is not delivered intact as a package to be carried away or otherwise disposed of as buyer sees fit, that it needs must be emptied at once into the crank case of the motor vehicle, that the purchaser never secures possession of the bottle nor has the opportunity of checking its contents, and that it serves exactly the same purpose as the older type of lubricating-oil bottles filled from bulk at the service station. They urge that some of the bottles are likely to be used regularly or in emergencies as measures by the service-station owner in delivering oil from bulk no matter how jealously the bottles are guarded and checked by the distributing company; that the purchaser is entitled to the satisfaction and the

safeguard of being able to check for himself the sufficiency of the filling; and that for these reasons a capacity mark is essential and should be included and all other specifications complied with.

It may be said at once that the code of specifications to be presented is similar to that which is now in effect, in this respect, that lubricating-oil bottles, whether sealed or unsealed, are regarded as measures. If the majority of weights and measures officials assembled here subscribe to the measure theory then the code will be satisfactory to them in that respect. If on the contrary the majority desire to allow the oil distributors to market their product in bottles as packages, then the code which will be presented will require amendments in this connection. As we understand it, the various jurisdictions which have given especial attention to this matter have been by no means unanimous in their conclusions. The specific recommendations of your committee are already in your hands in mimeographed form.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman,*

I. L. MILLER,

JOSEPH G. ROGERS,

W. A. PAYNE,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. HOLBROOK. You now have in mind the evidence available to the committee and acted upon in the preparation of its recommendations.

The recommendations of the committee will now be presented. I think most of you have a copy of this; additional copies are available on the table for any who are not supplied.

The first recommendation is that a section be inserted to read as follows:

DEFINITION.—Lubricating-oil bottles shall be construed to include all bottles used for the sale of lubricating oils for immediate delivery to the crank case of a motor vehicle, whether or not the bottle is used to determine the quantity of oil sold and whether or not it is sealed with a cap or some other device.

Obviously, that definition, in connection with the requirements occurring hereafter, will require that these bottles, regardless of whether they are sealed or unsealed, be regarded as measures. If that is not the consensus of the conference, the consensus should be developed and the code modified accordingly.

The chairman suggests that, if there is no comment, presentation of the recommendations continue in order.

It is recommended that present specification No. 1 be amended by striking out the words "Bottles used for the sale of lubricating oil" and inserting in lieu thereof the words "Lubricating-oil bottles," to make the specification read as follows:

Lubricating-oil bottles shall be made of clear, uncolored glass and only in sizes heretofore specified under the heading "Liquid capacity measures." They shall be made to contain their indicated capacities at a temperature of 20° C. (68° F.), and they shall not be subdivided.

The amendment in that specification is purely formal.

It is recommended that present specification No. 2, which fixes the maximum heights of bottles, and the note thereunder, be struck out

in their entirety. Attention has already been called to the fact that all height limitations were intended to be deleted from the code.

The next recommendation is that present specification No. 3 be struck out and that there be inserted in lieu thereof a specification to be numbered 2 and to read as follows:

2. A lubricating-oil bottle shall be marked on the side with its capacity and on the side or bottom with the name, initials, or trade-mark of the manufacturer.

The change in that specification is purely formal, no real change occurring in the meaning of the present specification.

It is recommended that present specification No. 4 be struck out. This reads:

4. Bottles shall be provided with a clearly defined graduation line blown or otherwise clearly and permanently marked in or on the bottle, and extending at least halfway around it, which indicates the correct capacity, and with the words "Fill to line" or a similar and suitable inscription clearly and permanently marked in or on the bottle and clearly referable to this graduation line. This line shall in no case be more than 0.10 inch in width and the bottom edge of the line shall define the top of the meniscus of the water which is used in the test of the bottle. This graduation line shall be placed so that it is at least one-fourth inch below the bottom of any metal top when this is screwed firmly into place or otherwise securely attached. The capacity of that portion of the bottle above the bottom of the graduation line shall be at least 3 cubic inches.

It is proposed that there be inserted in lieu of the above the following specifications to be numbered 3, 4, and 5.

3. A lubricating-oil bottle shall be provided with a clearly defined graduation line indicating its capacity, and with the words "Fill to line," "One quart to line," or a similar and suitable inscription, clearly referring to this capacity line. The capacity line shall occupy at least one-half of the circumference of the bottle, and shall not be more than 0.10 inch in width. This specification shall not be construed to prohibit the placing of an auxiliary line above the capacity line, to serve as a guide for filling with an excess measure of oil, but in case such auxiliary line is provided it shall be undesignated and shall be less prominent than the capacity line so that it will not be confused therewith.

4. A lubricating-oil bottle shall be so designed and constructed that the capacity of that portion of it above the capacity line is at least 3 cubic inches, and that there shall be at least one-fourth inch clear space between the capacity line and any metal or other opaque top or spout when such top or spout is screwed firmly into place or otherwise securely attached.

5. A lubricating-oil bottle shall be correct within the tolerance provided when filled so that the top of the meniscus of the water which is used in the test of the bottle coincides with the bottom of the capacity line.

The requirements of these specifications are similar to those contained in the specification already in effect.

It is recommended that present specification No. 5 be stricken out.

This reads as follows:

5. When a bottle is equipped with a spout this shall be so constructed that free and unobstructed drainage is provided. This specification shall be construed to require that there be an effective air vent in the spout and no shoulder or other obstruction tending to result in a trapping of the liquid being delivered. The spout shall not be over 6 inches in length measured from the point of contact with the top of the bottle to the tip of the spout.

It is proposed that there be inserted in lieu thereof a specification to be numbered 6 and to read as follows:

6. A lubricating-oil bottle shall be so designed and constructed that free and unobstructed drainage is provided.

It is proposed to insert a specification to be numbered 7 and to read as follows:

7. All markings or graduations required by the provisions of these specifications shall be blown or otherwise permanently marked in or on the lubricating-oil bottle, and shall be clear and distinct.

It is proposed to amend the section headed "Tolerances" by striking out the words "all bottles used for the sale of lubricating oils" and inserting in lieu thereof the words "lubricating-oil bottles," to make this section read as follows:

TOLERANCES.—The tolerance to be allowed on lubricating-oil bottles shall be in excess only and shall be the values shown in the following table. There shall be no tolerance allowed in deficiency.

Capacity of bottle	Tolerance	
	Drams	Cubic inches
2 quarts.....	12	2.7
1 quart.....	8	1.8
1 pint.....	6	1.4

Mr. SWEENEY. Mr. Holbrook, how effective would this be if a concern decided to use a bottle not complying with your specifications as stated here and started to put that on the market to sell? What position could the sealers of weights and measures take in preventing its use?

Mr. HOLBROOK. That would depend upon the law in the particular State in question. Obviously this code has no force or effect until adopted in a jurisdiction. After the code had been adopted in a jurisdiction it would express the opinion of the weights and measures officials that all bottles used for the sale of lubricating oil were measures and must conform to measure specifications. If that opinion was not agreed with by an oil company the oil company would be entitled to go into court and bring injunction proceedings to prevent the condemnation of their bottles. The court would decide whether or not the lubricating-oil bottle was a measure and susceptible of regulation by weights and measures officials of the jurisdiction in question.

Mr. SWEENEY. Another question, Mr. Chairman. Would it be necessary for the sealer to seal those bottles?

Mr. HOLBROOK. That would depend upon the official in the jurisdiction. I take it that all officials would test a sufficient quantity of them to be able to determine whether in general they complied with specifications and were accurate within tolerances. The number of these will not approach the number of milk bottles in use and it is perfectly possible that in some jurisdiction the sealer might desire to seal them all, in which case he would do so.

Mr. SWEENEY. I might say, Mr. President, that in Massachusetts a law was passed by the last legislature that will allow the manufacturers to seal these bottles to be used for the purpose of selling lubricating oils. That would eliminate, so far as we are concerned, the actual sealing by the official.

Mr. HOLBROOK. Will that law apply to the bottles in use in filling stations, such as I have here [indicating bottle with metal spout]?

Mr. SWEENEY. That is handled by the director of standards, and I am not entirely familiar with the law, but I know action was taken on it. I presume in giving the right to the manufacturers, the director of standards in Massachusetts will carry out the specifications and tolerances laid down here.

Mr. HOLBROOK. I was just going to remark that this bottle which is filled at the filling station and delivered directly to the car is in the same category as any metal measure which might be used at the filling station. There is no distinction except in the shape and the material out of which it is made.

Mr. JOHNSON. Mr. Chairman, the State of Massachusetts has a new law of its own in reference to the marking that goes on that bottle and spout. In some details these requirements differ from the requirements in other States. Even the height and the width of letters that are to be used in the State of Massachusetts are fixed before a bottle can be sealed by a manufacturer. In other words, before we are given a serial number in the State of Massachusetts, the letters must be a certain size, and in a certain location, and even the seal has to be of a certain dimension, definitely specified by the State of Massachusetts. There will be a special requirement for oil bottles that have a spout. I have been informed by Major Meredith that the bottles will be subject to periodic inspection at a charge which I believe is made from time to time for such service. That is my understanding of what Major Meredith stated in his letter. I am not so sure about the charge, but I do know that that is what is required if the bottle is sealed by the manufacturer.

Mr. HOLBROOK. I have no doubt that Massachusetts will see to it that the bottles in use are accurate. Massachusetts has a reputation to that effect. I question, however, whether Massachusetts will require the periodic sealing of a glass bottle, because a glass bottle will not change no matter how long it remains in service. Once correct, it may be considered always correct.

Mr. SWEENEY. Mr. Chairman, I would like to say that where they are sealed by the manufacturer there would be no necessity of us re-sealing them. Of course, under the requirements of the Massachusetts law, in so far as the power is given to the director of standards, naturally the manufacturer who gets the right to seal these bottles will have to put on the designation number or letter which is required, together with the initial, name, or trade-mark of the corporation. I may say that the only interest the sealers will have subsequently thereto will be to make sure that the bottles are manufactured according to law and periodically the sealers of weights and measures will have the right to and will examine the bottles, but no charge will be made by them for that service.

Mr. SAYBOLT. Mr. Chairman, is there any provision under which a bottle may be considered a container and not a measure? Again, if a bottle receives its oil from a retail dispensing tank which tank is calibrated, would not that permit us to use the pump device on the tank which has been approved and sealed as delivering a quart

to fill the bottles, and then consider that a quart has been delivered into the bottle?

Mr. HOLBROOK. Under this code all lubricating-oil bottles used in the sale of lubricating oil for immediate delivery to the crank case of an automobile are considered as measures and must comply with the specifications. The proposed code has been so worded because the committee believes that the past actions of the conference constitute an instruction to the committee in that regard. Also, incidentally, the committee on its own account believes that is the proper viewpoint to be taken. If, as I have said, the consensus of the conference is that there are occasions under which these bottles are not to be considered as measures, then this code will necessarily have to be amended to meet the desires of the conference in that regard.

Mr. BAUCOM. Mr. Chairman, we have a law which requires that all containers of lubricating oil shall be labeled with the name of the oil, and so forth. That is one requirement that I think everybody manufacturing or selling ought to observe; they should specify what kind of oil it is and the net contents of the container. I do not know just how that will be done, but I think I may be able to work it out. Perhaps you might add to new specification No. 7 the words "in addition to such markings as may be required by the individual State law," or words to that effect, which will make the bottle comply with the State requirements.

Mr. HOLBROOK. Specification No. 7 is to the effect that the markings required by these specifications shall be marked in or on the bottle in a certain way. That would not apply to additional markings required by the State unless such markings were to be included in this code, in which case those markings would also have to be put upon the bottle in the manner prescribed in the specification. In framing that specification the committee had in mind the particular markings required by the code itself. If additional markings are to be required, then consideration should be given as to whether they should be blown in the bottle or whether they might not be indicated in some other manner.

Mr. HUBELE. We charge 10 cents for sealing a measure in St. Louis. Isn't it a fact that they are trying to get into use measures which need not be sealed annually? One company refused to pay fees on 100 bottles and I had to turn it over to the law department. The case involves the same kind of bottles we are discussing here, and if we lose that case we lose \$3,500 to \$4,000 in revenue.

Mr. HOLBROOK. I might say that I have so little sympathy with the fee system that that loss does not cause me much concern.

Mr. A. B. SMITH. Mr. Chairman, I would like to call Mr. Holbrook's attention to the substitute specification numbered 2. Suppose a company were to contract for a quantity of these bottles and should require that the manufacturer should blow in that bottle only the name of the oil company. Would that bottle without the trade-mark of the factory people come within that specification?

Mr. HOLBROOK. It would not comply with this code. It has been the policy of the conference in the case of milk bottles to require the name, initials, or trade-mark of the manufacturer of the bottles. Obviously in those States which have a law requiring manufacturers to furnish bond, such a provision is essential in order that the proper

manufacturer may be proceeded against under his bond in case the bottles which he puts upon the market are not correct. Perhaps some States would not be particular that the name, initials, or trade-mark of the manufacturer appear upon the bottles. However, I think it will be found that in almost every case the manufacturer puts his name or initials or trade-mark upon every bottle of such a type as this that he turns out. The requirement is important in that it allows the weights and measures official to put the responsibility of inaccurate bottles where it belongs, namely, upon the manufacturer. I would hold that if the name, initials, or trade-mark of the manufacturer does not appear upon the bottle the code is violated.

Mr. A. B. SMITH. That is the point in which we are interested.

Mr. SWEENEY. Do I understand that you would delete the height requirement? If you do, you are going to open up an avenue where bottles of any height can be put into use.

Mr. HOLBROOK. We have not found a bottle which is objectionable from the standpoint of its height. A year or two ago we considered this tall bottle [indicating] to be objectionable. Our investigations show that it is not objectionable. The committee considered whether a new height requirement should be prepared and decided to let the matter take care of itself. The height of a bottle will be, to a certain extent, regulated by the breakage. The greater the height of the bottle and the smaller the base, the more likely the bottle is to be broken. Whether this bottle is the maximum height which would be nonobjectionable from the standpoint of retaining oil, frankly, the committee does not know, because they have not had any taller bottles to investigate. We decided to eliminate the height requirement completely rather than write a new height limitation which might be shown to be faulty in a year or two.

Mr. WARNER. Mr. Chairman, I wonder if the committee has considered a bottle which might be wide at the base and narrow in the neck. How about that type of bottle?

Mr. HOLBROOK. The committee does not desire to regulate unnecessarily. We do not know that a shorter bottle than any of those we have here would necessarily be unsatisfactory. Therefore, we have not specified either a maximum or a minimum height, since we consider the bottles at present in use to be unobjectionable from a height standpoint.

Mr. SAYBOLT. Are there specifications and tolerances which govern metal retail-dispensing units which might be used in lieu of bottles?

Mr. HOLBROOK. Yes; they come under the provisions of the liquid-measure code.

Mr. SAYBOLT. Then it would be required, as a matter of protection, that any medium used to transfer oil from a retail storage tank, the pump on which was sealed and approved as delivering the quart, to a car would have to be of an approved measure and within the tolerances? You could not use a tomato can; you could not use a mayonnaise jar or a water pitcher.

Mr. HOLBROOK. Yes; I think you could use any container to take the oil from a sealed pump to a car excepting a container which looks like a measure and which might be used as a measure in a station. If a water pitcher did not retain an excessive amount of lubricating oil there is nothing in the specifications which would prevent it from

being so used, for a water pitcher does not simulate a measure. A metal container or a glass bottle, that looks like a measure would be required to be an accurate measure on account of the danger of its being used as a measure at a filling station.

Mr. SAYBOLT. In my next question please understand that I have no desire to beg a logical issue which is perhaps for the protection of the consumer, nor to be in any way facetious, but I am trying to clarify one remaining point: Suppose a bottle were blown that was most irregular in shape, which had no regularity to its dimensions at all, and thus could never be assumed to be a measure; that would probably then pass without the necessity for coming up to the specifications and tolerances just suggested?

Mr. HOLBROOK. If it were a bottle used for the sale of lubricating oil, even to transfer a measured quantity from a pump to a crank case, under these specifications I am inclined to think that it would have to be a measure. The idea, of course, is to prevent the service station from having a number of irregularly sized containers about the station which might readily be used as measures, but in respect to which representations might be made that they were not used as measures but merely as containers to remove oil from a storage tank to the car. The amount of regulation necessary for the weights and measures official to see to it that they were not improperly used, would be tremendous. If there were to be allowed around the station containers which were not measures and not of the accuracy of measures, but which looked like measures, then there would be danger of their improper use in all cases.

Mr. SAYBOLT. I made that point, Mr. Holbrook, because I would like to say that there are two reasons why the industry has used glass bottles. The sealed bottle is the type which protects the consumer's interest and the oil company's reputation in the case either of a premium oil or a branded oil. The unsealed-bottle type is intended to speed up service, since the service-station operator is enabled to fill those containers during slack periods and have them ready for service immediately upon the approach of a car with a request for oil. We are simply desirous of all the clarification we can get, since we realize that the best minds in the various States, or counties, or municipalities, may make regulations which are not entirely uniform, and it might easily happen, of course, that such regulations would create hardships not only upon the manufacturers of the containers but also upon the vendors. If we seem to ask a lot of questions, it is just to approach the desired situation without unreasonable expense.

Mr. MARONEY. May I ask why the specification calls for glass? We know that most of them are of glass, but they might be molded of any type of material. It might be well to change it so that it would read "glass or other transparent substance."

Mr. SAYBOLT. I might supplement it by saying that a type proposed and suggested for the market is somewhat like the cardboard milk container which you buy in some of the stores.

Mr. HOLBROOK. If the container were not transparent, obviously it should not have a filling line such as is proposed here, because you could not fill to it.

Mr. SWEENEY. Mr. Chairman, I believe that in view of the fact that time has proven that there are a great many bottles of different sizes put upon the market, it might be well for weights and measures officials to consider all bottles to be measures. You should not lose sight of the fact that the main purpose of weights and measures officials is the protection of the public as well as the protection of the manufacturer. The time has come, or is pretty close at hand, when we must take a stand, and I think that the simplest way out of it would be the establishment of these bottles along the lines of definite measure. Then it will be an easy matter of inspection to determine from a test of a bottle whether or not it conforms with the law.

Mr. BAUCOM. It might be desirable to add in there a time element—that all bottles used for lubricating oils shall be designed to deliver in 30 seconds, for instance. I offer that for your consideration.

Mr. RICHARDS. After listening I am inclined to believe that there is some lack of confidence. You spoke about the height of those bottles. We find a bottle measuring 18 inches. I think that the glass manufacturers will bear me out when I say that we know of no machine that will produce a bottle longer than that. We have no reason to believe that a bottle will be made shorter than those you have there [indicating]. Such a bottle would be too large in diameter and would have a shoulder on it; you would have a container which would not be suitable for the purpose intended. The problem is confronting us which is confronting you, standardization and simplification. The machines and molds to make these bottles are very expensive. We have not shirked for one minute to meet the needs of the various States, but if it will be necessary to seal these bottles for various States that means that you will pile upon the industry a heavy expense, and you will get away from standardization. If we could have one mark on them that was interchangeable among all the States, you would simplify the whole thing.

Mr. FRENCH. Old paragraph 4 required the capacity graduation to be indicated by the words "Fill to line," or a similar and suitable inscription. In new paragraph 3 the words "Fill to line," "One quart to line," or a similar and suitable inscription is provided for. Could not something be done to at least suggest to the various States that certain inscriptions on that bottle would be interchangeable? If one State requires the inscription, "Fill to line," and another State requires something else, then the bottle will look like a Chinese puzzle.

Mr. HOLBROOK. The present recommendation is to strike out old specification No. 4 and in lieu thereof to insert in the code new specifications to be numbered "3," "4," and "5." In specification 3 it is provided that the words inscribed may be "Fill to line," "One quart to line," or any other words having the same meaning. Either of the quoted inscriptions would be satisfactory to all States adopting this code. It is pointed out that you do not have to use any definite wording provided you have a wording which properly expresses the idea.

Mr. FRENCH. A bottle will not be acceptable in a State where the blown-in readings do not meet its specifications.

Mr. HOLBROOK. Any State adopting these specifications would accept the words "Fill to line" or the words "One quart to line," or any other similar and suitable inscription, under the terms of its own specifications. These specifications are proposed to the States to be adopted in their entirety. If one firm wants to use the words "Fill to line" and another firm wants to use "One quart to line" either would be accepted in all States which adopted this specification the way it stands now.

Mr. SWEENEY. In other words, Mr. Holbrook, if these specifications are adopted in a State the sealers of weights and measures will proceed to seal a bottle if it complies with the tolerances and specifications. In a State which permits the manufacturer to seal bottles, when they bear a designating mark, it will only be necessary for the sealers to see that the designating mark is upon them before they are distributed throughout the State.

Mr. HOLBROOK. The designating mark is required under the State law and not under this code.

Mr. FRENCH. I am trying to simplify this by a suggestion that bottles be made interchangeable in the various States, and thus reduce the cost of them.

Mr. RICHARDS. Mr. Holbrook, I believe the Massachusetts requirement is that there be two arrows, one on each side, pointing to the line.

Mr. CAREW. Mr. Chairman, I think the gentleman is mistaken in that last statement. The law in Massachusetts only requires one arrow. I might add that in my home town of Medford, where I am the sealer, it is not necessary to seal the oil bottles in a station where the pumps have been sealed—the bottles are only used as containers. That same law holds throughout the entire State.

Mr. BURKE. Mr. Chairman, would not specification No. 3 be simplified by using either one or the other of the two wordings "Fill to line," "One quart to line"?

Mr. HOLBROOK. The committee did not feel that any hard and fast wording should be required. Sometimes one and sometimes the other may be preferred. For instance, this bottle here [indicating] is supposed to hold 1 quart to this line [indicating the capacity line on the bottle], but they intend to fill to this fine line [indicating a lighter graduation line above the capacity line] because it is intended to put 3 per cent excess in the bottle. In the case of this bottle the capacity line—the lower of the two—would be more appropriately marked "One quart to line" than "Fill to line." The wording is simply alternative. Any manufacturer who desires to use "One quart to line" can use that language; likewise any manufacturer can use the words "Fill to line." If this specification is adopted in any State either phrase will be satisfactory and the manufacturer can select either one, or any other suitable wording that he likes.

Mr. BURKE. How will the sealer recognize it?

Mr. HOLBROOK. The upper line is put on to indicate to the employees of the oil company the point to which it is desired to fill, but they tell the public that the bottle holds a quart when filled to that lower line, which is perfectly correct. This difference repre-

sents an excess measure which the company desires to put in the bottle.

Mr. W. L. DAVIS. Mr. Chairman, suppose bottles are made of tin and are of the same dimensions, have the same capacity and are sealed in the same way as these glass bottles. They are used to distribute oil. Would it be considered a measure, or what would it be?

Mr. HOLBROOK. If this container were tin and sealed and delivered to the purchaser who desired to carry it away, it would doubtless be a package just the same as the rectangular oil can which is delivered under similar circumstances is a package.

Mr. W. L. DAVIS. Suppose the contents were poured into the car in the same way as from those glass containers?

Mr. HOLBROOK. Certainly a thing like that, constructed out of tin, which is supposed to hold its capacity to some point down inside, could not be used the same way, since the height of the contents in reference to a capacity line could not be checked.

Mr. W. L. DAVIS. But the filling machine from which it is filled would be the measure?

Mr. HOLBROOK. The manufacturer would be allowed to determine the quantity by any reasonable means, but he would be held accountable for full measure.

Mr. W. L. DAVIS. Would it not be the same for any other package, as well as a tin package?

Mr. HOLBROOK. If all these specifications are adopted glass bottles will fall into the category of measures.

Mr. FRENCH. Mr. Chairman, how will these specifications affect the old glass bottles which we are using now?

Mr. HOLBROOK. Bottles will continue in use if complying with this specification as set up here.

Mr. FRENCH. Some of the bottles that we are using now will not meet those specifications, will they?

Mr. HOLBROOK. In what respect?

Mr. FRENCH. The wording as blown in the bottle—and the line and the arrow on the bottle?

Mr. HOLBROOK. The requirements you mention have been in force and effect since 1929. This bottle [indicating] has blown in it the proper wording, and the line and arrow, yet it was picked up some two or three years ago. If a bottle is used as a measure and does not have a capacity line on it, it ought to be condemned.

Mr. FRENCH. I mean the wording "one quart"?

Mr. HOLBROOK. Every liquid measure has been required to be marked with its capacity since 1913.

Mr. FRENCH. Suppose we adopt "One quart to line" instead of "Fill to line."

Mr. HOLBROOK. The inscriptions are simply alternative. Either one or the other, or an equivalent wording, will be satisfactory. "Fill to line" was suggested formerly and this is still satisfactory. There is no change in the specification in that regard, except that it is broadened; a new example is given, but the old wording has not been repealed.

Mr. I. L. MILLER. Mr. Chairman, may I suggest that manufacturers were never limited to the phrase, "Fill to line." A similar

and suitable inscription has always been allowed. Certainly "One quart to line" would have been acceptable under the old specification.

Mr. RICHARDS. Mr. Chairman, we had some discussion in regard to wording. In regard to the developing of bottles I might say that recently we developed a bottle. After the bottle was completed the law in Massachusetts was amended. The name of the manufacturer is now required to be put on the face of the bottle. No other State has that requirement; other States are satisfied with initials. It was found that the wording "Liquid contents one quart" was not acceptable to the State of Massachusetts—Massachusetts requires the words "One liquid quart." On account of those requirements our bottle would not be accepted. Two arrows are now required on the bottle when used as a sealed container. We have only one arrow. Another point that was brought up was that the inscription was placed vertically along the arrow. Under the new law of Massachusetts it must be horizontal below the line. Those are points that are being discussed.

Speaking from our own marketing point of view, it is almost impossible for us to segregate our bottles and have one set of bottles for one State and one set for another. If it is generally accepted that there must be a State seal on the bottle, we feel that each State should accept a bottle bearing the seal of any State—the State seals should be interchangeable. It would be impossible to make different markings for the various States.

Mr. JOHNSON. It is not very often that we have an opportunity to have with us so many people who are so influential in weights and measures work. I would like to say that our bottles with the mark of the State of Minnesota have been passed in every State where we have had any experience, except in Massachusetts. Under the new law in Massachusetts our markings are no longer acceptable. We appreciate what has been done, since we could not smear a bottle up with a number of seals; it would make the bottle look bad. To make different bottles is expensive; it takes 10 large and expensive molds for a bottle. However, we all appreciate the fine cooperation we have received in the various States.

Mr. RICHARDS. Mr. Chairman, I think you can have the assurance that the glass-container manufacturers will make their bottles of the specified size; they, on their part, would like to be assured that when they are of the proper capacity and properly marked, they will not be condemned.

Mr. ROGERS. While on this subject, I would suggest to the representatives of the glass industry that before they proceed with any large program in filling orders, they submit initial samples to us. We had a serious condition which might have reacted very unfavorably. An oil company submitted a wooden pattern of a proposed bottle, but we had not been able to approve the capacity without a test. Four carloads of a 16-carload order were then shipped. A representative of the company suddenly had the thought that he had better come down with some of the bottles to see if they were all right. These samples of the bottles were found 1 fluid ounce short. The four carloads were rejected, shipped back to the factory, and, I suppose, remelted. I think it would be a good idea for the manu-

facturers to ship samples out to the various States that have these requirements. I personally would like to see that done for New Jersey, and I think some other States also would be glad to see it done.

Mr. McFADDEN. Mr. Holbrook, when you find that tall bottle which has no filling line upon it, used as a measure, what would you do with it?

Mr. HOLBROOK. How can it be used as a measure when it has no filling line?

Mr. McFADDEN. I find it is being used as a measure in my county.

Mr. HOLBROOK. When is a measure not a measure? When it has no capacity point.

Mr. McFADDEN. When bottles of oil are allowed to remain in the sun, some of them will be filled up to the cap, while in others the oil level may be 2 to 2½ inches below the cap. Often people who want to buy the oil will say, "Give me that bottle there," indicating the bottle that appears to have the most oil in it.

Mr. WARNER. Mr. Chairman, I have not heard of any particular reason why there is objection to putting the capacity mark on that tall bottle.

Mr. BAKER. Mr. Chairman, certain objections have been cited that have not been commented upon. There were points brought out by the oil companies which I think quite important. For instance, there is the difference between the marking required in Massachusetts and in other States.

Mr. SAYBOLT. I think that is one objection; bottles are nonacceptable in Massachusetts when they have been accepted by the other States.

Mr. HOLBROOK. Of course the main reason for the existence of this conference is to provide that a policy that is satisfactory in one State is satisfactory everywhere. This conference is endeavoring to work toward that ideal.

Mr. BEATON. Mr. Chairman, in specification No. 1, I note that a temperature of 20° C., or 68° F., is specified as the temperature at which bottles shall be made to contain their indicated capacities, whereas gasoline and kerosene oil are sold on a basis of 60° F., which is recognized by the Bureau of Standards. I wonder what the thought was in changing that specification. It will make some difference.

Mr. HOLBROOK. In the first place, I think a difference of 8° F. would affect the capacity of the bottle so slightly that it would be difficult to detect the difference in any ordinary test. Moreover glassware has always been standardized on a basis of 20° C. and that same temperature has been carried in many other specifications, I think there can be no difficulty on this score.

Mr. BEATON. What I had in mind was this: If this is adopted by the members as a part of the code, what effect would this have on the industry as a whole? All weights per gallon are based on 60° F., and if this change is made it will be reflected all down the line.

Mr. HOLBROOK. I would not suppose that a specification of this sort would influence the custom of the trade, because all the code requires is that these bottles shall be similar to all other graduated glassware and be made to be correct at 68° F. The practice of selling petroleum

products at wholesale need not be affected in the slightest degree thereby. We will merely be following firmly established practice in each case.

Mr. BAUCOM. Mr. Chairman, I think the Supreme Court will not uphold your decision in providing that there shall be no tolerance in deficiency and I believe you are trying to pass something which is impossible for manufacturers to live up to.

Mr. HOLBROOK. The tolerances allowed on these bottles are very large. The United States Supreme Court in the case of a bread law has already declared that it is constitutional to allow no tolerance in deficiency.

The ACTING CHAIRMAN. The question is upon the adoption of the code.

(It was moved and seconded that the report of the committee be adopted as recommended, the question was taken, and the motion was agreed to.)

(At this point, at 5.15 o'clock p. m., the conference adjourned to meet at 10 o'clock a. m., Wednesday, June 3, 1931.)

THIRD SESSION (MORNING OF WEDNESDAY, JUNE 3, 1931)

The conference reassembled at 10.06 o'clock a. m., at the Bureau of Standards, Dr. George K. Burgess, president, in the chair.

The CHAIRMAN. Gentlemen, the conference will please be in order.

It may be of interest to you to note that there has been issued a list of the persons attending the conference, that can be obtained at the desk. I think it is particularly gratifying that there are here representatives of 25 States and also the District of Columbia, which, the chairman thinks, is a very good record, especially for this year.

The first paper on the program for this morning was written by Charles M. Fuller, city and county sealer of weights and measures, of Los Angeles, Calif. Mr. Fuller expected to be present, but at the last moment found that he would be unable to attend.

EQUIPMENT FOR TESTING LARGE-CAPACITY METERS FOR PETROLEUM PRODUCTS¹

By CHARLES M. FULLER, *City and County Sealer of Weights and Measures, Los Angeles, Calif.*

Probably no line of industry has progressed more rapidly, both in volume and in the development of new devices and types of equipment for handling its product, than the business of producing and selling gasoline and petroleum products. Keeping up with this progress and with the increasing demands made upon our department has been a constant problem.

Only a comparatively few years ago one man was able to work along "Automobile Row" on foot, carrying all the testing equipment in his hands that was necessary for the primitive 1-gallon pumps and measures, which constituted the sole means of selling to the public. Compare this with the present time, when in one year we made 16,644 inspections of gasoline measuring pumps or devices and 4,225 inspections of grease "guns"; gaged 653 large vehicle tanks and trailers, many of them having a capacity of over 3,000 gallons; and inspected 269 large-capacity meters of the wholesale type.

From previous papers which have been presented here, you are familiar with the equipment which we have designed and built for most of this work. Last year we found ourselves confronted with the problem of an adequate method for testing large-capacity meters whose rate of flow was from 150 to 300 gallons per minute. It was obvious that our 50-gallon outfit was entirely too small to be of value.

¹ In the absence of Mr. Fuller this paper was read to the conference by F. S. Holbrook, secretary of the conference. A lantern slide illustrating the equipment was exhibited and explained. In this connection Mr. Holbrook suggested to the conference that there was a need for a code of specifications and tolerances covering liquid-measuring devices intended for wholesale deliveries of liquids.

Of course it was possible to carefully gage a vehicle tank and use this for a test run, but this method was slow and inefficient.

In the meantime these large meters were being installed on loading racks, at wholesale yards, and on the docks, and the demands made upon this department that they be tested and sealed were increasing. An appropriation was obtained and an outfit designed and built. It has now been in use for a number of months and has proved its value and efficiency.

It consists of two test measures or tanks, each having a capacity of 300 gallons, with graduated gage glasses, mounted on a truck. The gages are placed on both sides of the dome, so that if the truck is not on level ground an average or mean reading can be taken. The graduations are $\frac{3}{8}$ inch apart for each quart, and give us a capacity of 4 gallons above and the same amount below the zero indication.

A pump operated by a power take-off from the engine enables us to empty the test tank in four minutes. A connection is provided so that we can use this same power pump to drain our 50-gallon outfit. A manifold also enables us to drain the tank by gravity if desired.

The capacity of each tank is exclusive of the pipe lines and the valves are placed close to the tank outlet so as to prevent formation of any air pockets. Air vents are also provided on top of the tanks.

A cupboard or locker on the back of the truck provides space for test measures, tools, and other equipment.

If any of the delegates should be planning to build such an outfit, we will be very glad to furnish them with the details of its construction.

STATE REQUIREMENTS FOR NET-CONTENT MARKING OF PACKAGES OTHER THAN FOOD PACKAGES

By HOWARD S. JARRETT, *Commissioner of Weights and Measures, State of West Virginia*

The subject which has been assigned me, State Requirements for Net-Content Marking of Packages Other than Food Packages, I will deal with according to the laws of my own State and the experiences in connection therewith. In doing so I believe that similar circumstances surround the work in 14 other States that have practically the same statutes or regulations.

Section 24, chapter 47, of the Code of West Virginia, pertaining to weights and measures, provides:

It shall be unlawful to keep for the purpose of sale, offer or expose for sale, or sell any commodity in package form unless the net quantity of the contents be plainly and conspicuously marked on the outside of the packages, in terms of weights, measures, or numerical count: *Provided, however,* That reasonable variations or tolerances and also exemptions as to small packages shall be established by rules and regulations made by the commissioner of weights and measures: *And provided further,* That this section shall not be construed to apply to medicinal articles and to those commodities in packages the manner of sale of which is specifically regulated by the provisions of other sections of this act.

The word "package" as used in this section shall be construed to include the package, carton, case, basket, can, box, barrel, half-barrel, hamper, keg, drum, jug, jar, crock, bag, pail, wrapping, parcel, package, bottle, phial, or other receptacle put up by the manufacturer; or, when put up prior to the order of the commodity, by the vendor; which may be labeled, branded, or stenciled or

otherwise marked, or which may be suitable for labeling, branding, or stenciling, or marking otherwise, making one complete package of the commodity. The word "package" shall be construed to include both the wholesale and the retail package: *Provided*, That a box or carton used for shipping purposes containing a number of similar packages which are individually marked, as hereinbefore provided, will not be required to bear the weight or measure of contents.

You will note the word "package" is defined in such a manner there is no escape from its meaning or little margin for a controversy as to the requirements of the law.

In these days and times we must visit the hardware stores, the 5-and-10-cent stores, the department stores, and many other merchandising concerns to find whether the statute is being observed. While grocery stores are confined mostly to the sale of foodstuffs, we do find there also commodities other than foods requiring certain content markings. There are also many of these packages in drug stores, although drugs seem to be a secondary consideration in many of our pharmacies to-day. * * *

It is quite difficult to keep away from the question of net-content marking of foods and drugs in preparing a paper, as these commodities constitute 90 per cent of the reweighings or examinations.

Only 15 States have specific laws on package-content markings for commodities other than foods and drugs. If every State would have an identical statute or regulation, and these rules were strictly enforced, little difficulty would be encountered. Each State would thus not only see that its own laws were observed but its vigilance would greatly assist the officials in other States. I find, however, that commodities of national distribution are almost always properly marked.

Packages containing 2 ounces avoirdupois or less are usually termed "small" and are exempt from marking in terms of weight, as are packages of 2 fluid ounces or less exempt from markings in terms of measure. Packages containing less than 6 units of a commodity are usually termed "small" and not required to be marked in terms of numerical count. My experience has been that when violations occur it is usually because packages are without any markings whatever, rather than incorrect markings.

While we have no definite program of inspection, the inspectors in visiting a merchant for the inspection and testing of scales extend their work to reweighing of packages and examination of all goods sold by weight, measure, or numerical count. The manufacturers of package goods cooperate satisfactorily with the department and have been found willing to correct any errors that might be found.

I would venture the assertion there are not more than three out of five people who purchase commodities that pay the attention they should to the content markings. Then the weights and measures official is rendering a degree of protection to every purchaser of which the buyer has no knowledge. Or else the purchaser has placed confidence in the weights and measures official to the extent that he feels he is receiving his money's worth because of the alertness of the sealer. We do not want that confidence placed in us to wane—then we must constantly be on the job to keep faith with others.

The officials of each State have their own problems and correct them to their own satisfaction. They render efficient service to their own people and in so far as their own particular rules and regulations

are concerned, but there should be a spirit of cooperation manifested on this question as between States.

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The CHAIRMAN. The Chair has just been informed that the Secretary of Commerce has been obliged to go to New York on unexpected urgent business. I can assure the conference that he had a paper ready to present, and as late as 9.30 o'clock this morning his secretary told me that he would be out here. He sends his regrets to the conference that he can not be present.

PROPOSED CONSOLIDATION AND AMENDMENT OF FEDERAL STANDARD-CONTAINER LEGISLATION

By H. A. SPILMAN, *Senior Marketing Specialist, Bureau of Agricultural Economics, United States Department of Agriculture*

Gentlemen of the conference, before proceeding with the discussion of this proposed consolidation of container legislation I would like to call your attention briefly to the exhibit of containers that we have on the other side of the room. These exhibits cover the containers and baskets standardized under both the acts of 1916 and 1928. There is a greater degree of standardization of those baskets than seems to be indicated by the number of samples that we have there.

The standard container act of 1928 requires submission for approval of dimension specifications. Specifications are approved, providing containers made in accordance therewith are of proper cubical capacity and provided they are not deceptive in appearance. Under this dual requirement the results of our efforts to hold the number of different shapes to a minimum have been very gratifying. In other words, there has been developed a large degree of uniformity in the dimensions and shapes of the several sizes of the various types. But while considerable has been accomplished there still remain some more or less minor differences to be eliminated in certain types, particularly splint baskets. In these we started with less data and information than were available for the hampers and round stave baskets, and we have found considerably more local prejudice to be overcome in these baskets than was perhaps true in any of the others. However, even in splint baskets, which are after all more or less a local proposition, the specifications for any given community or territory have been brought to common standards. For instance, we have in the 8-quart diamond-weave overhandle basket an Ohio type, a Pittsburgh type, and a New York type. There is a New York type of 12-quart diamond-weave overhandle which is somewhat different from the 12-quart made in all other sections. However, the commonest size of diamond-weave overhandle splint basket, the 16-quart, is practically identical the country over.

Let me briefly review some of the factors involved in the simplification of containers for fruits and vegetables. We have mentioned local prejudice. Then there are differences in the species of woods used; differences in manufacturing methods; the human equation and the eternal quest of human nature for change. These several factors effectively preclude the probability of effecting standard-container specifications by the mere standardization of the forms. The

program must reach back through the sales room and assembly room to the lathe and clipper of each individual manufacturer.

An important and sometimes distressing factor in the simplification of container specifications is differences in types of construction. For instance, in hampers we have those with flush top and bottom; hampers with the inside top hoop set down to accommodate the cover; hampers with raised bottoms; and hampers made like barrels. In straight-side baskets there are bent bottoms, removable bottoms, fixed fabricated bottoms, solid-board bottoms, baskets with two center hoops, and hamper-type baskets. Besides these there are baskets with covers setting down inside like hampers and baskets with both top and bottom removable. Some of these are not yet of commercial importance. When it comes to splint baskets there are, first, the diamond-weave overhandle, drop-handle, and no-handle types; some made with eight splints and others with nine splints. In the square-braid splints there are mostly the over-handle types with a few no handles, and, I believe, an occasional drop handle. But here we have the corners either scored and square at top and bottom, scored at bottom and round at top, or round at both top and bottom. And finally the slab baskets, which are close kin to the square-braid type.

While the containers displayed here do not include all of the various types of construction, they do show the range of sizes and the degree of differentiation between them according to the specifications which we recommend and strive to have accepted in all cases. It is a striking contrast to the conditions existing with regard to the berry boxes and till baskets for which, under the act of 1916, no provision is made for regulating dimensions.

This exhibit will give you an opportunity to observe how many different kinds of shapes and sets of measurements are used in the manufacture of splint baskets and will serve as an object lesson of the further need of simplification of these containers.

Standard containers—standard container act of 1928

Established standards	Number of shapes or specifications	Variants and types
Hampers:		
⅛-bushel.....	One.....	1. Regular flush top. 2. Raised bottom. 3. High hat.
¼-bushel.....	do.....	Same as above plus 4. Cross-brace stave. 5. Square hamper.
½-bushel.....	do.....	1. Regular flush top. 2. Raised bottom. 3. Cross-brace staves. (8 and 8½ inch bottoms).
⅝-bushel.....	do.....	1. Regular. 2. Cross-brace staves.
¾-bushel.....	Two.....	1. Based on old ⅝ bushel. 2. Based on old 1 bushel.
1-bushel.....	Four.....	1. Regular—set-down hoop. 2. Flush top. 3. 10-inch bottom—storage. 4. Lobart export—13-inch bottom. 5. Oval.
1¼-bushel.....	One.....	
1½-bushel.....	Two.....	1. 9-inch bottom regular and flush top. 2. 10-inch bottom.
Round stave baskets:		
¼, ½, ¾, and 1-bushel.....	One each.....	

Standard containers—standard container act of 1928—Continued

Established standards	Number of shapes or specifications	Variants and types
Straight-side baskets:		
$\frac{3}{8}$ and $\frac{1}{4}$ -bushel.....	One each.....	
$\frac{1}{2}$ -bushel.....	Two.....	1. Bent bottom. 2. Same with 2 middle hoops. 3. Flat (planters).
$\frac{3}{4}$ -bushel.....	One.....	
1-bushel.....	Practically one..... (Slight variations in depth and bottom diameters.)	1. Bent bottom. 2. Same with 2 middle hoops. 3. EZ Pak. 4. Fixed fabricated bottom. 5. Hamper type. 6. Top and bottom both removable. (Heacock.)
Splint baskets:		
Diamond-weave overhandle—		
4-quart.....	One.....	
8-quart.....	Three.....	1. Ohio type. 2. Pittsburgh type. 3. New York type (9-splint).
12-quart.....	Two.....	1. Regular (8-splint). 2. New York (9-splint).
16-quart.....	One.....	
24-quart.....	do.....	
Diamond-weave drop-handle—		
4, 8, and 12-quart.....	One each.....	
16-quart.....	Two.....	1. 8-splint. 2. 9-splint.
Square-braid and slab baskets: 4, 8, 12, 16, 24, and 32 quarts.	One each.....	1. Round top. 2. Square top. 3. Round corners (very few).

Handle or no handle baskets conform to same specifications.

Now we may return to the consideration of the proposed consolidation and amendment of the Federal standard container acts. I take it that you have all been supplied with a copy of the text of this proposed consolidation, and I want to discuss as rapidly as I can the factors that caused us to suggest such a consolidation, and then run briefly over the proposed draft itself.

Let me remind you first that we have on the Federal statute books four laws relating to the standardization of containers for fruits and vegetables. The two earliest of these are the law establishing the standard apple barrel, which was approved on August 3, 1912, and the law establishing the standard barrel for fruits and vegetables and the standard barrel for cranberries, which was approved on March 4, 1915. The third act is what is commonly known as the standard container act of 1916, which was approved on August 31 of that year, and the fourth is the standard container act of 1928, which was approved on May 21 of that year.

These laws have been in effect for a sufficient length of time to bring out certain deficiencies which exist therein. Most of these deficiencies tend to make the acts harder to enforce. Some of them represent mere inconsistencies and others extend the scope of the act beyond any intention of those who framed the legislation. All of us who have had anything to do with laws relating to containers have known all these deficiencies for some time and have realized the desirability of initiating action looking toward the correction of conditions. Some of the interpretations placed upon the standard container act of 1928 have extended the scope of that act further than any of us desired and have served to focus attention on the need of change in all of these container acts.

When I talked to you last year I told you that we realized that the wording of and the interpretations placed upon the act of 1928

seemed to endanger much that had been accomplished by weights and measures officials throughout the United States looking toward the retail sale by weight and numerical count. I assured you at that time that the Department of Agriculture had no desire to render ineffective the good work already done along such lines and that we had already consulted with representatives of the Bureau of Standards regarding possible changes in the act of 1928 and expected to continue those discussions.

In the meantime various onslaughts have been made on the old standard container act of 1916. This is the law which establishes three standard sizes for Climax baskets, establishes the half pint, pint, and quart as the standard sizes for berry boxes, and provides in effect that till baskets shall be made in the multiples of the dry quart. This act as passed was a combination of a bill introduced for the standardizing of Climax baskets and three bills introduced for the standardizing of berry boxes. The combination was made rather hurriedly and no great attempt seemed to have been made to make the language of the law consistent throughout. This has resulted in some loopholes, and during the past year various parties have made successful attempts to take advantage of these loopholes. This circumstance brought to the fore the question of revising the 1916 act, and it was suggested that both of the laws be combined in one act to cover the whole field of baskets for fruits and vegetables.

This suggestion recalled one made some two or three years ago by one of the largest manufacturers of baskets in the country, a company which also manufactures many barrels. This particular firm had some competition from manufacturers making barrels which were believed to be nonstandard and had also had some difficulty with small plants under contract to make barrels for them. They found these small plants very careless, so they claimed, with regard to making barrels according to the standards set up by law. A representative of this firm approached the Department of Agriculture and asked if it would be possible for us to undertake the enforcement of the standard barrel law. We replied that it would not be because we felt that such authority was vested in the Bureau of Standards. He then asked whether we would be willing to have the enforcement of barrel legislation added to our duties, and was told that we felt that the question of any such change should be taken up first with the Bureau of Standards rather than with the Department of Agriculture. This suggestion was followed, and, as a result, certain correspondence ensued in which the Bureau of Standards indicated their entire willingness to accede to the enforcement of the barrel laws by the Department of Agriculture. The matter rested there.

These discussions were recalled and the suggestion made that if new legislation were to be considered it might be desirable to get up a sort of container code, including baskets and barrels for fruits and vegetables, in one comprehensive act. This suggestion was taken up with the Bureau of Standards, and, upon learning that that bureau was still willing to acquiesce in a proposal for the transfer of barrel laws to the Department of Agriculture, this idea was followed in the draft which I am going to ask you to consider with me.

Let us consider some of the weaknesses of the laws now on the statute books.

(1) The act of 1916 establishes in the first section standards for Climax baskets, for grapes and other fruits and vegetables; in the second section it establishes sizes for the standard basket or other container for small fruits, berries, and vegetables. Note that in the first section the phrase "grapes and other fruits and vegetables" is used, while in the third section the phrases are "small fruits, berries, and vegetables." The discrepancy in language may not appear to be important, but during the past year it had been made the basis for resisting the enforcement of the act. The question arises as to what is a small fruit. Horticulturalists tell us that the small fruits are berries, and that other fruits may be classed as tree fruits and vine fruits. The act, by mentioning both small fruits and berries, may seem to indicate that Congress had something else than berries in mind in speaking of small fruits. One Federal court, however, appears to take the opposite view.

(2) Section 3 of the act of 1916 is the penalty section. It provides a penalty for using nonstandard Climax baskets and other containers for small berries, fruits, and vegetables, making no mention of grapes which are specifically mentioned in the first section. Here again we have a technical point which has been made the basis of resistance to the act. The claim has been successfully made that since grapes are not specifically mentioned in section 3, there is no punishment for using any type or size of container for grapes.

(3) The act of 1916 is based on interstate commerce. It makes it unlawful to manufacture for shipment, sell for shipment, or ship in interstate commerce nonstandard containers. Obviously, a manufacturer in the State of Illinois may manufacture nonstandard Climax berry boxes or till baskets and ship them to Chicago without interference on the part of the Federal Government, whereas an Indiana manufacturer may not do so. The standard barrel law, and the act of 1928, on the other hand, are weights and measures laws and as such are effective in intrastate as well as interstate commerce.

(4) The act of 1916 nowhere mentioned specifically the standardization of till baskets. It is accomplished by providing that baskets and other containers must be made in the half-pint, pint, and multiples of the dry quart. This provision is somewhat inconsistent with the act of 1928, and it would be much better if the till baskets were specifically standardized.

(5) The act of 1928, as I have previously stated, may be construed as nullifying much that has been accomplished in bringing about the sale of fruits and vegetables by weight and numerical count.

(6) The old apple barrel law contained one section which established standard grades for apples when packed in barrels. So far as is known these grades have never been used to any extent, and the Department of Agriculture long ago recommended other and more specific grades for barreled apples. This act has to a great extent been superseded by the second barrel act of March 4, 1915, but was never repealed. Under present conditions its continuance on the statute books seems unnecessary and undesirable.

(7) The second barrel act does not prohibit the manufacture of nonstandard barrels for fruits and vegetables. It makes it unlawful to sell or to offer or expose for sale a nonstandard barrel when it contains fruits or vegetables. Experience has demonstrated that it is much easier to enforce a law of this character if it makes it possible to eliminate nonstandard containers at their source, namely, the manufacturer.

(8) None of these standard container acts contains a provision requiring the marking of containers to show the capacity and the identity of the manufacturer. The lack of any identification mark makes enforcement more difficult.

Having set forth some of the deficiencies which have caused a study to be made of the possibility of codifying container legislation, let us proceed to a brief review of our suggestions which have been put in the form of a bill. I first wish to emphasize the fact that this draft is not to be understood as proposed at this time by the Department of Agriculture. It represents the results of the study of the subject made by specialists in the Bureau of Agricultural Economics, as modified in some respects to meet suggestions made by representatives of the Bureau of Standards. It contains our present suggestions as to how weaknesses in existing acts might be corrected and existing container legislation placed upon a better basis. I do not know whether these views would receive the approval of the department, and I do not know whether the department would be willing to propose any further legislation on the subject. I am bringing these suggestions to your attention because I think you are entitled to know what we are thinking on the subject and because we should like to have the benefit of your experience and of any suggestions which you may wish to make. I shall be disappointed if those of you who are present here look on this as something regarding which we in the department have come to a definite and final agreement and upon which we are not open to suggestions. We have fretted and worried a great deal over this whole proposition and, perhaps somewhat selfishly, are now inviting you to fret and worry with us.

SECTION 1. That for the purposes of this act a bushel, standard dry measure, has a capacity of 2,150.42 cubic inches; a quart, standard dry measure, is $\frac{1}{4}$ of a bushel, or 67.2 cubic inches; a pint, standard dry measure, is $\frac{1}{2}$ quart, or 33.6 cubic inches; and the standard containers established by this act, respectively, shall have capacities in cubic inches equal to the designated multiple or fractional part or combined multiple and fractional part of such standard bushel, standard quart and/or standard pint. The capacity of any hamper or basket provided in this act shall be determined by stricken measure in accordance with the rules and regulations prescribed by the Secretary of Agriculture. If a cover be used upon any hamper or basket mentioned in this act it shall be securely fastened or attached in such manner, subject to the regulations of the Secretary of Agriculture, as not to reduce the capacity of such hamper or basket below that prescribed therefor.

This section sets forth the number of cubic inches in a bushel, a dry quart, and a dry pint, and provides that the standard containers set up by the act shall be of cubical capacities corresponding to their relation to the bushel, the quart, and the pint. This part of the section is new and was written in this way to meet a suggestion from the Bureau of Standards that the act could be much simplified if we abandoned the form used in the acts of 1916 and 1923 of setting forth the number of cubic inches for each container. This form

shortens the bill materially and we believe does not weaken it in any respect. The portions of the section providing for the determination of capacity by stricken measure and that any covers used must be so attached as to not reduce the capacity of the basket are not new.

SEC. 2. That the standard till basket for fruits or vegetables shall be of the following capacities, standard dry measure, namely, $\frac{1}{2}$ pint, 1 pint, 1 quart, 2 quarts, 3 quarts, and 4 quarts.

This section establishes standard capacities for till baskets. This is new in form but not in the standards. The new feature consists in the elimination of all mention of berry boxes, classing them under the head of till baskets which is where they properly belong. Another new feature is the placing of a limit on the size of till baskets. Heretofore, under the act of 1916, a till basket could be made in any size, so long as it was a multiple of the quart.

SEC. 3. That the standard Climax baskets for fruits and vegetables shall be of the following capacities, standard dry measure, namely, 2 quarts, 4 quarts, and 12 quarts, respectively.

(a) The standard 2-quart Climax basket shall be of the following dimensions: Length of bottom piece, $9\frac{1}{2}$ inches; width of bottom piece, $3\frac{1}{2}$ inches; thickness of bottom piece, $\frac{3}{8}$ inch; height of basket, $3\frac{7}{8}$ inches, outside measurement; top of basket, length 11 inches and width 5 inches, outside measurement. Basket to have a cover 5 by 11 inches, when a cover is used.

(b) The standard 4-quart Climax basket shall be of the following dimensions: Length of bottom piece, 12 inches; width of bottom piece, $4\frac{1}{2}$ inches; thickness of bottom piece, $\frac{3}{8}$ inch; height of basket, $4\frac{1}{8}$ inches, outside measurement; top of basket, length 14 inches, width $6\frac{1}{4}$ inches, outside measurement. Basket to have cover $6\frac{1}{4}$ inches by 14 inches, when cover is used.

(c) The standard 12-quart Climax basket shall be of the following dimensions: Length of bottom piece, 16 inches; width of bottom piece, $6\frac{1}{2}$ inches; thickness of bottom piece, $\frac{7}{8}$ inch; height of basket, $7\frac{1}{8}$ inches, outside measurement; top of basket, length 19 inches, width 9 inches, outside measurement. Basket to have cover 9 inches by 19 inches, when cover is used.

This merely repeats section 1 of the present act of 1916.

SEC. 4. That the standard hampers, round stave baskets and straight-side baskets for fruits or vegetables shall be of the following capacities, standard dry measure, namely, $\frac{1}{8}$ bushel, $\frac{1}{4}$ bushel, $\frac{1}{2}$ bushel, $\frac{5}{8}$ bushel, $\frac{3}{4}$ bushel, 1 bushel, $1\frac{1}{4}$ bushels, $1\frac{1}{2}$ bushels, and 2 bushels.

SEC. 5. That the standard splint basket for fruits or vegetables shall be of the following capacities, standard dry measure, namely, 4 quarts, 8 quarts, 12 quarts, 16 quarts, 24 quarts, and 32 quarts.

Sections 4 and 5 contain practically the same matter as that appearing in the first paragraphs of sections 1 and 2 of the act of 1928. The sections are made much shorter because section 1 of the draft makes possible the elimination of the paragraphs relating to the cubical content of the individual baskets.

SEC. 6. That the standard barrel for fruits or vegetables and other dry commodities other than cranberries shall contain 7,056 cubic inches and be of the following dimensions without distension of its parts: Length of stave, $28\frac{1}{2}$ inches; diameter of heads, $17\frac{1}{8}$ inches; distance between heads, 26 inches; circumference of bulge, 64 inches, outside measurement; thickness of staves, not greater than $\frac{1}{8}$ inch: *Provided*, That any barrel of a different form having a capacity of 7,056 cubic inches and which is not deceptive in appearance shall be a legal barrel. The standard barrel for cranberries shall contain 5,826 cubic inches and be of the following dimensions when measured without distension of its parts: Length of staves, $28\frac{1}{2}$ inches; diameter of heads, $16\frac{1}{4}$ inches; distance between heads, $25\frac{1}{4}$ inches; circumference of bulge, $58\frac{1}{2}$ inches, outside measurement; thickness of staves, not greater than $\frac{1}{8}$ inch: *Provided*, That in barrels having but one head and no croze ring or other means for the insertion of a head at the opposite end, the distance between heads shall be meas-

ured perpendicularly between the one head and a plane $1\frac{1}{8}$ inches from the end of the staves at the opposite end.

The standard subdivisions of the standard barrel for fruits or vegetables and of the standard cranberry barrel shall be the $\frac{3}{4}$ barrel, $\frac{1}{2}$ barrel, and the $\frac{1}{8}$ barrel, respectively, the dimensions of which shall be prescribed in the regulations to be promulgated by the Secretary of Agriculture.

The first paragraph of this section contains the same material as that found in section 1 of the standard barrel law of 1915. It has, however, one addition; that is, the proviso at the end of the paragraph which reads: "*Provided*, That in barrels having but one head and no croze ring or other means for the insertion of a head at the opposite end, the distance between heads shall be measured perpendicularly between the one head and a plane $1\frac{1}{8}$ inches from the end of the staves at the opposite end." This proviso was inserted at the suggestion of those in the Bureau of Standards who have had to do with the enforcement of the barrel law, as being desirable.

The second paragraph of section 6 establishes the subdivisions of the standard barrels which now appear in section 2 of the act of 1915. These subdivisions have been the subject of some discussion and it does not appear that any great use has ever been made of any of them. Cranberries are now packed in boxes or cartons which represent subdivisions of the barrel, but the only one of the subdivisions here mentioned which is used is the half-barrel. The quarter-barrel box is used, as is also an eighth-barrel carton. However, in the absence of any comments either for or against the present arrangement it was deemed advisable to continue it.

SEC. 7.—That no person shall manufacture till baskets, hampers, round stave baskets, straight-side baskets, splint baskets, or barrels for fruits or vegetables unless the dimension specifications for such till baskets, hampers, round stave baskets, straight-side baskets, splint baskets, and barrels shall have been submitted to and approved by the Secretary of Agriculture who is hereby directed to approve such specifications if he finds that till baskets, hampers, round stave baskets, straight-side baskets, splint baskets, and barrels made in accordance therewith would not be deceptive in appearance and would comply with the provisions of sections 2, 4, 5, and 6 of this act. The provisions of this section shall not apply to barrels for fruits and vegetables which conform to the standard dimensions set forth in section 6 of this act.

This is a rewriting of section 4 of the standard container act of 1928. It has some wording that is new and which is intended to strengthen the requirement that specifications be submitted to and approved by the Secretary of Agriculture. It may be noted that it directs the Secretary to approve specifications if they would not be deceptive in appearance and would comply with the provisions of sections 2, 4, 5, and 6 of the act, and then goes on to exempt barrels which conform with the standard dimensions set forth in section 6. Reference to section 3 of this bill is omitted because it relates to Climax baskets and establishes standard dimensions therefor. Barrels conforming to standard dimensions set forth in section 6 are exempt for the same reason.

SEC. 8. That till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets, and barrels for fruits or vegetables shall be plainly marked by the manufacturer to show the identity of the manufacturer and the capacity of the container. Such marking shall be in accordance with the regulations prescribed by the Secretary of Agriculture.

This is an entirely new section and one in which I believe you will all be interested. It is one requiring the marking of fruit and

vegetable containers by the manufacturer to show his identity and the capacity of the container. There was a time when manufacturers would have objected strenuously to such a provision. In fact, it was such objections which caused the elimination of a provision of this character from the act of 1928 at the time it was under discussion in Congress. I believe now, however, that the great majority of manufacturers will support such a proposition. I believe you will all agree that it is desirable.

SEC. 9. That it shall be unlawful to manufacture, to offer for sale, to sell, to offer for shipment, to ship or to use till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets, and barrels for fruits or vegetables, either filled or unfilled, or parts of such containers, that are not of the capacities and/or dimensions specified by this act, or for which the dimension specifications have not been submitted for approval or approved as provided by this act, or which do not conform to the specifications approved therefor as directed by this act, or which have not been marked as provided by this act.

This section may be described as defining illegal containers. It makes it unlawful to manufacture, to offer for sale, sell, to offer for shipment, to ship or to use containers not of the capacities and/or dimensions specified by the act or for which the dimension specifications have not been submitted for approval or approved as provided by the act, or which do not conform with the specification approved therefor directed by this act, or which have not been marked as provided by this act. Please note that in existing laws it has been declared unlawful to manufacture for sale or for shipment thus making it necessary to prove that the manufacturer actually did make the goods for sale or shipment. Some may allege that the proposed provision is too harsh. Certainly, if a manufacturer makes any quantity of illegal containers he must have made them only for sale or for shipment and it is throwing needless obstacles in the way of enforcement to require that it be proved that he manufactured them for such a purpose. This provision is more stringent than any now existing in that it clearly makes illegal the manufacture of containers which do not conform to approved specifications or the specifications for which have not been submitted and approved. This was the plain intent of the act of 1928, but the act did not specifically so state, and it is questionable whether it could be enforced along such lines. Lawyers differ in their opinions on the point and it seems well to clear it up. Since marking is incorporated in this draft, it is, of course, necessary to make unmarked containers illegal.

SEC. 10. That, except as provided in section 15 of this act, any person who violates any of the provisions of this act shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding \$500: *Provided, however,* That no person shall be prosecuted under the provisions of this act when he can establish a guaranty signed by the manufacturer, wholesaler, shipper, or other party residing within the United States from whom the containers as specified in this act, or parts thereof, were purchased, to the effect that said container or parts thereof are correct within the meaning of this act. Said guaranty, to afford protection, shall contain the name and address of the party or parties making the sale of the containers or parts thereof to such person, and in such case such party or parties making such sale shall be amenable to the prosecution, fines, and other penalties which would attach in due course under the provisions of this act to the person who made the purchase.

This is the penalty section. We have followed a little different system here. The matters appearing in sections 9 and 10 of this draft have formerly been combined in one section. It is believed that the present method makes greater clearness.

SEC. 11. That any till basket, Climax basket, hamper, round stave basket, straight-side basket, splint basket, or barrel for fruits or vegetables, whether filled or unfilled, or parts of such containers that are not of the capacities and/or dimensions specified by this act, or for which the dimension specifications have not been submitted for approval or approved as provided by this act, or which do not conform to the specifications approved therefor as directed by this act, or which have not been marked as provided by this act which shall be manufactured, offered for sale, sold or shipped, or which shall be used contrary to the provisions of section 12 of this act, may be proceeded against in any district court of the United States within the district where the same shall be found and may be seized for confiscation by a process of libel for condemnation. Upon request the person entitled shall be permitted to retain or take possession of the contents of such till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets, or barrels, but in the absence of such request, or when the perishable nature of such contents makes such action immediately necessary, the same shall be disposed of by destruction or sale, as the court or a judge thereof may direct. If such till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets, or barrels, or parts thereof, be found in such proceeding to be contrary to this act, the same shall be disposed of by destruction, except that the court may by order direct that such containers, or parts thereof, be returned to the owner thereof or sold upon payment of the costs of such proceedings and the execution and delivery of a good and sufficient bond to the effect that such containers, or parts thereof, shall not be sold or used contrary to law. The proceeds of any sale under this section, less legal costs and charges, shall be paid over to the person entitled thereto. The proceedings in such seizure cases shall conform as near as may be to the proceeding in admiralty, except that either party may demand trial by jury of any issue of fact joined in such case, and all such proceedings shall be at the suit and in the name of the United States.

This is the seizure section of the act of 1928. The only difference is that this section gives specific permission to seize baskets which are not of the dimensions specified by the act or for which the dimension specifications have not been submitted for approval or have not been approved or which have not been marked as provided by the act. I might say there that some of you might think we are trying to be a little severe in this matter of submitting specifications for approval, but our experience in the past three years with the act of 1928 convinces us that we need a little more stringent provision along this line not only to make enforcement easier for us but to protect the manufacturer who does cooperate against the manufacturer who does not cooperate readily.

SEC. 12. That till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets or barrels, which do not comply with this act shall not be used for fruits or vegetables, and that standard till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets or barrels, which do comply with this act shall not be used by any retailer for the determination of the quantity of fruits or vegetables sold at retail unless such fruits or vegetables were received therein by him and/or unless such retailer is the producer or grower of the fruits or vegetables so sold: *Provided*, That this act shall not prohibit the manufacture, offer for sale, sale, or shipment of till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets or barrels, or parts thereof, to any foreign country in accordance with the specifications of a foreign consignee; nor shall this act prevent the manufacture or use of banana hampers of the shape and

character now in commercial use as shipping containers for bananas, nor of barrels used in packing commodities sold exclusively by weight or numerical count.

This is an entirely new section and the one which I think will probably be of greatest interest to this conference. This is the section which has been devised in an attempt to make it very sure that the provisions of standard container legislation shall not interfere with State laws or city ordinances respecting the sale of fruits and vegetables by weight. We have had more trouble with this section than with all the rest of the bill put together. Messrs. Holbrook, Smith, Carey, and I have all fussed around with this section and our efforts have been submitted to Mr. Lees, of the office of the Solicitor of the Department of Agriculture. None of us are altogether satisfied with the result. As a matter of fact, I can not tell you very definitely just who is to be praised or blamed for the section as it stands. My recollection is that it was written by Carey, revamped by Smith, and revised by Lees, with Holbrook and I as more or less innocent but hopeful bystanders. What we had to do was to write a section which would in no way nullify or weaken the standard container legislation and which at the same time would in no way nullify or weaken what you gentlemen have accomplished in bringing about sale by weight. The problem sounds very simple; we did not find it at all so, and if any of you gentlemen can suggest a wording which accomplishes the result more securely and more definitely and in smoother and more understandable language, we shall welcome your suggestion with open arms. I ask your serious and careful consideration of this section. It is one which is even more important to you than it is to us and one on which I think we are entitled to well-considered and well-thought-out advice.

SEC. 13. That the examinations of samples of hampers, baskets, and barrels mentioned in this act shall be made by the Department of Agriculture or under the direction and supervision of such department, for the purpose of determining from such examinations whether such hampers, baskets, or barrels comply with the provisions of this act; and if it shall appear from such examination that any of the samples is not in compliance with the act, the Secretary of Agriculture shall cause notice thereof to be given to the party from whom such samples were obtained. Any party so notified shall be given an opportunity to be heard under such rules and regulations as may be prescribed, and if it appears that any of the provisions of this act have been violated by such party, then the Secretary of Agriculture shall at once certify the facts to the proper district attorney, with a copy of the results of the examinations and tests of such samples duly authenticated by the person making the tests, under the oath of such person.

This section provides for examinations and tests of baskets and for the holding of hearings in case baskets are found not to comply with the act. The portion relating to examinations and tests is not new, but is made somewhat more specific. That relating to the holding of hearings is entirely new. It has been put in because some of the other portions of the act are more stringent than they have been heretofore. If this draft were to be accepted, it would be possible to proceed immediately against any manufacturer who submitted samples which were found unsatisfactory, unless the manufacturer's interests were safeguarded as provided in this section. It should be understood that opportunity for such a hearing must be granted only when the samples submitted as the result of call by the Secretary are

found to be not of standard capacity. It is believed that a provision such as this will result in obtaining quicker rectification of nonstandard forms by manufacturers than the mere threat of prosecution.

SEC. 14. That the Secretary of Agriculture may require manufacturers to report annually the number of each size and type of till baskets, Climax baskets, hampers round stave baskets, straight-side baskets, splint baskets and barrels for fruits or vegetables manufactured by them, and shall cause such examinations and tests to be made as may be necessary to determine whether such till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets and barrels, or parts thereof, subject to this act, meet its requirements, and may take samples of such containers, and/or require such samples or parts thereof to be submitted to him. Failure to report the quantities of such containers manufactured within 60 days following notification by the Secretary of Agriculture by mail, or to submit samples of such containers in compliance with this section, or to furnish adequate explanation for such failure, within 15 days following notification by the Secretary of Agriculture by mail, shall constitute a misdemeanor and be punishable by a fine of not less than \$50 nor more than \$100.

This is another section which is entirely new. It makes two requirements—one, the submission of annual production reports, and, second, the submission of samples when required by the Secretary. It further provides for a punishment for failure to submit production reports and samples. The department has for several years given out a production and carry-over report. This has been purely voluntary, and while we have been able to get reports from a great majority of manufacturers, the report is not as complete as it should be. That, however, is not the reason for requiring the making of reports. The reason it is essential that we know who is making various types and sizes of containers and how many are being made, is to assist us in the enforcement of the act. Obviously, it would be much more easy to enforce the law if we could require the making of this report. We have had instances where manufacturers have failed to report the making of a certain size and type of container and have found out later that they have been making this size and type for some time without securing the approval of our office.

We have had even more trouble as a result of failure of manufacturers to supply samples when requested. We attempt to obtain samples of a given type of basket from all manufacturers of that type throughout the country and to make a test of these during a given production season. We have had trouble with manufacturers either carelessly or wilfully neglecting to send a sample as asked, with the result that the current production season passes and it is time to take up tests of another type of containers. Our work can be made very much more valuable and more efficient if we have some way of requiring the submission of samples.

SEC. 15. That the Secretary of Agriculture shall make uniform rules and regulations for carrying into effect the provisions of this act, including such definitions as may be necessary and prescribing a method of testing till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets, and barrels and for such tolerances as may be necessary to provide for reasonable variations occurring in the course of manufacturing and handling such containers; and providing a manner or style of marking such containers, including the authorization of properly accredited identification numbers to be used in lieu of or in conjunction with manufacturers' names and addresses; and providing also for the manner and time of reporting the quantities of such containers manufactured.

This is the customary section conferring on the Secretary the authority to make rules and regulations but is new in that it directs the Secretary to provide the manner or style of marking such containers, including the authorization of properly accredited identification numbers and also it authorizes regulation as to the manner and time of reporting production by manufacturers.

SEC. 16. That it shall be the duty of each United States district attorney to whom satisfactory evidence of any violation of this act is presented to cause appropriate proceedings to be commenced and prosecuted in the proper courts of the United States in his district for the enforcement of the provisions of this act.

SEC. 17. That for carrying out the purposes of this act the Secretary of Agriculture is authorized to cooperate with State, county, and municipal authorities, manufacturers, dealers, and shippers, to employ such persons and means, to collect statistical data on production and distribution of containers for fruits and vegetables, and to pay such expenses, including rent, printing, binding, telegrams, telephones, books of reference, publications, furniture, stationery, office equipment, travel, and other supplies and expenses including reporting services, as shall be necessary to the administration of this act in the District of Columbia and elsewhere, as may be appropriated for by the Congress; and there is hereby authorized to be appropriated out of any money in the Treasury not otherwise appropriated such sums as may be necessary for such purposes.

Sections 16 and 17 are customary sections placed in all Federal acts of this character.

SEC. 18. That an act to establish a standard barrel and standard grades for apples when packed in barrels, and for other purposes (37 Stat., ch. 273, p. 250) and an act to fix the standard barrel for fruits, vegetables, and other dry commodities (38 Stat., ch. 158, p. 1,186) and an act to fix standards for Climax baskets for grapes and other fruits and vegetables and to fix standards for baskets and other containers for small fruits, berries, and vegetables and for other purposes (U. S. C. title 15, sec. 251-256) and an act to fix standards for hampers, round stave baskets and splint baskets for fruits and vegetables, and for other purposes (U. S. C. title 15, sec. 257) are hereby repealed.

Section 18 definitely and specifically repeals the two barrel laws now on the books and the standard container acts on 1916 and 1928.

I commend these suggestions to you for study and discussion. They have been put in the form of a bill merely for convenience in comparing them with existing laws. I realize there is much in them to which many of you may have given but little thought. I am hoping that as a result of our discussion here to-day you may be induced to give them constructive consideration. As I have said before, we want the benefit of your advice and of your experience. If there are other defects in existing laws which we have overlooked, we should like to have them brought to our attention. We should like to know how you feel regarding these suggestions and how you feel regarding the necessity of correcting some of the evils at which they are aimed.

Coupled with consideration of possible changes in the laws should be thought along the lines of some of the containers which various people are seeking to make, differing from the standards set up by present laws. The principal one of these is the so-called 9-basket crate. California has for years used a crate holding four 3-quart till baskets, these baskets being square in shape. There has been devised a basket of such a size that 9 of them will fit this crate, each basket holding but a quart and a third. This basket was used to some extent last season and, as a result of its use, two suits were brought

by the Federal Government, one involving a shipment of plums and the other a shipment of grapes. The Government lost both of these suits on the ground that the section of the container act of 1916 applying to till baskets related only to small fruits and berries, whereas neither plums nor grapes are considered by horticulturalists to fall within the category of small fruits.

One of the arguments put up by the gentleman who devised this package is that the nine $1\frac{1}{3}$ -quart baskets hold 12 quarts, which was the combined capacity of the four 3-quart baskets originally used in this crate. This argument is, of course, entirely illogical, as there never was any standardization of the crate in question on the basis of capacity.

However, the principal argument which this manufacturer makes is economic. So far as shipment of grapes is concerned the 4-basket crate was used largely for the Thompson seedless grapes, and the manufacturer claims that it was finally found to be unsatisfactory for this particular variety. He states also that when packed in lugs many of the grapes shatter and fall to the bottom of the lug and represent a dead loss to the retailer. He contends that when packed in these small containers, even if some of the grapes shatter they remain in the container and are sold to the consumer, the retailer not suffering the loss. He makes a further contention that a popular chain-store price is 25 cents and that these $1\frac{1}{3}$ -quart baskets make a convenient size package to sell for that price.

The assertions made by the proponents of this package are interesting and, if true, are very important; they have not, however, so far produced any concrete evidence to back up their assertions. Our own representatives in various cities have submitted some very interesting opinions from different members of the trade, but we have as yet nothing which we feel conclusive, although the reports received from our representatives are not altogether favorable to this container.

This situation provides plenty of food for thought. Is it true that economic conditions demand the introduction of new packages of this sort? If we grant this, what packages are we to look on as proper and what are we to condemn? I think that we will all admit that we can not stop with the introduction of only one package if there is a genuine economic need for a change of this sort.

The statement has been made by those favoring such packages that the contents will be sold by weight and some of the samples which we have received have had the weight printed on the container. I think that all of us will agree that it is extremely difficult for a grower of grapes or plums or some other commodity in California, to guarantee the delivery of any given weight to a housewife in Pittsburgh or New York. If there are gentlemen here from Pittsburgh or New Jersey I think their experience with potatoes in 15-pound sacks will enable them to tell you that the proposition is not quite as simple as it may seem.

Another suggestion which the advocates of this package have made is that they would be willing to increase the size from $1\frac{1}{3}$ quarts to $1\frac{1}{2}$ quarts, urging that $1\frac{1}{2}$ quarts would be a proper size to add to existing standards. They make a point that we now recognize the pint or half quart and the quart and to include the $1\frac{1}{2}$ quart would

be merely recognizing again that the half quart is a proper subdivision. To you who are familiar with deceptive measures of all sorts, I do not need to point out how fallacious this argument is. I need only to call attention to the fact that the difference between a pint and a quart is 50 per cent of the larger size, while the difference between $1\frac{1}{2}$ quarts and 2 quarts is but 25 per cent of the larger size. If we admit the half quart as a proper basis for subdivisions between multiples of the quart, then there would be no logical argument against a $2\frac{1}{2}$ quart or a $3\frac{1}{2}$ quart. The difference between a $2\frac{1}{2}$ and a 3 quart package would be but $16\frac{2}{3}$ per cent of the larger size and between a $3\frac{1}{2}$ and a 4 quart package but $12\frac{1}{2}$ per cent of the larger size.

It seems to me that the final decision in a matter of this kind may rest with the housewife. Is she going to be pleased with a small package of grapes which has many shattered grapes in the bottom or does she prefer to buy bunches which are intact? We expect during the summer to make an effort to obtain some information along these lines and I want to bespeak the assistance of you gentlemen in that endeavor. If you have an opportunity to make any observations as to the sale of this package and as to the reaction of the trade and of the housewife to the package, we shall be very glad to have them. Some of you will be interested in the container because of the fact that it violates your State laws or city ordinances and this probably will give you the opportunity of obtaining for us information which we greatly need.

In considering this question, I ask you to bear in mind that acquiescence in changes of this sort implies an abandonment of the present basis of standardization of fruit and vegetable containers and the substitution therefor of some other basis. I do not feel that we should take the position that a standard once agreed upon or set up by legislation should never be subject to change. I do feel, however, that changes should be made only for good and sufficient reasons and that when a change is made involving the abandonment of one basis of standardization then we should have some idea as to a new basis before we abandon the old one.

Another container which is suggested as an addition to the standard is a 6-quart Climax basket. This proposal has come in from the Northwest and apparently grew out of the fact that the 6-quart is one of the standard sizes in the Dominion of Canada. Apparently those suggesting the container as one of our standards have not given thought to the fact that the Canadian 6-quart Climax basket is standardized on the basis of the Imperial quart and consequently is $12\frac{3}{4}$ cubic inches larger than would be a standard 6-quart Climax basket in this country. In other words, the Canadian basket would be too large to be considered standard here and I presume that our basket would be too small to be considered standard in Canada.

However, the important question here is whether there is a need for a size intermediate between the 4-quart and the 12-quart; and, if so, what that size should be. Some think that it would be more logical to make an even division and provide the 8-quart as an intermediate size if one is necessary. It is a matter of container history that when the manufacturers of Climax baskets were deciding what sizes they would ask for as standards a rather heated argument arose

as to whether the largest size should be the 8-quart or the 12-quart. The theory which they followed was that the 2 and 4 quart sizes would provide the packages for table stock, and that the 12-quart size would provide a package for juice stock and for purchases which the housewife might wish to make for preserving purposes. For this reason they felt the size between the 4 and 12 quart to be unnecessary; some Northwest parties now believe that an intermediate size is necessary. This is another question which we expect to investigate this summer and on which we should like to have the benefit of any suggestions you may wish to make or any information you may be able to supply.

Gentlemen, I have taken up a great deal of your time in discussing this subject. I should like to commend it to your consideration, particularly section 12, which as I endeavored to point out is intended to correct an evil which no one anticipated when the act of 1928 was passed.

DISCUSSION OF ABOVE PAPER

The CHAIRMAN. Gentlemen, this presentation by Mr. Spilman of the situation over the country is evidently of the greatest importance to all weights and measures officials on the one hand and the manufacturers of containers on the other. I am sure that I express the sentiment of the conference in saying we appreciate Mr. Spilman's presentation of this very complex subject, and we are also indebted to him for the excellent exhibit which he has been kind enough to bring with him.

We are all interested in this matter and in any legislation which may ultimately be enacted. You are in a position either in this conference, or after you go home, to speak or write to Mr. Spilman, or to the Bureau of Standards, and express your ideas. As Mr. Spilman says, the Agricultural Department will welcome any suggestions.

I might state what the attitude of the Bureau of Standards is in regard to this container question. It has been the policy of the bureau and staff not to seek for police power. There has been set up in the Department of Agriculture a most admirable jurisdiction in regard to the matter of containers, and we consider it wise to have a single jurisdiction rather than a divided jurisdiction.

Now, gentlemen, the matter is before you for discussion and questions. I am sure many of you have questions to ask and suggestions that you would like to make.

Mr. COVILLE. I would like to ask Mr. Spilman if the manufacturer is required to stamp his name on the basket?

Mr. SPILMAN. Not at the present time. We do have regulations under the act of 1928 whereby we have provided a method of marking and have assigned identification numbers, and some are using it, but it is purely voluntary.

Mr. SWEENEY. Mr. Chairman, I would like to ask Mr. Spilman a question. The preamble to the proposed bill reads:

A bill to fix standards for till baskets, Climax baskets, hampers, round stave baskets, straight-side baskets, splint baskets, barrels, and other containers for fruits and vegetables, and for other purposes.

I was wondering if the words "other containers" are broad enough to interfere with the standard bushel that we are using. We have a standard farm bushel in Massachusetts. I was wondering if this could have any control over that.

Mr. SPILMAN. It would not. Lawyers tell us that those words are to be construed as meaning other containers similar to those already mentioned. They were put in there to get some one who is trying to evade the law.

Mr. MEREDITH. Mr. Chairman, the comments and statements of Mr. Spilman are so clearly conservative and constructive, and yet so voluminous, that it is scarcely possible, according to my personal view to express much of an opinion at this time. Undoubtedly there is a great deal of value in the paper, and it is possible that it is one of the most important papers that we have yet listened to in conference.

I, perhaps, am inclined to feel that it would show a lack of appreciation to remain silent and make no comment, which would be in the direction of discouragement. I seriously hope that the opportunity will be afforded to have a sufficient number of copies of the paper so that we may take it home and give it that serious and careful consideration which is evidently sought for. I know of no subject at the present time to which we can devote more serious attention. I can not attempt to analyze it, but I feel that such a paper warrants our hearty support, with the heartiest cooperation.

Mr. TINKEY. Mr. Chairman, we have not been enforcing our State law as we should; but just recently we had some conflict with a market master of the State, and he insists that our present Federal law annuls all of the sales-by-weight laws whether commodities are in those containers or not. Just last week after a conference our director of agriculture called in a circular which he was about to issue over the State. He withheld it until I return from this conference. What I would like to know particularly is, when would be the earliest possible time that this proposed law as enacted would be in force and effect, so that we could use it in the different States?

Mr. SPILMAN. The earliest possible time it could be introduced in Congress would be about next December 1. You can not tell how long it will take those gentlemen to act. I would say the earliest possible time for the taking effect of the act would be the 1st of July, 1932, and my past experience with Congress has been such that I question whether it will be passed so quickly.

Mr. TINKEY. Then, in the meantime, the best thing we can do is to get along the best we can.

Mr. SPILMAN. I would not say the best thing you can do would be to do that, but rather to do constructive work toward the introduction of legislation correcting that situation.

Mr. SWEENEY. Why is there a distinction between the standard barrel and the cranberry barrel? Why make two barrels?

Mr. SPILMAN. I do not know whether I ought to answer that, or Mr. Holbrook. It is my understanding that the cranberry people marketed 100 pounds of cranberries in a barrel. They called it 100 quarts. This barrel does not hold 100, but 86 and a fraction, but they asked that their barrel be recognized and Congress thought fit to do so.

The CHAIRMAN. I would like at this time to ask the Hon. Philip H. Dewey, secretary of internal affairs of the State of Pennsylvania, to rise and make a remark or two.

REMARKS BY HON. PHILIP H. DEWEY, SECRETARY OF INTERNAL AFFAIRS, STATE OF PENNSYLVANIA

Mr. President, and ladies and gentlemen of the convention, I have only been in the office for a few days and I am not here to tell you people how to carry on the work with which you are familiar.

I want to assure you that we will be very willing to cooperate and will try to be helpful in carrying on the work you have in hand. I realize how important to the manufacturer, to the distributor, and to the consumer are matters you are talking about here to-day.

How much better milk tastes out of a bottle sealed at the source of that product; how much better honey, butter, apples, and other fruits look when put up in a nice container. I want to tell you this incident that happened up in my State of Pennsylvania. A young man on a "two by four" farm with a few apple trees conceived the idea that if he rubbed his apples with a cloth suitable for that purpose, and put them in little paper containers labeled with his name and address, when they were offered for sale on a fruit stand in a city like New York, the people would even find where Homer Howe lived, in Tioga County. This attracted the attention of Governor Sproul, with the result that he put Mr. Howe in charge of all his farms in Pennsylvania; the last I knew he was still in that business, looking after Governor Sproul's estate, because he had foresight enough to see that if he rubbed his apples well and put them in just a simple container he would draw a market. We all attend the market in our own city and we know that the little booths that have these attractive containers and give good measure get along best almost always.

The CHAIRMAN. I wish to take this opportunity of extending to the next speaker on our program an official welcome to this conference. It is a source of gratification for all of us, I am sure, to have present a representative of the national organization having charge of the administration of weights and measures in the Dominion of Canada, who will tell us something of how that work is carried on across the border. E. O. Way, Director of the Weights and Measures Inspection Service of Canada, was unable to be present at our meetings, but he has been good enough to prepare a paper and to arrange for the attendance of his principal assistant and "second in command" to present this paper to us. It is a pleasure for me to introduce to you D. J. McLean, Superintendent of the Weights and Measures Inspection Service of Canada.

THE ADMINISTRATION OF WEIGHTS AND MEASURES IN CANADA ¹

By E. O. WAY, *Director, Weights and Measures Inspection Service, Department of Trade and Commerce of Canada*

In reading this paper on Canadian weights and measures, which has been prepared by our director, Mr. Way, at Ottawa, he wishes

¹ In the absence of Mr. Way, this paper was read to the conference by D. J. McLean, Superintendent, Weights and Measures Inspection Service of Canada.

me to say that it gives him much pleasure to comply in this way with a request from your secretary, Mr. Holbrook, from whom we have received many valued and valuable courtesies, and his one hope is that we shall not betray the confidence Mr. Holbrook has shown in inviting us to address this conference.

Every year the world is growing smaller and international contacts more intimate. Millions of Americans have made personal contact with Canada since the advent of the motor car, and many of them no doubt have come to the conclusion that Canadians are mighty fine people since they get more miles out of a Canadian gallon of gasoline than they do at home. Some, of course, are more interested in pints and half pints, and these find our liberality and our liberty as large as our gallon, to their personal delectation!

There are no doubt quite a few in this gathering (and I have already met some of them) who are more or less familiar with Canadian weights and measures through the marketing of weighing and measuring equipment across the line, a marketing that is quite extensive, not to say aggressive, and unhappily not as reciprocal as many of us in the north could wish. The names of many of your manufacturers of weighing and measuring devices and their products are as familiar to us as to our friends in the South, but we are happy to say that few manufacturers gives us less trouble than those of this inventive and mechanistic paradise, and that despite the fact that under Canadian standards we are fairly strict, we are neither unfair, foolish, nor fussy. I think nearly every American manufacturer submitting devices and machines to Ottawa for approval will do us the honor of endorsing that modest assertion.

Turning now more directly to the subject assigned to us—Canadian System and Administration of Weights and Measures—I might say at the outset that it is a Federal service, administered under a Federal act under the Federal Department of Trade and Commerce. The whole staff from the director to the furthestmost inspector are Federal civil servants, permanent in their appointments under the civil service act.

That was not always the case. Prior to confederation, which took place in 1867, Upper and Lower Canada—in fact, all the Provinces as they were created—had charge of and administered their own weights and measures inspection and possessed their own sets of standards—copies, of course, of the British standards.

From the lessons to be learnt from history, the fathers of confederation no doubt saw the light, and amongst many wise enactments decided that the needs of the Dominion for uniformity in weights and measures should be assured by making the control of the standards of weights and measures a Federal responsibility.

That decision was embodied in our principal weights and measures act of 1872, the provisions of which followed closely the English legislation of the day. The standards adopted, of course, were the British standards, including the imperial gallon.

There was, however, one very important modification made in the legal series of weights. The old English series of 1, 2, 4, 7, 14, 28, and 56 pounds was discarded in favor of our present simpler and decimalistic series of 1, 2, 3, 5, 10, 20, 30, and 50 pounds with a hundredweight of 100 pounds and the short ton of 2,000 pounds.

This made the pound and its multiples the sole basis of weight in Canada and freed the country from all entangling alliances with such hoary anachronisms as the 14 pound stone, the 112 pound hundredweight, and that galaxy of historical customary weights and measures concerning which our metric friends do so love to make fun.

Under this principal weights and measures act of 1872, then, all the Provinces gave up all local authority over weights and measures. Administration was assigned to the then Department of Inland Revenue, and the commissioner went to England for consultation with the standards department of the Board of Trade, London, and to arrange for the purchase of new sets of primary standards, including the avoirdupois pound and troy ounce in platinum iridium, the yard in Bailey's metal, the imperial gallon and the bushel, and a copy of the meter and the kilogram. Incidentally the act made the metric system legal and permissive for all purposes.

Three sets of these primary standards were obtained. One set each was placed in the custody of the Speaker of the Senate and the Speaker of the House of Commons and one in the custody of the Minister of Inland Revenue.

Sets of departmental standards in brass, complete in pounds, ounces, drams, and grains, in kilograms and grams, were also obtained as the working standards of the department and for equipping the local offices situated in the business centers of the country.

I might mention here that the original meter was a copy of the metre des archives, but it has recently been replaced and superseded by a nickel bar of H section, which is a copy of the international meter, with which it was compared and verified in June, 1924, at the International Bureau of Weights and Measures, France; and reverified again in the fall of 1929.

Nevertheless, the primary standards of Canada are the standards of the English system. They have their values, of course, with reference to the standards of the metric system, but they are the de facto standards of the Dominion and not merely functions of the metric standards.

For trade we have the simplified English avoirdupois system, with the metric system legal for all who care to use it, but very few seem to take advantage of that golden opportunity.

For gold and silver, we have the troy ounce with its decimal multiples and submultiples, and the carat, now equal to 200 milligrams for precious stones. There are, however, many jewelers who still use the historical pennyweight, so strongly does custom persist.

There is, of course, no troy pound, which was abolished in England in 1857, due to its confusion and substitution, when it furthered the merchants' profits, for the larger avoirdupois pound.

As regards measures of capacity, the Canadian system is identical with that of England and is based upon the imperial gallon of 277.274¹ cubic inches and equivalent to 10 pounds of water at 62° F.

It is also worth noting that, unlike the United States, dry and liquid measure are the same in England and Canada; that is to say,

¹ The latest equivalent of the imperial gallon as determined by the National Physical Laboratory, England, is given as 277.420 cubic inches.

the dry pint, quart, and gallon are of the same volume as the liquid pint, quart, and gallon, whilst the bushel in volume is equal to 8 liquid gallons; that is, 2,218.19 cubic inches.

The United States liquid gallon equals 231 cubic inches and eight times that equals 1,848 cubic inches, but the bushel itself has a volume of 2,150+ cubic inches.

In measures of capacity, then, the Canadian system is simplicity itself compared with the double and unrelated series of the United States.

The wine gallon as used in the United States was abolished in England in 1824, over 100 years ago.

The gallon and its derivatives represent the most unlucky divergence between the weights and measures of the United States and Canada, and, for that matter, the whole British Empire.

If the situation in Canada is any criterion, this volumetric confusion must give many American producers and packers a great deal of trouble with their export trade. One of our most persistent causes of trouble is the shipment into Canada of American goods marked in United States measure. The United States pint, quart, and gallon are not only illegal measures for trade, their use and sale punishable by fine, but it also involves the double offense of short measure, since the American pint is approximately 16 per cent smaller than the imperial or Canadian pint.

Commodities, of course, can be invoiced and shipped into Canada by wine measure, but the individual wine-measure package can not be legally resold unless remarked five-sixth pint, quart, or gallon, as the case may be, the Canadian equivalent.

Incidentally we read a good deal from time to time about some hypothetical difference between the American and the English yard. Washington it seems, in the pursuit of its very valuable studies and labor in simplified practice, has simplified the relation of the American yard to the meter by lopping off all decimal figures but two, making the ratio

$$1 \text{ meter} = 39.37 \text{ inches}$$

whereas the British equivalent is declared to be

$$1 \text{ meter} = 39.370113 \text{ inches}$$

Now, of course, this eleven hundred-thousandths of an inch is a long way within the 12-mile limit, and I suppose we can not protest if the United States seizes upon it, but to the ordinary man it does seem a pity that this nebulous inexactitude should have developed to destroy the metrological harmony between the two great branches of the English-speaking people. It looks as if we have here a variant of Euclid's axiom—things which are equal to the same thing are not equal to one another.

Turning to more complimentary matters, it can be said, I think, without fear of contradiction, that to weights and measures men on this continent, Washington stands as a synonym for the Bureau of Standards. It might as well be admitted right now that there is nothing in Ottawa to compare with the highly developed scientific and technical institution that you have here. Nevertheless, it is nothing for Canada to be ashamed of. We are only some 60 years from confederation, and a considerably longer time elapsed between

United States independence and the establishment of your magnificent bureau.

In 1870 the Commissioner of Inland Revenue was, *ex officio*, the head of the Weights and Measures Service, and it was not until 1900 that an immediate and responsible head was appointed to take charge of weights and measures work in the person of a chief inspector. It fell to the writer's lot to succeed that gentleman in 1912, which bears rather eloquent testimony to the youthfulness of organized weights and measures work in Canada.

Scientific and industrial research, with its concomitant standardization, is now recognized as fundamental to industrial success. In recognition of this fact, the Canadian Government in 1916 established the Industrial Research Council, which has since become the National Research Council, and building operations are now under way in Ottawa for the erection of three-million-dollar laboratories, the initial step toward a Canadian Bureau of Standards. Under this research organization will be collected all those numerous branches of the Government service that have been carrying on research work for years, such as the metrological section of Topographical Surveys, the metallurgical and oil section of the Department of Mines, research in agriculture and forestry, and research in connection with the standards of mass, weight, length, volume, time, heat, electricity, etc. The administration of the Weights and Measures Inspection Service will, we expect, remain attached to the Department of Trade and Commerce as at present, and when any unusually difficult technical or scientific problems arise, we shall in future be able to seek the assistance of our own Canadian Bureau of Standards.

Coming to administrative matters, the Weights and Measures Inspection Service of Canada, as has already been mentioned, is a Federal service and a branch of the Department of Trade and Commerce. The whole staff is appointed by examination under the auspices of the Civil Service Commission and all are permanent civil servants.

The whole service operates under the same legislation and under the same weights and measures instructions, emanating from the director's office in Ottawa, and by the same token, they all report back to Ottawa.

The Dominion is divided up into 18 districts, each under a district head and centered upon some principal city such as Halifax and St. John in the Maritimes, Quebec, Montreal, Ottawa, Toronto, London, Winnipeg, Saskatoon, Regina, Edmonton, Calgary, Vancouver, etc.

These 18 district offices are under the direct supervision of two superintendents, one for eastern Canada and one for western Canada, who visit the districts, audit the books and records, attend to matters of complaint and personnel, and generally perform the duties of liaison officers between the department and the field force.

In all, the staff consists of only 111 inspectors, outside the departmental staff in the Department at Ottawa, which I might say here only numbers 13, including 2 stenographers, yet despite the small field staff, inspection work is quite efficient, and I think the large number of United States interests that do weights and measures

business in Canada will indorse that claim. In fact, the wish has often been expressed to the writer that the same system operated in the United States.

It might be mentioned here that a good deal of work related to weights and measures is done by other services of the Government as, for instance, the sale of bread is supervised under provincial legislation and by provincial officers. The Department of Agriculture has a considerable staff looking after the grading and sale of root vegetables, fruit, eggs, butter, canned meat, fish, jam and preserves, etc. The Department of Health, under the food and drug act, supervises adulteration of food and the sale of "package" goods, which includes the important factor of net weight and the marking of the net contents on all package food products. The Weights and Measures Service proper is chiefly concerned with the mechanical devices used in trade and commerce and with the question of short weight and measure in its general and common occurrence, outside of those commodities that are the subject of specific legislation as previously mentioned.

Short weight, I might say, was made a statutory offense in 1919 by the addition of the following section to the weights and measures act:

Notwithstanding any of the provisions of the Criminal Code, any person who sells, delivers, or causes to be sold or delivered, anything by weight, measure, or number, short of the quantity ordered or purchased, shall be guilty of an offense and liable to a fine not exceeding twenty-five dollars for the first offense, and to a fine not exceeding one hundred dollars for every subsequent offense.

The significance of that clause is that what the lawyers call "mens rea," that is, intent, usually embodied in the word "wilful" was and is removed as a protection against conviction. The above wording covers short weight and measure arising from any cause whatsoever—whether intentional, accidental, or from carelessness. Short weight, per se, is made an offense, and as a proven fact is, alone, enough to secure conviction.

This short-weight provision is possibly as important as the whole of the rest of the act and is complementary thereto, for there is little use in spending thousands of dollars in verifying scales and measures, etc., unless something is done to see that correct weight and measure are given.

The main factors in Canadian weights and measures administration are:

1. The examination and approval of all new types and makes of weighing and measuring equipment by the Standards Branch at Ottawa, before they can be offered for sale in Canada, or stamped by an inspector. Each machine, as approved, is covered by an official circular advising the service of such approval.

2. The inspection and stamping of all appliances, either in the factory or on the premises of the importer before they can be sold or taken into use for trade.

3. The holding by the customs officials of all entries of weights and measures equipment for the approval of the nearest weights and measures inspector before they are allowed to be released and delivered to consignee.

In this way the Canadian system excludes many palpably inferior machines and equipment and such as are so made as to be liable to facilitate fraud, whilst customs cooperation keeps the country clean of unapproved and unlawful equipment, and a lot of what is spoken of in common parlance as "junk."

In addition, the Canadian system makes for uniformity and offers a fair and easy market for the manufacturer. Once approved at Ottawa, his product is acceptable anywhere in Canada and will be stamped by any inspector provided it conforms to conditions set down in the certificate of approval, copies of which are placed in the hands of every inspector.

Canadian inspection is on the fee system, inspection fees for each type of device or machine being set by Order in Council under the provisions of the act.

Inspectors have no share whatever in the money they collect and are not allowed to use any of it to pay expenses. They receive an annual salary and are given "contingent" money to pay expenses, a lump sum being voted by Parliament each year for the administration of the Weights and Measures Service.

According to the amounts collected, the revenue from fees is deposited daily, weekly, or monthly to the credit of the Receiver General and forms part of the consolidated revenue fund of Canada.

For the protection of this revenue, special weights and measures Government revenue stamps of various denominations from 5 cents to \$10 are issued and charged to each officer, who is required to affix to each certificate of inspection he issues, revenue stamps for the full amount of money collected.

These certificates are in triplicate and consecutively numbered, and every one must be accounted for to the department. One copy with the revenue stamps affixed is given to the trader and constitutes proof of legal inspection, over and above the stamp of verification which is incised by means of a steel stamp on a suitable soft metal plug or plate provided for that purpose on each machine. One copy of the official certificate is sent to the department at Ottawa and the third is retained by the officer as his record.

In addition each officer makes out and submits a complete itinerary of each month's work, with his expenses, so that from both the preceding data the department compiles statistics covering the work and efficiency of each inspector and a complete record of all inspections, month by month, and for the year.

For the year ending March 31, 1931, fees collected totalled \$420,-305.52 and the expenses \$353,385.24, disclosing a surplus of revenue over expenses of \$66,920.28, a result I believe to be unique in the field of Government weights and measures inspection the world over.

The fee system is of course debatable, although more or less universal. The popular argument is that weights and measures exists for the protection of the public which is only as true as it is a limited statement of the case. The obligation is on the trader to sell correct weight and correct measure, and it is as much to protect the honest trader and to prevent the dishonest as to protect the public, that weights and measures inspection is made necessary.

The trader's weights and measures equipment are the instruments of his trade and the meter of his profits, and if the Government

gives him inspection and standardization service and protection from unfair competition, he should pay for that service. The annual inspection fee can quite fairly be regarded as a small premium against loss of business from unfair competition and fraudulent practices.

From the administrative point of view, the fee system has many advantages. It constitutes an incentive for the inspector and undoubtedly increases efficiency and economy. Against this it may be said the monetary factor involves the danger of a man scamping proper inspection to make a good showing, but that factor carries its own corrective, for excessive returns incite suspicion and inquiry. Against scamped inspection there is also the ever-present factor of the cross check of one scale against another, of the check between shipping and receiving weights. Complaints of this nature are frequent and if investigation disclosed that an inspector had failed to inspect—well, there might be a funeral.

Our own Canadian records for the past 20 years embody some interesting speculations in this behalf. For 1910, 1920, and 1930 the records are as follows:

Year	Number of inspectors	Expenditure	Revenue	Deficit
1910.....	124	\$110, 281. 62	\$92, 789. 30	\$17, 492. 32
1920.....	127	272, 515. 36	149, 473. 43	123, 041. 93
1930.....	111	353, 385. 24	420, 305. 52	¹ 66, 920. 28

¹ Surplus.

The years of the war greatly increased the expense of weights and measures inspection, and in 1920 the service showed a deficit of just over \$123,000. That called for reorganization and adjustment of fees, which were raised 40 per cent.

The result shows that with a reduction in staff of 16 men, made possible largely through the use of the motor car, the service wiped out the large deficit of \$123,000 and established a surplus of \$66,000 in 10 years. What is more, whilst revenue, which represents work done, increased 173 per cent, expenses only increased 26 per cent.

Inspection, I might say, is annual, but, of course, inspections can be made as often as the department or an inspector may deem advisable where suspicion or unsatisfactory conditions are involved. Fees, however, are only payable once a year.

The money factor, or fee system, presents the situation to the whole force in concrete form. The spur to improve the situation becomes a concrete objective and each step in the direction of self-support is an achievement, a victory won. There is no desire to make a large surplus, but every man is jealous of maintaining our status of self-support, and what is more important, every increase in efficiency reduces the individual charge for inspection against the trader. A civil servant is as much a human being as any other type of employee, and as susceptible to the incentive of success and good repute.

In common with all countries, Canada in the past few years has witnessed an astonishing development both in the extent and the

variety of weights and measures work, with an ever-increasing complexity in the problems to be solved, not the least of which is the perplexing problem of the transport and handling of adequate test loads for heavy capacity weighing equipment—with reasonable economy. This problem is found in its acutest form in the grain elevator inspection work of the west, where the introduction of tank trucks has displaced the old 12,000-pound wagon scale with 20,000-pound truck scales.

The motor truck provides efficient transport, but the dirt roads impose a limit on the total load of truck and weights. The officers carry 2,000 pounds of 50-pound weights for making corner tests, and these with the truck provide a total load of from 6,000 to 7,000 pounds.

In the Calgary districts we have experimented with an all-steel short-wheel-base dolly truck, giving a mobile 1-ton corner-test load. This has proved very satisfactory and a great economy in labor and time. Unfortunately the times are not propitious just now to buy this equipment for each prairie inspector.

The next important and more widespread problem is that of the handling and sale of gasoline, oil, and grease, a comparatively new industry that has almost doubled weights and measures work. The measuring instruments used have passed from the old blind pump to the visible and now to the meter pump, the latter presenting some of the most difficult issues that weights and measures has ever had to contend with. The meter pump has given us a great deal of trouble, but there are signs and portents of a very great improvement in the design and refinement of this type of meter being introduced.

To begin with, the meter presented an entirely new problem. For the first time weights and measures was confronted with a device that was not correct through the whole range of its possible operation. The range of its accuracy was limited—to begin with, very limited indeed. A scale that was only correct within a small range of its maximum capacity and hopelessly wrong under light loads, would not be considered at all. Yet that is about the problem presented to us in the meter. By precept and age-old weights and measures principles and practice, such a device was not entitled to consideration, but we were confronted with the facts of industrial evolution and there seemed to be no sense in trying to play King Canute and forbid this advancing tide of the meter pump.

Canadian weights and measures then bowed before this meter invasion, and I might say here that nearly all our troubles in the world of weights and measures flow over from this side of the border, and we allowed meter pumps to be installed under the proviso, and without responsibility on our part, of the full and half speed test.

I imagine this episode of recent history is more or less well known. The half-speed test, which is fundamental to a certain standard of refinement in construction and constancy, proved to be a stumbling block to the first meters and most of them are now replaced by positive displacement meters of ingenious design and easily able to take care of the half-speed test and the age-old trouble of seepage.

In the matter of grease dispensers, Canada is more or less marking time. Years ago we objected to the sale of grease by the pound as representing a physical contradiction.

In the absence of calibration to measure by volume, sale by undenominational units was permitted. This dispensing of grease by measure seems to have involved quite a few difficulties—one being the interference of air and its elimination from discharge. In issues of this kind, where there are physical and manufacturing difficulties, it is the experience of the writer that, given time, troublesome questions have a way of solving themselves and that a policy of watchful waiting is preferable to arbitrary interference, if in the meantime public interests are not being gravely sacrificed. Vast volumes of grease of course are sold, but the greasing done to the individual car, for instance, bears no relation to the consumption of gasoline, or even engine oil. As nearly every firm marketing these products in Canada are either branches of American firms, or agents for American houses, it will not be long, in view of this conference's specifications requiring that grease dispensers dispense by volume, before volumetric devices are on the market—in fact one at least, if not more, is already available—and it simply means a little adjustment in the measuring element to make them throw imperial measure. Then we can inspect and regularize the whole situation.

There remains the oil bottle. Canada has established a more or less standard type of bottle and pouring spout, more or less consistent with the specifications of this conference. The bottle is 4 inches in diameter and a capacity line must indicate full capacity in the neck of small diameter, about 2 inches, and stand clear for observation and reading. These bottle measures are inspected by inspectors, but they are not stamped, owing to the difficulties connected with stamping glass measures over a vast country.

In some quarters it has been suggested, I believe, even enacted, that oil bottles shall be made to pour or decant correct measure. There is a good deal to justify such a departure from the established idea of a measure, in the interest of accurate service, because with a viscous fluid like oil there is quite an appreciable quantity that is not decanted; on the other hand we are of the opinion in Ottawa that any such alteration in the use of a measure embodies a very grave danger to the whole structure of weights and measures standards.

The question logically arises, can we have a quart measure that is not a quart in volume? Can a quart measure be a quart measure if it holds, and is marked to hold, more than a quart?

Such a vessel can be marked by way of distinction "to pour 1 quart," but we submit that such a vessel can not be stamped as a quart measure.

Such tampering with the standards of weights and measures to meet the difficulties presented by the physical properties of commodities is full of danger. Establish this precedent with the oil bottle and we shall be confronted with different sized gallons to take care of the expansion and contraction of gasoline, which to-day is quite a live issue.

Thermometric correction might legitimately be made, but that must be by agreement. The Government can certify thermometers, but it can go no further.

The correct alternative to the oil bottle and its residue would seem to be measurement by meter or force pump, wherein lies the choice between visibility and accuracy.

Another issue of some importance might be mentioned, and that is the coin operated personal weigher.

Up to the near present these machines have not been treated very seriously, but classed rather as novelties and amusement accessories. Of late years modern hygiene and medicine has made the public weight-minded, and as a consequence there have been increasing complaints about the inaccuracy of the personal weigher.

The Canadian service has always inspected personal weighers both for private use and the coin variety—the former before they are offered for sale, the latter in the same way as ordinary commercial scales.

Inquiry disclosed that a large part of the inaccuracy in the coin scales was due to out of balance condition at zero. Most of these scales are blind. There is no zero graduation and nobody can see if they are in balance or not. Resort has to be made to the use of a standard weight and, of course, barber shops, poolrooms, etc., possess no such weights and would not use them if they did.

To correct this situation the Canadian Weights and Measures Service about a year ago decided that all personal weighers should conform to the regulations and show a zero graduation on the dial, and further that the scale should be so made as to be adjustable at "0" in the same way as any other weighing machine.

Some manufacturers have expressed appreciation of this new requirement and have made their scales accordingly. Some, of course, have protested. The free zero balance necessitates a modification of the coin-locking mechanism, but this can be made and, as stated, in some cases has been made. The interest of the public who pay for their weight demands that it shall be made, as also does the validity of weights and measures inspection. A blind scale is not a good scale, and the Canadian service is not approving any more blind scales. One American manufacturer whose scale we rejected for being blind gave ear to our arguments and proceeded to redesign the coin mechanism and zero control. Having done this, he declared that he considered the Canadian model so much the better scale that he intended to adopt it for the home market.

The above represents a few of our major difficulties and activities in the past few years. Most of our troubles, of course, originate from this side of the line, for more than any other country we, in Canada, are up against the impact of United States inventive ingenuity, and it is a pleasure in closing this paper to express our appreciation of the universal willingness on the part of all United States weights and measures industries to meet Canadian requirements, which, it may be said, we endeavor to dovetail as closely as possible with American conditions without sacrificing our essentially British ideas and outlook. The director and myself would also like to take this opportunity of voicing our deep appreciation of the valued and valuable assistance we derive from the extensive technical work of the Washington Bureau of Standards and of the ever-courteous response of its personnel to such inquiries as we may make from time to time for information.

The CHAIRMAN. I am sure the members of the conference enjoyed the paper immensely and extend to Mr. McLean our heartfelt thanks for the excellent paper. I trust he will take back to Mr. Way an expression of our appreciation.

THE EXTENSION OF WEIGHTS AND MEASURES SUPERVISION

By RALPH W. SMITH, *Bureau of Standards*

Mr. President, a weights and measures official has two well-defined classes of duties which, although directed to the same general end, are yet so distinctive that they are often separately considered. The first and more fundamental of these duties is the testing for accuracy of the actual instrumentalities of weighing and measuring, and includes the approval for commercial use of apparatus which is found to be correct, and the exclusion from commercial use of all other apparatus. The second duty is supervision over the use of approved apparatus to insure that it is of proper design for the use to which it is being put and that it is being properly used, the prevention of short weight and short measure, and the inauguration of the proper legal steps to secure the punishment of those guilty of willfully delivering less or taking more than the quantity represented. It is obvious that the exercise of the second duty must follow upon the execution of the first; but with human nature what it is, it must be equally obvious that unless the second duty is faithfully performed, the discharge of the first can effect only nominal protection to the consumer and to the competitors of that small minority of merchants who, without supervision, would indulge in dishonest practices.

This summary of the duties of a weights and measures official makes this service appear to be so fundamental and so necessary that it seems that long since it would have been established everywhere. But it is a fact that weights and measures supervision does not exist at all in some of the States, and that it is not uniformly supplied in all sections of all States where it does exist to some extent. The reasons for this condition are not readily apparent. Therefore it is proposed briefly to analyze the general causes of this condition, and in so doing to pay especial attention to the effect on business and industry which it is considered naturally flows from a proper supervision of weights and measures and the consequent attitude which it is conceived business and industry may well maintain toward the establishment and the support of official inspection services.

First, then, is there any conflict of interest between business and industry on the one hand and official weights and measures supervision on the other? There appears to be no reason why the closest cooperation and harmony should not prevail between these interests. In the first place there can be no argument that accuracy is the paramount consideration in the case of all devices used commercially to determine the weight or measure of commodities bought or sold or the value of services rendered. A scale, a weight, or a measure is procured and used for the purpose of eliminating guesswork and reaching a true value. There can be no question that the very great majority of our merchants and manufacturers desire to employ correct apparatus. Anyone who has observed the very great advances made in the last few years in the manufacture of weighing

and measuring devices knows this to be a fact. Buyers are constantly demanding greater refinements and increased accuracy and are willing to pay well for apparatus having these attributes; less satisfactory apparatus is less and less in demand. One of the important functions of the weights and measures official at this stage is to protect the buyer of the apparatus since his original inspection and approval are the guaranty to the buyer of apparatus that he has, in fact, secured the thing he desires, and for which he has paid; that is, an accurate piece of apparatus which is legal for commercial use.

If initial accuracy of apparatus is so desirable, it is axiomatic that the apparatus should be kept at all times in a condition accurately to fulfill its function; otherwise the care exercised at the time of purchase is nullified. It is a fact, however, that some persons—including many who are technically trained and should be better informed—assume that a weighing or measuring instrument is inherently accurate and will remain so until it can no longer be used, or, at least, that if it be found to be correct when new, no further attention will ever be necessary. It need not be emphasized to you, whose business it is regularly to examine these devices, that nothing could be further from the facts. Weights and measures instruments are mechanical devices in the same sense as an ordinary machine; it follows that these instruments will not, in the very nature of things, continue to maintain their accuracy indefinitely without attention. Weighing and measuring apparatus will more or less frequently become inaccurate during and as a result of use. Here again the weights and measures inspector plays an important part. His periodic examinations, when resulting in approval, are insurance to the merchant that his own apparatus and also that of his competitor, is continuing to function as it should. This insurance, which is so necessary to stability of business, can in no other way be so completely secured. The official nature of the test is also of much value especially in cases of dispute. Obviously it is a corollary that when approval fails to follow an inspection—when it is found necessary to prohibit the use of improper or inaccurate equipment—such action, far from being a detriment to business and industry is manifestly a help to these interests, since continued accuracy is every whit as important to the proper conduct of business as is initial accuracy.

Thus far one fails to find anything which should be inconsistent with enthusiastic support of weights and measures supervision on the part of industry and business.

And now let us proceed to a brief survey of how the exercise of the second group of the weights and measures officer's duties affects business and industry. Having seen to it that the mechanical condition of the weighing and measuring apparatus in his jurisdiction meets the prescribed requirements, the official makes it his business to prevent the misuse of that apparatus, to protect the buyer and the seller from the delivery of less or the taking of more—within reasonable limits—than the represented amount, and to secure the punishment of the individual who will not conform to the law but who insists upon engaging in fraudulent and dishonest practices. What effect have these activities of the official upon the commercial

life of the community? The merchant is assured that a single standard is being demanded of all and that all are being required to meet that standard. Unfair, cutthroat competition, which descends to the systematic stealing of amounts small perhaps in a given instance but aggregating a tremendous total, is eliminated. Carelessness in weighing and measuring and inattention to the rights of others in the matter of quantity determination, evils only less vicious by reason of the absence of the willful intent to defraud, are effectively banished.

In the case of any controversy involving weighing or measuring there is available in the person of the weights and measures officer an impartial and skilled arbiter to protect the interests of both parties and to adjudicate the dispute. There is inspired in the entire community a feeling of security and confidence that their rights will be conserved, a feeling which is conducive to the stimulation of business in general. Finally those elements of the business life of the community which refuse to conform to the principles of fair and honest dealing find themselves, through the action of the courts, reduced to the necessity of discontinuing their illegal practices or transferring their operations to a section where less attention is paid to accurate weights and full measure.

Certainly there is nothing in that program which conflicts in any way with the best interests of those engaged in industry or commercial pursuits. On the contrary, such a program enhances the opportunities for progress. The conclusion appears inescapable that the character of service which is rendered by weights and measures officials is such that it should have the most hearty support of business and industry everywhere.

Our next consideration may well be to inquire as to the extent of the interest in the condition, with respect to accuracy, of a piece of weighing or measuring apparatus and in the delivery of full weight and measure. As has been pointed out, the owner and user of apparatus is vitally interested. But business is by no means alone in its interest that apparatus be correct and that correct amounts be delivered. It is obvious that the parties who buy over the apparatus directly are likewise interested. Nor does the interest stop here; it extends to the entire community. In the case of sales to the ultimate consumers of commodities such as foodstuffs and other necessities of life, it becomes plain that every person in the community is directly concerned; and a little reflection will show that the indirect interest of all of our citizens in transactions perhaps several times removed from the ultimate sale is no less real, because unsatisfactory conditions at any point along the line of progression from producer to consumer will almost surely be reflected at the consumers' end of the journey. Moreover, a healthy condition in industry and commerce, inspired by fair dealings and the absence of controversy, reacts to the benefit of the community as a whole.

This being the case, it seems eminently logical that the supervision of the condition and use of weighing and measuring instrumentalities, which have such a close relation to the community as a whole, should be carried on by the community as a whole through the agency of an officer of the State or local government. Notwithstanding the soundness of the general principle of "less govern-

ment in business," nevertheless there are certain fields of activity of such a public character and of such fundamental importance that they must be subjected to official control. It is to be remembered that he who sells or buys commercially occupies a quasi public status, and that his actions affect, not himself alone, but directly or indirectly a multitude of others. Surely no fair-minded person should fail to appreciate that the control of weights and measures is a proper exercise of the police power of the State and should be supplied as a function of our State and local governments in every community in the entire country.

But if there is so great a necessity for the supervision of weights and measures, how does it happen that some of our State and local governments are lagging behind in the adoption of such regulation? It would seem that the principal reason is that some of our State and local governing bodies do not fully appreciate the conditions which actually exist within their several jurisdictions, the consequent need for comprehensive and adequate weights and measures supervision, and the tremendous savings to the people which regularly follow the establishment of such supervision. Perhaps a secondary reason, applicable to a few jurisdictions, may be the unsatisfactory results which have followed an attempt to administer an ineffective or inadequate weights and measures law, either in the jurisdiction in question or in a neighboring one; there may also have been the occasional unfortunate example of the indifferent weights and measures official who has made a farce of his administration through carelessness, inefficiency, and inattention to his duties. But such incidents, unfortunate though they are, should not result in the failure to establish or carry on supervision. Better, they should be negated by the adoption of a better law or the securing of a more competent enforcement.

It is not unfair to assume that, in a very large number of cases, failure of State or local governing bodies to act along any particular line is a consequence of lack of insistence of demand, properly voiced, for such action. It is the general experience that consumers are favorable to proper supervision of weights and measures. But sometimes the public, as a whole, are not well organized and thus lack the proper channels to make their desires clearly known. Business and industry are usually better equipped in this respect. In view of the community of interest in weights and measures supervision it is surprising that our commercial interests have not, ere this, either in conjunction with consumers' organizations or independently, demanded and secured weights and measures supervision wherever it is lacking; for modern business in the United States is not usually backward in taking all necessary steps to protect itself and advance its interests, and it surely appears that the procurement of weights and measures supervision constitutes one of these steps.

It should be remembered in this connection that those jurisdictions which have not provided for supervision are in the minority. It is well to point out also that it is not intended to suggest by what has been said heretofore that in places where proper weights and measures supervision is now in effect business interests are inimical to this supervision, or that they have not done their full share in bringing it about. Quite the contrary is the fact. As a very gen-

eral rule the business interests of the community strongly second the efforts of the official. It is questioned, only, why the business interests of the remaining communities consent to inactivity on the part of the governing authorities in the matter of making such supervision an accomplished fact. The conclusion in this relation must be that, never having experienced the benefits to be derived, they either have not given the subject the consideration it deserves, or they fear that concomitant inconveniences will offset the good which might result from the inauguration of official weights and measures control. Such conceptions are, perhaps, not surprising, especially in view of the fact that in the past the protection of the consumer may have been overemphasized, and too little stress laid upon the advantages to be derived from competent supervision, by the business interests themselves.

The consumer being already convinced of the desirability of the service, it remains to bring the facts of the case to the attention of the business interests before it can be expected that they will come to the point of making a demand for the service in question in localities where it does not now exist. In other words, consideration may well be given to the proper method of interesting this class.

If representative business men from jurisdictions not having adequate regulation were to come into this conference and observe the proceedings here, noting the manner in which all parties to each question are invited and encouraged to discuss the matter from their various standpoints, and marking how earnest are the attempts made to do no injustice to any group, any underlying distrust of weights and measures regulation should quickly disappear. This, then, is an excellent way to interest business.

Efforts have been made in the past to secure this very result and in consequence numerous representatives of industries very immediately concerned are accustomed to attend the conference each year. The lists of those in attendance disclose numerous representatives of manufacturers of weighing and measuring devices, of railroads, of the baking industry, of petroleum producers and distributors, and of other fundamental industries in which weighing and measuring play an extremely important part. But many, and perhaps the majority, of these men come from sections in which inspection services are already firmly established. Therefore, efforts should still be carried on especially to secure business representatives from those sections from which official representation can not as yet be secured, and in these efforts every member of the conference should share. Results may be slow, because our States rarely have appropriations from which the expenses of such delegates can be paid, and because, the importance of the matter not being understood, individuals rarely can be found who are content to consume their time and to spend their personal funds to attend a meeting which is not directly in line with their particular business interest.

Again, since the conference programs must of necessity be arranged in harmony with the idea of the greatest good to the greatest number in attendance, they can not be arranged specifically to interest this group, since it would always be a small minority of the whole attendance. To do so would work an injustice on the officials who attend in order to attain greater efficiency in their work, and

who, therefore, desire a program along technical lines. However, efforts to secure such attendance should be continued, and with the cooperation of the conference membership such attendance should eventually be secured; it is reasonable to anticipate that this will be followed by an initiation of activity in those jurisdictions from which such attendance is obtained.

That country-wide weights and measures laws and their enforcement is the desirable condition is unquestionable. Primarily, business interests and consumers everywhere are entitled to benefits and protection so fundamental as this. Secondly, our national commercial and industrial fabric is so closely woven and our interstate-commerce activities so universal, that so long as any section remains which does not regulate weights and measures its influence will, to a greater or less extent, be felt throughout the country as a whole, and those jurisdictions in which everything possible is being done to secure the best conditions will as a consequence fail to achieve entire success.

The goal, then, should be the demonstration of the advantages of supervision in so unmistakable a fashion that every jurisdiction will be convinced that it can no longer afford to lag behind. Every person who attends the national conference should constitute himself a missionary to spread the message of weights and measures protection. Especially should the representatives of business concerns and of organizations of business men lend their interest and their efforts to the movement to extend this protection to every community in the United States. The degree of success which will follow will be dependent in large measure upon the sincerity and the earnestness and the persistence with which this program is supported. But with industry, commerce, the consuming public, and the weights and measures official standing shoulder to shoulder in a joint endeavor to bring about adequate supervision in every city and town of every State throughout the length and breadth of our country, ultimate success should surely crown these efforts.

The CHAIRMAN. We are to be favored at this time by an address by a Member of the new Congress, who represents a district in a State which has long been active in weights and measures supervision, particularly on the part of city and county sealers. I am happy to introduce to you Hon. Charles West, Member of Congress from the seventeenth Ohio district.

REMARKS BY HON. CHARLES WEST, MEMBER OF CONGRESS,
SEVENTEENTH OHIO DISTRICT

Mr. Chairman, ladies, and gentlemen, it is a very real pleasure for me to be here this morning and to have the privilege of speaking to the members of this conference on weights and measures. I desire to express to you and to Doctor Burgess my admiration for the splendid work that you have been doing and my appreciation of the work of the Bureau of Standards in sponsoring a movement of this kind.

In speaking to you this morning on the subject of technical progress and public government it is not my purpose to come to you in any sense as an expert or an authority on this subject of weights and measures. In fact, I must admit at the very outset that my

knowledge of this subject is merely that possessed by any layman. Accordingly, it is not my purpose to attempt in any manner to deal with the technical phases or to concern myself with those specialized problems which come to you in your official capacities as weights and measures officials. I trust, however, that what I may have to say, even though it is quite general, may also be quite intelligible. * * *

When we come to a subject like yours, the subject of weights and measures, we are dealing with one of those technical subjects which must find a place in our governmental system. Our Government has come to be a great social institution for the promotion of progress in many lines. When the last session of Congress adjourned, that Congress had to its credit an expenditure of more than ten billions of dollars for the two years of its existence, and if you are reading the newspapers you will note that revenues do not cover the actual cost of running the Government—we are having a deficit. Of that stupendous sum of money—five billions of dollars per year—approximately two and one-half billions of dollars per year were appropriated to meet the expenses of running the Federal Government. If you add to it the cost of maintenance of State governments throughout the country and the cost of municipal and local governments, which is estimated at approximately nine and one-half billions of dollars each year, you arrive at the stupendous total of more than twelve billions of dollars yearly as the investment of the American people in their Government. That sum of money is about equal to the total annual production of the farms of our country; it approximates the principal of the debts owed to us by foreign countries as they now stand with the reductions that have been made. It represents one-half or more of what we suspect is the total valuation of the railroads of the country. The American people each year are investing in their instruments of government a sum of money equal to 10 or 12 per cent of our total national income, and so it is only proper that the people themselves should have a voice in the management and in the direction of the policies of that Government. We have for many years very frankly and very sincerely attempted to recognize the conception in political philosophy that our Government rests upon the consent of the governed, and whenever there is any articulate expression of public opinion through any organized agency that properly represents a group or section of our people, that expression of public opinion has its influence in the determination of the public policies of our country. But there is a demand for another influence in government, and that is the factor of expert opinion, the presence of authoritative judgment. Our Government is no longer the small institution that it was when our country was small with a group of isolated communities. We have many complicated problems that are facing the leaders of our Government, and those problems, if wise solutions are to be found, demand expert opinion. Your subject of weights and measures is such a problem.

Of course, under the Constitution, the authority could be found for the passage of Federal laws in regard to weights and measures; and you know we have on several occasions had Federal laws enacted meeting specific problems, particularly those phases of

standardization that are peculiarly and vitally significant in the field of interstate commerce. But we have allowed the State governments to exercise the main authority in the administration and enforcement of weights and measures laws and in the formulation of systems for inspection and supervision of weights and measures within their localities.

As a Member of Congress I am in thorough sympathy, Doctor Burgess, with your work here at the Bureau of Standards and with your work in the various States, and may I say very frankly and genuinely that you can count on me for thorough and enthusiastic support for any proper measure that will promote the work which you are doing.

I believe profoundly that technical skill and expert judgment should be utilized in framing laws relating to such as the subject you gentlemen are engaged in. I believe with President Hoover, who spoke to you as Secretary of Commerce, emphasizing the vital proper relationship that exists between the Federal Government and the State governments. We have made a distribution of power between the two and while the Federal Government exercises policies that are national in scope, there is left to the local governments the authority to meet problems in their local way. We should have a balanced relationship between the Federal Government on the one hand and of the State governments on the other—enough balance to prevent excessive centralization on the one hand with its attendant evils, and its eternal inefficiencies, and enough control on the other hand to prevent complete decentralization into localized jurisdictions with resultant chaos and inefficiencies. This will make for the greatest progress in administration. I feel that the sort of things that you gentlemen do here—in meeting in your National Conferences of Weights and Measures, in exchanging your views as regards the administration of these laws, in working with a Federal agency of the Government and securing a proper relationship between the Federal Government and the State governments—is a program that is sound and wise, and should be productive of the greatest achievement in the long run.

Justice Holmes has admirably referred to that relationship—as did President Hoover when he spoke to you on one occasion three or four years ago—by stating that we have in our country at the present time what you might call 48 laboratories for experiments in government. Now, I know we are all working toward uniformity in State legislation. We are working for the general acceptance of good standards in our States. But, at the same time, our States vary in their conditions, in their development, and in the problems that confront them, and we use these various State organizations or bureaus as proper laboratories for experiment in government and that is one of the fine things that we have in our Government system at the present time.

There is another thing that I should like to speak of for just a moment, and that is the complexity of the system that we have to-day and the consequent importance and seriousness of the problems that confront organized government. I was speaking a moment ago about the matter of expert opinions in government. If

there was ever a time when our country required sound judgment and wise policies in dealing with public questions, that time is now. We are no longer the country of isolated rural communities in which we had a pastoral or an agricultural economy. We are a great industrial Nation. Take this matter of communications, the tremendous development of which we have witnessed in the last century. At the close of the War of 1812 a peace treaty was signed in December, 1814, but so long did it take for word of the signing of the peace treaty to end the war to reach this country by the old-fashioned method of sending news, that it was two or three weeks after the ending of the war that we heard of the signing of the peace treaty. Ignorant of the ending of the war we went on fighting, and the biggest battle, the battle of New Orleans, was fought on the 8th of January, 1815, after the war had officially ended.

Just about a century later when the war with Spain was fought we had improved methods of communication, and when the battle of Manila Bay was fought, the news was sent by transoceanic cable, and so quickly did the news of the victory reach our country that we knew of that battle and the victory the day before the battle occurred—that was because the international date line is in the middle of the Pacific, and when it is Saturday on that side it is Friday here. But the fact remains that we got the news the day before the battle occurred.

All of you know, when you hear over the radio the tones of the original Big Ben in the Tower of London, that through the marvelous system of broadcasting to-day you in this country hear the tones of that great bell before that bell is heard by the man in the streets of London, so marvelous has been the means of communication.

A story was told me by a man who was with the Byrd party on the trip to the Antarctic. Admiral Byrd had constructed a radio broadcasting station down there and there was a receiving and sending set in the office of the New York Times in New York City; there was also a receiving and sending set in the home of the editor of the New York Times out on Long Island. One evening the editor went home and, wishing to be undisturbed, disconnected his telephone so that no message would come to his home. An important story came in to the office in the city and the city editor wanted to reach the editor in his home on Long Island, but due to the fact that the telephone receiver was off the hook he was unable to get a telephone communication through. This is what he did. He radioed a message to Admiral Byrd at the South Pole and asked him to transmit a message back to Long Island, to the editor, telling him to put the receiver back on the hook.

In the matter of transportation, as a boy, not many years ago in a little town in Ohio, down where I was born—Mr. Tinkey, one of your members here, used to live in that town—I remember when the first automobile came to that town; there was a big crowd on the street to see the appearance of the first horseless carriage. I remember that crude device came over the top of the hill and down across the public square, going at the alarming speed of 6 to 8 miles an hour, zigzagging across the street because of the crude steering arrangement of the machine; when the people saw it coming they all pushed back to the walls of the buildings on the sidewalks, for fear that something

might happen and that automobile would suddenly turn in their direction and run over them. To-day note the marvelous change in the mechanism of an automobile. A friend of mine went from Columbus, Ohio, to Chicago, a distance of 300 miles, in one of the new-type cars. He averaged more than 50 miles and at times went over 90 miles an hour, over a hard-surfaced pavement in a machine with great power, with great weight, and with great speed. Now, my point is this: In the old days when you had only a few machines, the horses understood what to do and got out of the way, and it was very seldom that you met any other machine. When a machine was going along at 8, 10, or 15 miles an hour it did not so much matter what kind of a steering wheel it had. But the automobile was perfected, the mechanism of that machine was developed to give greater power, weight, and speed, and we now have literally millions of them on the highways and the streets of our country; it is now highly important that along with the perfection of the mechanism there should be a perfection of the steering wheel.

So it is to-day. As our industrial system becomes more complicated, as our social organization extends its jurisdiction to 120,000,000 people scattered over three and one-half million square miles of territory, as our mechanism of government becomes more complex, it is highly important that the management and the direction of society should be made by skilled measures. That is the place in modern government for the opinion or the judgment of the expert. Now, there are some questions, of course, that are purely political in character and should not be selected, but there are other questions which are based and should be settled strictly and absolutely upon the basis of fact, upon skilled technical opinion; and the great challenge to our country to-day is to furnish that skilled opinion and that authoritative judgment on public questions.

If I may speak for just a moment with reference to the present industrial or business situation in our country, in my judgment the situation is one that calls for the wisdom and for the advice of experts. In my judgment it is just as inexcusable for us to find ourselves utterly unprepared in a matter of national defense when our country faces an international crisis as it is for us with our great governmental organizations to find ourselves utterly unprepared to deal with an economic crisis such as that which confronts our country at the present time.

Of course, I know that a business depression is a whole lot like a leaking roof. When it is raining you do not fix your leaking roof because you can't, and when you have good weather you do not fix it because you do not need to. Now we have been having business depressions for more than a century. We had one in 1817, another in 1837, one in 1847, one in 1857, then a bad one in 1873, again in 1884, another in 1893; a slight drop in 1900, another in 1907, the beginning of a serious one in 1914, the severity of which was mitigated by the World War; a slight one in 1921, and the present depression which confronts us. Are there things that can be done? Our experts in the field of economics know that there are certain causes of economic depression. They know, for example, that one of them is the element of variation in natural conditions, periods of excessive rainfall and drought that affect agricultural and business conditions.

They know another factor is the element of overproduction that we have at the present time in the matter of wheat and other peacetime commodities. They know that each period of prosperity brings on a depression.

During the past 10 years people have obligated themselves for the payment of installments for commodities purchased amounting to ten billions of dollars; there are improper methods of distribution; and there are other factors which they say are caused by free and open unrestricted competition; but the fact remains that we have established in our Government expert fact-finding agencies that know the facts of the business conditions in this country. There is no Government in the world that has established such great fact-finding institutions as ours has. We have bureaus like the Federal Reserve Board, the Interstate Commerce Commission, the Federal Trade Commission, the Radio Commission, the Federal Farm Loan Board, and others. It is a challenge to our country. If popular government is going to function efficiently and meet the problems of a modern complex system, we must utilize the expert judgment of our authorities in these fields and find remedies which, if they will not wholly remove business depressions, will at least mitigate some of the more serious phases.

There could be organized within the machinery of our Government as it now exists a council of outstanding economists which could work with our Secretary of Labor, our Secretary of Agriculture, our Secretary of Commerce, and our Secretary of the Treasury, which could meet each year in conference with the outstanding leaders of finance, of labor, of industry in various parts of the country, and which could face frankly these business depressions that confront us from time to time.

In my judgment the significance of the work that you are doing is that it is a pioneer work. It is the kind of thing that is bringing coordination among our various jurisdictions in government. You are bringing about an integration of various agencies of our Government that are dealing with your problems, and you secure at once plans, and policies, and the adoption of measures that will make for greater uniformity, for wise standardization, for the promotion of industry, and for greater efficiency in the administration of our laws.

I want to thank you for the kindness of your invitation in permitting me to speak to you here to-day and for the opportunity that I have had of meeting you gentlemen from the different States of the country.

The CHAIRMAN. Thank you, Mr. West, very much, for your inspiring address.

It may be appropriate at this point for the Chair to advise you of a letter from Congressman Randolph Perkins, chairman of the House Committee on Coinage, Weights, and Measures, who addressed the conference, you will remember, last year, in which he expresses regret that his engagements prevent his attendance at any of our sessions this year. Mr. Perkins extends his best wishes for the success of our meeting.

The Chair also desires to convey to the conference a greeting and an expression of good wishes from Congressman A. H. Andresen,

of Minnesota, who wrote me and asked to be remembered to the conference. You will recall that several years ago Congressman Andresen gave us a very interesting address based upon his earlier experiences as an inspector of weights and measures in Minnesota.

NECESSITY OF A CODE OF REGULATIONS FOR COMMERCIAL WEIGHING AND MEASURING DEVICES

Mr. HOLBROOK. It seems that at this session there will not be sufficient time to present the report of the committee on specifications and tolerances on a code of regulations for commercial weighing and measuring devices, but as we have a few minutes available it might be advisable to utilize them in explaining to you briefly what this report is about and the opinion of the committee as to its necessity. We can then postpone consideration of the individual items until to-morrow.

You are all familiar with the codes of specifications and tolerances adopted by this conference. At the time of their latest publication, as Handbook of the Bureau of Standards, M85, an introduction was written in relation to judging the suitability of use of commercial weighing and measuring equipment. In that discussion the following language was used:

* * * the specifications and tolerances usually adopted here are general in their character, they are drawn broadly to cover devices of certain general types, and they do not generally attempt to define or restrict the uses to which apparatus may be put. * * *

* * * were the attempt to be made to require specific types for particular uses this object would probably best be accomplished in this country by rule and regulation promulgated by the individual offices rather than by specifications and tolerances designed for national acceptance. This is for two reasons: First, the manner of use of apparatus is, under our system of law, the prerogative of the States, and they should be left entire freedom to work out these details in the manner which seems to them best. Second, the specifications and tolerances are not only guides for the weights and measures official in the enforcement of law but they also serve the very important purpose of advising the manufacturer of weighing and measuring devices as to what apparatus will be satisfactory in many of our far-flung jurisdictions. * * * the specifications and tolerances must become primarily the sole reliance of the manufacturer in judging whether his product will be satisfactory. They should, therefore, be prepared in the form which will be of most use to the manufacturer.

It seems, then, best that they be not complicated by specifications concerning the particular uses to which specific types may be put. For, after all, the manufacturer of the apparatus is not, perhaps, primarily concerned with this—certainly in most cases he can not be held generally responsible for the use in which a device which he produces may be employed. When he produces apparatus complying with the specifications and tolerances he fulfills the only duty to which he can be held strictly to account. He will, and usually does, when practicable, go further than this; to secure customer satisfaction, he will endeavor to see to it that the purchaser secures apparatus nicely fitted to his particular needs. But since he will often not be fully advised as to the condition under which the apparatus is to be used, and since, in any event, a manufacturer will practically be obliged to sell the particular device ordered, the onus of securing a device properly fitted to the particular need must, in the final analysis, be borne by the purchaser.

One further word may be added in regard to the character of the requirements contained in the specifications and tolerances. We feel that the principal object to be attained by specifications and tolerances is to eliminate from commercial use generally unsatisfactory commercial types. The desirable concomitant is to secure in place of the discarded apparatus constantly improving types. This latter condition will be most effectively secured not by

hedging the manufacturer about with specific and restrictive specifications, but rather by allowing his initiative the fullest play. The specification and tolerances have, therefore, been designed to inform the manufacturer in general language of the fundamental considerations believed to be vital to the construction of proper apparatus, and of some forms of construction found by experience not to result in accuracy, dependability, or fair dealing in the field. Within these broad limits the manufacturer has been left the greatest latitude possible in the working out of his designs.

Now, while it was said in the above that "the specifications and tolerances usually adopted here * * * do not generally attempt to define or restrict the uses to which apparatus may be put," it was necessary in a footnote to call attention to some exceptions to the general rule—to some specifications for the selection of equipment for a certain use which had necessarily been included in our codes, such as the specification under the heading "Counter scales" and other headings, which requires that scales used in the retail sale of foodstuffs at retail shall have graduations of 1 ounce or less. Then we have specifications referring to installation, such as the specification under the heading "Liquid-measuring devices" requiring that all devices shall be installed plumb and level. Again other specifications are directions to users, such as the requirements under the heading "Scales—General specifications," to the effect that all scales shall be maintained in balance.

Your committee has been giving attention to such specifications and has finally decided to recommend that a new general policy be adopted in relation to such requirements as these.

We have, as you know, general headings covering particular classes of apparatus in use—"Linear measures," "Liquid-measuring devices," "Scales" (of various types), etc. Under those general headings there are included subordinate headings—"Definition," "Specifications," "Tolerances," etc. The committee considers that it would be wise if specifications of the character noted above now in the codes of specifications and tolerances, and specifications of this kind which may hereafter be introduced, were to be assembled under a new heading to be entitled "Regulations," and to appear under each general heading. This material, in the main, would be that of use to the user of the apparatus but which is of little use to the manufacturer of apparatus, since he has no power to dictate how the apparatus shall be installed, maintained, or used. The specific recommendation of the committee, then, is to add a new subheading under our general headings to be entitled "Regulations" and to consist primarily of instructions to the user of the apparatus as to the conditions under which the apparatus is installed, maintained, or used.

If that policy is approved by the conference, then consideration of the report of the committee will be in order. In this report are cited certain specifications which are considered to be in the class mentioned, and it is proposed to remove those from the present codes of specifications and assemble them under these headings of "Regulations." If these specifications are found proper ones to be included under "Regulations" and they are transferred as suggested, these requirements will serve as a nucleus around which may be gathered other regulations which will also be proposed or which may be adopted in the future.

If we adopt this policy, the conference will then be in the position of recommending to the various jurisdictions certain uniform regulations which might reasonably be adopted for their use.

With the consent of the chairman, if the conference will at this time settle the theory of this matter and decide whether this is a proper method of procedure, and go on record in that respect, then, if the answer is affirmative, the specific recommendations can be considered to-morrow, when, I think, there will be plenty of time to introduce the details of the report which is now in your hands.

The CHAIRMAN. Do you make a motion to that effect, Mr. Holbrook?

Mr. HOLBROOK. I will make that in the form of a motion, that a new subheading of "Regulations" be included under the general headings contained in our codes, this subheading to follow the subheading entitled "Tolerances," and hereafter to include those requirements which are in the nature of instructions to purchasers or users rather than in relation to construction requirements for commercial weighing and measuring devices.

(The motion was seconded, the question was taken, and the motion was agreed to.)

APPOINTMENT OF COMMITTEES

The CHAIRMAN. It is appropriate for the Chair at this time to announce the personnel of two committees of the conference, the committee on nominations and the committee on resolutions.

As the committee on nominations the Chair appoints Howard S. Jarrett, of West Virginia, chairman; Francis Meredith, of Massachusetts; W. T. Fossett,¹ of Illinois; B. Frank Rinn, of Allentown, Pa.; and J. H. Stephenson, of Rochester, N. Y.

As the committee on resolutions George Warner, of Wisconsin, chairman; H. A. Webster, of New Hampshire; S. C. Dinsmore, of Nevada; C. D. Baucom, of North Carolina; Glenn L. Berry, of Monmouth County, N. J.; C. B. Tolan, of Fort Wayne, Ind.; and M. C. Griffin, of Hartford County, Conn.

We might take a recess at this time and assemble this afternoon at 2 o'clock, when a number of groups will start on an inspection of the bureau.

(At this point, at 12.50 o'clock p. m., the conference took a recess until 2 o'clock p. m.)

¹Mr. Fossett, who was unable to serve on the committee, was later replaced at his request by W. A. Carleton, also of Illinois.

FOURTH SESSION (AFTERNOON OF WEDNESDAY, JUNE 3, 1931)

TOUR OF THE LABORATORIES OF THE BUREAU OF STANDARDS

(The afternoon session of the conference consisted of a visit to the various laboratories of the Bureau of Standards, particular attention being devoted to the division of weights and measures. In order to make the trip of maximum interest and helpfulness the delegates and guests of the conference were divided into small groups, each group being in charge of a member of the staff of the bureau.)

FIFTH SESSION (MORNING OF THURSDAY, JUNE 4, 1931)

The conference reassembled at 10.10 o'clock a. m., at the Bureau of Standards, Dr. George K. Burgess, president, in the chair.

DEMONSTRATION OF SCALES EMBODYING NEW DESIGN FEATURES

The CHAIRMAN. Our program this morning carries two items which the Chair will comment upon briefly.

As many of you know, some years ago we were accustomed to have an exhibit of commercial weighing and measuring devices in connection with the national conference. As time went on both the manufacturers and the officials seemed to have less interest in the exhibits, largely, perhaps from the fact that many of the devices were already familiar to them. Accordingly, exhibits were discontinued with the understanding that they might be resumed if and when conditions seemed to justify them.

There are included upon our program this year two exhibits which, however, have been strictly limited in their scope. The first is in connection with a demonstration by manufacturers of scales embodying new design features; the apparatus used by the speakers to illustrate their remarks will be on exhibit during the remainder of the day. The other is an exhibit of person-weigher scales, which is especially appropriate in view of the consideration which is to be given to specifications and tolerances for these scales, and the probable unfamiliarity of many of you with the details of design, construction, operation and adjustment of person weighers.

These two items are something in the nature of an experiment and I will ask Mr. Holbrook to read the letter which was sent to scale manufacturers all over the country.

Mr. HOLBROOK. The letter is as follows:

GENTLEMEN: It is our thought to introduce on the program of the Twenty-fourth National Conference on Weights and Measures a new item, which may or may not be continued in future years, depending upon its treatment and reception this year.

This subject is a sort of symposium to be participated in by manufacturers of commercial weighing devices, our thought being to give to such manufacturers the opportunity of presenting briefly to the conference such of their products as have been very recently developed or placed upon the market.

The idea of this subject is to acquaint the weights and measures officials with the latest developments in the scale industry so that they may not only keep abreast of these developments as a matter of information, but may also be sufficiently instructed as to the novel features of new devices, methods of balancing, etc., and any other matters which should properly be brought to their attention, that when these devices are introduced into their jurisdictions they will understand them and be qualified to accord them appropriate treatment.

It is obvious that if this item is to be successful it must be constructive and interesting, from which it follows that manufacturers should not bring before the conference devices with which the weights and measures officials

in attendance may be presumed to be already reasonably familiar. In other words, the devices presented not only should be reasonably new as to design (probably developed and/or marketed within the past year), but also should present sufficiently novel mechanical features to make it reasonable that these be given special attention. It would appear that the decision on these points must rest with representatives of the conference. Moreover, the item will be successful only if a reasonable number of manufacturers participate in it. Until we receive the reaction of the manufacturers being addressed, we will be unable to determine definitely whether or not to include this item on our conference program this year. It is requested, therefore, that you give this matter your careful attention and let me have an expression of your opinion upon it at your very earliest convenience, indicating whether or not your company would have any scale which you consider meets the qualifications outlined above and which you would be prepared to present to the conference in the manner indicated, and, if so, giving us a brief description of the scale in question.

Should a single manufacturer desire to present more than one scale, this will be satisfactory provided that the number of manufacturers participating is not so great as to prolong this item unduly; if eliminations must be made because of shortage of time, these will first be made so as to reduce to one the devices to be presented by each manufacturer.

If this item is included on the program we believe that each of the devices in question should be exhibited to the conference at the time that the manufacturer's representative explains it and that the explanatory matter should be prepared with the idea of its being of maximum constructive value to the weights and measures official. Naturally, the presentation should in no way be a sales talk. We can not estimate as yet how much time will be required for this item if given, but it would be our thought that each manufacturer's representative would be allowed sufficient time properly to present his subject; from 10 to 20 minutes would appear to be reasonable in this connection.

In the case of person-weighing scales we are prepared to waive the limitations previously expressed relative to novel mechanical features and development or marketing within the past year. This is because it is anticipated that the conference will consider a tentative code of specifications and tolerances for person-weighing scales. Manufacturers desiring to exhibit their person weighers will probably be permitted to do so regardless of whether or not the demonstration of novel features, previously discussed, is included on the program, provided that a representative number desire so to exhibit. If you manufacture person weighers, please indicate in your reply your desires in this relation.

Please let me have your reply at your earliest convenience so that if the item in question is to be included upon the conference program, and if an exhibit of person weighers is to be made, we may proceed as early as possible with the necessary arrangements.

Respectfully,

(Signed)

F. S. HOLBROOK,

Secretary, National Conference on Weights and Measures.

I may say in this connection that some manufacturers of scales appeared to view the inclusion of this item with great enthusiasm. Several very enthusiastic letters were received from manufacturers in which it was said that a program item enabling the manufacturers of weighing and measuring devices to exhibit their products and to familiarize weights and measures officials with them, would be a splendid one and would enure to the joint advantage of the officials and the manufacturers. However, a surprisingly small number of manufacturers expressed an actual desire to participate in the item and for some weeks after the letter was sent out it was very questionable whether the item would be included on account of the very few manufacturers who desired to avail themselves of the privilege extended. However, eventually five or six manufacturers accepted the invitation, and we thought this number justified our including the items experimentally in the program. The success

of the item this year will to a large extent dictate whether this will be continued or revived in the future.

The CHAIRMAN. As Mr. Holbrook has intimated, while the response to this invitation has been less than anticipated, it was nevertheless decided to include the item in the program. I hope we may have an expression from the conference before adjournment as to whether or not a similar item shall be scheduled for the program of the next conference.

I will call upon the representatives of the manufacturers who are to participate in the demonstration of scales embodying new design features, in the alphabetical order determined by the names of the companies.

I will ask the speakers to confine themselves to 10 minutes.

SECRETARY'S NOTE.—At this point several manufacturers brought before the conference samples of scales embodying new design features and demonstrated them to those in attendance. Particular attention was given to the new features incorporated, the method of manipulation of the adjustments provided, and the answering of questions asked by members. As was the experience in a former case,¹ it was found that many of the remarks made are of no value to a reader when a sample of the product is not before him, and thus no good purpose would be subserved in printing such material here. Consequently it has been decided only to include here a portion of the debate which followed the formal demonstrations, which under the circumstances seems to include the material of most interest and value.

It may be noted, however, that such demonstrations as these, which familiarize the delegates with new apparatus, are of great interest and value to them. Attendance at the conference is the only way in which full advantage can be obtained from program features such as this. The delegates were duly appreciative of the efforts of the manufacturers who took part in this demonstration.

DISCUSSION FOLLOWING DEMONSTRATION BY MANUFACTURERS

MR. CROCKETT. Mr. Chairman, in the case of a scale having two pans somewhat similar to each other, one intended for the weight and the other for the commodity, and having an indicator purporting to show underweight and overweight, is there any designation to show which is the weight platter and which the load platter?

MR. WOODLAND. The scale is built in the customary way. People are very familiar with which side is the weight platter.

MR. CROCKETT. I do not agree with you. A man can put the weight on the wrong platter and the indicator would show the commodity overweight, when in reality it is short weight.

MR. WOODLAND. If there is intent to defraud on the part of the operator, that intent can be applied to any scale made to-day.

MR. CROCKETT. I grant you that, but don't you think it would be well to place an inscription on each scale indicating which side is for the weight and which side for the load?

MR. WOODLAND. Some of the scales employ scoops; the scale is made to suit the particular commodities it generally handles.

MR. CROCKETT. That is true; but what does the ordinary housewife know as to which is the weight and which is the load platter?

MR. WOODLAND. I think, speaking for all manufacturers, there is nothing we can do. We could put a red light or sign on it, but we do have to agree with the custom that has been followed for so many

¹ See Demonstration of Gasoline Meters by Manufacturers in Report of the Twenty-Third National Conference on Weights and Measures (p. 104).

years. We would like to put wording on saying "this is the weight platter," but we can not do it.

Mr. CROCKETT. It could be cast in the weight platter.

Mr. WOODLAND. It could be, but we like to keep the platters smooth and clean. As you can see it would be possible to stamp the weight platter, but the wording would be covered by the weight when the weight is put on. However, we are open to suggestions.

Mr. WARNER. I would like to ask if it would not be well to have the weight platter of just sufficient size to take care of the weight?

Mr. WOODLAND. The weight pan is 5 inches in diameter, the commodity pan 7; thus there is 2 inches difference between the weight and the commodity platters in this model. The capacity of the scale is 6 pounds and it can be increased to 10 pounds; unless you stack the weights you can not get 9 pounds on this weight platter.

Mr. SWEENEY. Why not put an arrow in front showing which is the weight pan?

Mr. WOODLAND. That is a good suggestion. We could put that on the front. That would be possible and is a very good suggestion.

Mr. A. B. SMITH. Mr. Woodland, in the case of a scale which is sold to weights and measures officials for testing purposes, from the moment that scale enters the possession of an inspector it becomes a standard, therefore that scale should be submitted to Harrisburg for sealing before it goes to the inspector, the same as any standard weight.

Mr. NEALE. I want to call attention to a situation which exists. On some scales there are placed the approval marks of New York City, Massachusetts, Pennsylvania, and Alabama; each of those States requires its own mark to be placed on the scale. There are 6 States requiring scales to be approved—New York, New Jersey, Massachusetts, Pennsylvania, North Carolina, and Alabama. I do not know what will eventually be required even with the good work my good friends are doing. I hope the time will come when we can have one marking, good in every State. As I have said, in some States not only must we get approval but we must put a disk on to show that approval. That results in a number of marks on the same scale, for while you may say that the manufacturer sells a particular scale to but one State, nevertheless we must have warehouse stock and ship therefrom, and since we can not have one warehouse for every State, we must have all the marks on each scale. Somebody must pay that price, and there is no question but that it all is passed on to the consumer.

SUPPLYING COPIES OF PAPER OF RALPH W. SMITH

Mr. CROCKETT. In regard to that wonderful paper that Mr. Smith read; will that be available to the members of the conference?

Mr. SMITH. I see Doctor Burgess looking at me. Copies are not available, but, if it is the desire of the conference, that can be mimeographed and made available.

Mr. CROCKETT. I think it is the desire of the conference that we have copies.

Mr. STRONG. I want to tell you that I will go further than that. I will have his paper mimeographed, and we will send it to every

county, city, and State sealer of weights and measures in the state of Michigan, on my return.

Mr. WEBSTER. Mr. Chairman, I also want to voice the sentiment expressed. I think we in weights and measures work are extremely fortunate in having as one of the officers in this citadel of learning a man who can produce such a cogent and well-delivered address as Mr. Smith did yesterday, and I had hoped that copies of his address would become available before we concluded the conference.

The CHAIRMAN. In connection with the report of the committee on specifications and tolerances on a code of regulations, you remember we passed a motion yesterday approving this code in principle. Now, the committee, I understand, has specific recommendations to make.

**REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES
ON A CODE OF REGULATIONS, PRESENTED BY F. S. HOLBROOK,
CHAIRMAN**

Yesterday the conference went on record as approving a new subheading, to be known as "Regulations" to be established under each of the main headings specifying the various classes of apparatus dealt with by the specifications and tolerances of the conference.

Your committee now has to present a detailed report in this connection.

The first portion of this report recommends that the following specifications, now embodied in various codes of specifications of this conference, be transferred, without amendment, from their present position in the codes to this new subheading.

Class of apparatus	Old specification No.	Page of M 85	New regulation No.
Linear measures.....	9.....	24	1
Taximeters.....	11.....	35	1
Liquid-measuring devices.....	2 (Second sentence only).....	48	1
Dry capacity measures.....	8.....	73	1
Scales—general specifications.....	2a.....	77	1
	25 (All that portion beginning with the words "all scales shall be maintained in balance")	80	2
Platform scales.....	4.....	83	1
	7a.....	84	2
	10a.....	95	1
Counter scales.....	12.....	95	2
	4.....	99	1
Spring scales.....	12.....	100	2
	19.....	101	3
Computing scales.....	8.....	105	1
	15.....	106	2

The remainder of the report falls in a somewhat different category since amendments are recommended and new material suggested.

Transfer specification No. 24, under the heading "Liquid-measuring devices," reading as follows:

24. HEIGHT OF SUCTION LIFT.—No defined-stroke, piston-type, liquid-measuring device shall be so installed as to work under a total suction head sufficient

to cause vaporization of the liquid for which it is used under the highest temperature and lowest barometric pressure likely to occur.

to the subheading of "Regulations" and amend to read as follows:

2. VAPOR OR AIR IN SUPPLY LINE.—Any installation of a defined-stroke, piston-type, liquid-measuring device shall be such that the total suction head will not be sufficient to cause vaporization of the liquid for which the device is used under the highest temperature and lowest barometric pressure likely to occur.

Any installation of a meter-type liquid-measuring device shall include an effective automatic air-release unit as close as practicable to the measuring element whenever there is a reasonable probability that there will be any vaporization of the liquid for which the device is used under the highest temperature and lowest barometric pressure likely to occur, or that there will be any introduction of air into the system on the inlet side of the measuring element.

Insert a regulation under the heading "Liquid-measuring devices" to be numbered 3 and to read as follows:

3. METHOD OF OPERATION.—A liquid-measuring device shall be operated in accordance with the method which is obviously indicated by its construction or which is indicated by the manufacturer through the medium of instructions contained on the device itself; if the device is operated in any other manner, then the commercial use of the said device shall be prohibited and it shall be subject to condemnation.

The above recommendations were placed in your hands in mimeographed form a day or two ago.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
I. L. MILLER,
JOSEPH G. ROGERS,
W. A. PAYNE,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

SECRETARY'S NOTE.—When this report was presented at the conference each specification given in the tabulated matter in the report and recommended for transfer, was read and the reason for the recommendation briefly outlined, by the speaker. To conserve space and since each specification transferred can be readily identified by consulting Bureau of Standards Handbook M85, this material is not included here except where the specification was not transferred in its entirety.

Mr. HOLBROOK. In the case of specification No. 2, under the heading "Liquid-measuring devices," the second sentence only is recommended to be transferred. It reads as follows:

All liquid-measuring devices shall be installed plumb and level, and their installation shall be of such strength and rigidity as to maintain this condition.

That portion is intended to be Regulation No. 1. That obviously is an installation condition.

Specification No. 2 will then read as follows:

All liquid-measuring devices shall be so designed and constructed that they will be in normal operating position when they are in level.

It will be conceded that that is the manufacturer's responsibility.

A portion of specification No. 25, under the heading "Scales—general specifications," is recommended for transfer. This portion reads as follows:

All scales shall be maintained in balance.

A scale is in balance, as the term is used herein, when it correctly gives a weight indication of zero when there is no load on the platform, plate, or other load-receiving element.

A lever scale of the nonautomatic type not having an indicator and a graduated scale or arc is in balance when the beam comes to rest at, or oscillates through approximately equal arcs above and below, the center of the trig-loop when one is provided; or a position midway between other stops when these are provided; or a horizontal position when no trig-loop or other stops are provided.

A scale of the nonautomatic type having an indicator and a graduated scale or arc is in balance when the indicator comes to rest at, or oscillates through progressively smaller arcs about, a definite and clear zero graduation.

A scale of the automatic-indicating type—that is, one having a reading face or dial—is in balance when the indicator comes to rest at a definite and clear zero graduation.

That portion of the specification which remains reads as follows:

25. All scales shall be provided with a mechanical device or other means by which the balance condition may be adjusted.

This language will naturally remain in its present position in the code of specifications inasmuch as it is a construction requirement.

It is the recommendation of the committee that the specifications which are included in the table in the report and which have just been read¹ be transferred to the new subheading "Regulations" under the appropriate main heading.

The CHAIRMAN. Do you so move?

Mr. HOLBROOK. I will make that as a motion.

(The motion was seconded, the question was taken, and the motion was agreed to.)

Mr. HOLBROOK. The next recommendation is in relation to specification No. 24, under the heading "Liquid-measuring devices," reading as follows:

24. HEIGHT OF SUCTION LIFT.—No defined-stroke, piston-type, liquid-measuring device shall be so installed as to work under a total suction head sufficient to cause vaporization of the liquid for which it is used under the highest temperature and lowest barometric pressure likely to occur.

It is recommended that this be transferred to the subheading of "Regulations," numbered 2, and amended to read as follows:

2. VAPOR OR AIR IN SUPPLY LINE.—Any installation of a defined-stroke, piston-type, liquid-measuring device shall be such that the total suction head will not be sufficient to cause vaporization of the liquid for which the device is used under the highest temperature and lowest barometric pressure likely to occur.

The material read so far is practically the same as the old specification. The portion which follows constitutes a new requirement:

Any installation of a meter-type liquid-measuring device shall include an effective automatic air-release unit as close as practicable to the measuring element whenever there is a reasonable probability that there will be any vaporization of the liquid for which the device is used, under the highest temperature and lowest barometric pressure likely to occur, or that there will be any introduction of air into the system on the inlet side of the measuring element.

I think the members of the conference are all more or less familiar with the various devices which may be called "air-release" devices, now being installed by various manufacturers of meter systems.

¹ See secretary's note, p. 92; also p. 91 for table.

Since the meter system in its simplest form is a closed system in which there is no vent to the outside atmosphere, it is obvious that if gasoline vapor, or air in gaseous form, is present in the gasoline in the supply line, it will still be present at the time that the gasoline passes through the meter, and short measure of the liquid delivered to the purchaser will result. This short measure is due to the fact that a meter will successfully measure the volume of the material passing through it whether that material be gas or liquid, but liquid is the only thing that can be delivered to the car, as the gas will escape into the atmosphere.

Air may be introduced in the supply line in the form of bubbles as the result of a leak in the line. It may enter the supply line dissolved in the gasoline under pressure and form into bubbles upon the decrease of pressure as the gasoline moves through the supply line toward the meter. Bubbles of gasoline vapor may form in the supply line due to the breaking down of the gasoline as the result of turbulence, suction, or other cause.

Now it is believed by your committee that many of the short-measure deliveries, and many of the inconsistent and erratic deliveries, from meter systems are caused by the presence of vapor or air in gaseous form in the gasoline being measured. If such vapor or air is present in the gasoline, that vapor or air should be removed from the gasoline before the measurement takes place. The air-release device is for that purpose, and, if effective, it properly performs that purpose.

The committee was not willing to go to the length of recommending a mandatory specification to the effect that in every metering system an air release should be incorporated. The committee believes that in each case it should first be demonstrated or indicated that short deliveries, or erratic deliveries, from a metering system are caused by the presence of air or vapor. When that demonstration has been made then the system in question should be required to have an air release unit as one of its features. That is the reason for the requirement as presented.

The CHAIRMAN. It is moved that the recommendation of the committee be adopted.

Mr. CROCKETT. When does this regulation go into effect?

Mr. HOLBROOK. The committee felt that in case of a regulation it will devolve upon the various States adopting the regulation to define its scope and its enforcement. The States should use their own judgment in that relation.

Mr. CROCKETT. Mr. Holbrook, do you think the automatic air release in its present forms is perfected to such an extent that we ought to make the manufacturers place it upon their pumps? Do you consider them as effective as they should be?

Mr. HOLBROOK. I think that there are effective automatic air releases in various forms now available.

Mr. CROCKETT. Take a metering system and test it in a laboratory, and your results are entirely different from where you test it out in the open, in use. It is subject in the latter instance to changes in the weather—cold, heat, wet and dry conditions. I have seen some automatic air releases that did not automatically release; others

which automatically released the gasoline when they got frozen up with condensation in the mixture, creating a fire hazard.

Mr. HOLBROOK. The regulation requires that there be an effective automatic air-release unit; if it is effective it must necessarily be satisfactory.

Mr. CROCKETT. But you have not taken into consideration the changes and condensation which take place and where there is a difference in temperature there is bound to be condensation both inside and out. Now what is an effective air release?

Mr. HOLBROOK. An effective air release is one that successfully releases the air or the vapor contained in the gasoline before the gasoline passes through the metering unit of the system.

Mr. CROCKETT. Then, if it is frozen up, it is not a proper effective one?

Mr. HOLBROOK. If it is inoperative, it is not effective.

Mr. CROCKETT. If we do not have it, then why go on record to have it placed upon these systems?

Mr. HOLBROOK. We do not believe it has been demonstrated that we do not have any effective air releases at present. However, the committee has not given consideration to these air releases freezing up. Is it the experience of members of the conference that this happens in practice? If so, it seems probable that it might destroy the effectiveness of the air release for the time being, but I have not encountered that condition.

Mr. CROCKETT. I have seen an air release deliver gasoline for seven minutes before it stopped. Of course, I do not say that occurs in all sections of the country. Where there is a great variation in temperature there must be condensation; you can not get away from that. When you can overcome that difficulty, I will say you will have an effective air release.

Mr. HOLBROOK. Have any other members of the conference had a similar experience?

Mr. H. N. DAVIS. I would like to ask Mr. Holbrook just what an effective device is?

Mr. HOLBROOK. I do not think the inspector should be the sole judge. Where there is an effective State department in charge in the State, it might be necessary for them to make experiments.

Mr. BAUCOM. In studying this through, it looks to me as though we could delete this particular section and enforce paragraph 3, which requires a man to install the equipment properly; if he puts it in properly there will not be any air or vapor sucked into the line. I had a few cases of trouble where installations were drawing air through leaking joints. If the specifications for installation are lived up to, it looks as though that will cover the situation. If a pump will not work without an air-relief valve, the installation man will put it on. Also we might change the first paragraph to take in all types of pumps instead of piston-type pumps only.

Mr. HOLBROOK. That statement raises several questions that I will try to comment on. In relation to amending paragraph 1 to refer to any type of pump, it is unnecessary to make this applicable in the case of a pump vented to the atmosphere, because in that case

any air or vapor is immediately passed off from the top of the liquid and solid fuel is delivered.

In relation to the necessity for an air-release valve, this necessity may often be demonstrated upon devices in the field; but it may not in all cases be desirable to allow devices to be put into use without an air release and afterwards to require an air release when they are found to be inaccurate in the field. If it has been found that general inaccuracy encountered in a system can be cleared up by an air release, then the air release, in my opinion, should certainly be required before the device goes in the field—such devices thereafter should not be put in the field without the air release being incorporated in their construction.

A third question raised, as I understand Mr. Baucom, is whether regulation No. 3, which will be considered next, is not a satisfactory substitute for No. 2. I can not concur in that conclusion. Mr. Baucom has suggested that if the device is properly installed no air can be sucked into the line. In connection with that I would suggest that the line may be completely tight, and notwithstanding this, vaporization of liquid may occur within the line itself without leak to the outside atmosphere. Under the same conditions dissolved air may become air in gaseous form. I think that covers the committee's attitude upon the points raised.

The CHAIRMAN. The question is upon the adoption of the committee's proposal.

(The question was taken, and the regulation was adopted.¹)

Mr. HOLBROOK. The next recommendation is to insert a regulation under the heading "Liquid-measuring devices" to be numbered 3, and to read as follows:

3. METHOD OF OPERATION.—A liquid-measuring device shall be operated in accordance with the method which is obviously indicated by its construction or which is indicated by the manufacturer through the medium of instructions contained on the device itself; if the device is operated in any other manner, then the commercial use of the said device shall be prohibited and it shall be subject to condemnation.

There are devices on the market at the present time which, when operated according to the obviously proper method of operation, are entirely satisfactory devices and will deliver full measure. There are unusual and improper methods of operating some of those devices by which short measure may be caused. The correction of such condition, it seems to the committee, is largely a matter of regulation. If a device is being improperly operated—operated in a manner which was never intended by the manufacturer as shown by instructions on the pump or by the obvious design of the device itself—then it seems that the official should condemn that device or should take such steps as will make it reasonably certain that the device will be properly operated in the future. That is the gist of the regulation.

The CHAIRMAN. Are there comments or remarks?

(It was moved and seconded that the regulation be adopted, the question was taken, and the motion was agreed to.)

¹ Later, by vote of the conference, it was provided that the adoption of this regulation be tentative only. (See p. 147.)

(It was moved and seconded that the report be adopted as a whole.)

Mr. STRONG. Are these tentative or are they for immediate adoption?

Mr. HOLBROOK. It was not intended that these be tentative recommendations, inasmuch as they are not manufacturing specifications.

Mr. BAUCOM. A number of men have talked to me on this section since I have been here. What is passed here automatically becomes law in North Carolina, and I have to enforce what is done here. I will have to pass the buck on to the sealers, or vice versa. I want to study this a little before it is finally adopted, and, if I am not out of order, I would like to ask the gentlemen that we postpone a vote on this until after lunch.

The CHAIRMAN. Of course, Mr. Baucom, you can move a substitute, or an amendment to the motion, or move to table it.

Mr. BAUCOM. I move as a substitute motion that we defer action until after lunch.

(The motion was seconded.)

The CHAIRMAN. The question is upon the substitute motion to defer action on this question until after lunch.

(The question was taken, and the substitute motion was lost.)

The CHAIRMAN. The question is now on the motion to accept this report as a whole.

(The question was taken, and the motion was agreed to.)

THE SUPERVISION OF POST-OFFICE SCALES

By R. S. REGAR, *Administrative Assistant to the Postmaster General, and Purchasing Agent, Post Office Department*

Mr. President and members of the National Conference on Weights and Measures, it is a real pleasure to me to attend this conference and say a few words on the subject "The Supervision of Post-Office Scales."

Scales are the most important item of supply and equipment in the entire postal service.

Because of complaints the department received concerning our scale equipment, the Postmaster General decided that a survey should be made of the scales in use at a number of representative post offices to determine exactly the condition of these scales.

During the month of October, 1930, 15 post office inspectors were ordered to Washington for instructions in the test of scales. With the kind cooperation of the Bureau of Standards and particularly Mr. F. S. Holbrook, chief, division of weight and measures, and his assistant, Mr. Smith, these men were enabled in a very short period to proceed to different sections of the country to make the inspections which were to be the basis for further action by the department in the matter of repair and replacement of post-office scales.

This investigation, which included post offices of all classes located in all sections of the country, developed that our postal scales are not in such condition in so far as accuracy is concerned as to make the Post Office Department proud of its equipment. It was apparent

that corrective measures must be taken immediately to protect the revenues of the Government and the interests of the public.

For many years past the field force of the department, in the way of field mechanical force, has been limited to seven men or less; therefore it has been of course impracticable for much attention to be given the scale equipment of post offices. These seven men are required to cover the entire country and inspect, adjust, repair, and maintain all mechanical equipment in post offices, including canceling machines, conveyors, pick-up tables, and other mechanical equipment, in addition to scales. The result was that only a comparatively few scales could be checked for accuracy each year and properly adjusted or replaced. As a result, over a long period of years, the scales have been very much neglected, due mainly to a lack of personnel to handle this big task and due to a lack of necessary funds to provide replacements where necessary.

The conclusion was reached by the Postmaster General that the Post Office Department should have a special division to devote its entire time to the subject of post-office scales. Under date of February 19 of this year the Postmaster General signed an order establishing the division of scales.

When it is realized that the department has in use in all post offices throughout the country approximately 250,000 scales including 90,000 nine-ounce scales, 64,000 four-pound scales, 55,000 one-hundred-pound scales, and over 10,000 parcel-post automatic scales, it is easy to understand that this new division is absolutely essential and will be faced with many and varied problems which vitally affect the Post Office Department and the general public and which must be ironed out.

For the purpose of making periodic inspections and repairs to all scale equipment, it is the purpose of the Post Office Department to appoint a field personnel of 50 men, who will visit principally the large post offices throughout the country and place the scale equipment in accurate condition.

This personnel will be assigned as near as possible to territory contiguous to their home towns. They will be thoroughly schooled in all branches of theoretical and practical scale repairs. Before this mechanical force commences operations each and every man will receive a thorough course of instructions at the Bureau of Standards. Mr. Holbrook has again volunteered to teach these men many of the intricacies of the scale problems, and it is the sincere belief of the Post Office Department that after these men have been instructed by Mr. Holbrook, followed by some practical experience in the Post Office Department laboratories, it will have a corps of scale mechanics unsurpassed by any private or governmental activity. One reason for my optimism in this respect is the fact that this mechanical force is to be comprised only of men who have served an apprenticeship of four years as a machinist, toolmaker, instrument maker, or a comparable trade and in addition thereto have had at least one year of journeyman work.

The Post Office Department realizes that this work can not be done properly in six months or a year even with this excellent corps of men at its command, because of the large field which must be covered. Therefore, a 4-year program has been adopted. In that

period of time all scales in the Postal Service will have been replaced where necessary or repaired where possible of repair; then we will enter upon a program for future maintenance, periodic inspection, adjustment, and replacement; then we will be proud of our scale equipment. It will be just as good as the Bureau of Standards and the Post Office Department can make it. We have no apologies to offer for the present condition of this equipment; we have done the best we could over a period of 25 or 50 years with what we had to work with. This condition can not be corrected in six months or a year. It will require four years, as stated, and if we can accomplish this end in that time—and we will—we will have done a good job and we will be satisfied.

Concluding, let me add that it is the purpose of the Post Office Department not only to set its house in order in the way of its present scale equipment in every way possible, with the latest types of scales, the latest improvements on existing types, and in fact any improvement in post-office scales which can be adopted for the benefit of the service, but it will cheerfully consider and gladly accept, if practicable, considering cost, expedition, and accuracy in handling the mails, any suggestions which will improve its scale equipment.

The scale equipment of the Post Office Department represents an investment of hundreds of thousands of dollars; we hold that we are negligent if we do not give it the attention and consideration it deserves.

When your conference again meets we will be able to tell you of some of the results which the Post Office Department has accomplished in its endeavor to have accurate scales in its service.

THE DEVELOPMENT OF LARGE-CAPACITY SCALES

By A. BOUSFIELD, *Chief Engineer, E. & T. Fairbanks & Co.*

If we are to keep pace with the onward march of progress we must look toward to-morrow and not on yesterday. However, to obtain a true perspective it is necessary to review the past.

Mechanical developement has been slowly built up, usually by improving upon the heritage of the past. It is a mark of genius to be able to step beyond the conventional limitations and anticipate the requirements of the future.

Four-section railroad track scales.—Heavy-capacity scales have been developed gradually to meet the increasing demands of the railroads and the large industrials. During the last 20 years there has been a great development in track-scale construction. The older designs, wherein rigid bearings and multiple sections were the favorite models, have been almost entirely abandoned for heavier construction in favor of fewer sections and heavier sectional capacities. The series of pictures thrown upon the screen will best serve to illustrate this development. For several years prior to 1920 suspension bearings had been used in track scales and some fairly heavy constructions had been introduced, but there was a lack of uniformity and standardization, both with regard to sectional loading, length of knife-edge, and the effective length of the weighing rail, and there was quite a diversity of opinion among railroad engineers and manufacturers as to what was the best type of construction.

In 1913 the National Bureau of Standards began an investigation of railroad track scales. This investigation disclosed the fact that track-scale design theretofore had not been based upon scientific engineering principles, and the tests showed quite clearly that there was a need, both for improved design in the scale mechanism and in the foundation and method of installation. Some few years prior to the activity of the bureau in this direction, a series of tests had been made jointly by the Pennsylvania Railroad, the Baltimore & Ohio Railroad, and the Pittsburgh & Lake Erie Railroad in the Pittsburgh district, which clearly showed the necessity for heavier equipment and more refined design. The necessity for heavier bridge girders was also clearly demonstrated and these railroads started a campaign to improve their track-scale equipment.

After the Bureau of Standards had satisfied themselves that there was a great need for improvement in standardization of railroad track scales, a committee was formed consisting of representatives from the Bureau of Standards, the American Railway Engineering Association, the Railroad and Warehouse Commission of Minnesota, the National Scale Men's Association, and the Scale and Balance Manufacturers' Association. Their deliberations resulted in the promulgation of specifications by the American Railway Engineering Association and the publication of Circular No. 83 by the Bureau of Standards. These specifications virtually excluded the old-style rigid-bearing light-capacity scales, and set forth two classes of scales that would be acceptable as standards; that is, heavy-service scales 75 to 100 ton sectional capacity and light-service scales 60 or 75 tons sectional capacity. The lengths of the scales were specified as 50-foot, 56-foot, and 60-foot, effective weighing rails, and scales were limited to not more than four sections. For motion weighing, a maximum speed of 4 miles per hour was decided upon and a minimum of 3 seconds was established for the time that each car should be entirely and alone on the scale. It was definitely specified that the main levers and the end extension levers should carry a live and a dead load corresponding to 100 per cent of the sectional capacity; that the portion of middle extension levers carrying the load from the end sectional only should be 100 per cent of the sectional capacity; that the portion of the middle extension levers carrying the combined load on the end section and the inner section should be 160 per cent of the sectional capacity; and that the transverse extension lever, shelf lever, and beam should carry 300 per cent of the sectional capacity. A minimum distance of 8 inches was established for the distance between the fulcrum pivot knife-edge and the load knife-edge in main levers for heavy-service scales, and for light-service scales this fulcrum distance was specified to be not less than $6\frac{1}{2}$ inches. The bearing pressure per linear inch of knife-edge was specified not to exceed 5,000 pounds for high carbon steel or 6,000 pounds for special alloy steel. A table was prepared specifying the section modulus required for the girders in the weighbridges and also for the transverse deck supports.

These specifications and the factors established therein were the result of very careful investigation of the actual loading conditions imposed on the scale and the weighbridge for representative cars, dead load, and effects of shock due to moving loads. These speci-

fications are still in force and have served to standardize 4-section track scale design and to improve weighing conditions throughout the country, both for railroad and industrial installations. The specifications call for dead rails or relieving apparatus except to meet special requirements.

The use of dead rails on a track scale necessitates some delay in stopping to throw switches, and in some instances, backing up to get on the dead rail and notwithstanding the fact that instructions are issued to track crews to keep the locomotives off the scale rails, it frequently happens that these instructions are forgotten or violated and locomotives are allowed to pass over the scales, thus imposing overloading and shock not contemplated in the design. The dead rail also requires an extra length of straight track between the switches.

Two-section railroad track scales.—With the modern trend toward fewer parts and heavier construction in scale mechanism, the 2-section track scale has been introduced. The work of preparing the specifications for these scales was done by the yards and terminals committee of the American Railway Engineering Association in collaboration with the Bureau of Standards and the Scale and Balance Manufacturers' Association. These specifications were published by the American Railway Engineering Association, Bulletin 294, volume 28, pages 557 to 611, February, 1927. They are also printed in the Bureau of Standards Circular No. 333. They have been approved by the National Scale Men's Association and the Scale and Balance Manufacturers' Association.

These specifications cover 2-section knife-edge scales for weighing cars in railroad service without the use of dead rails. The scales are divided into two capacities; that is, 200 tons per section and 150 tons per section. The specifications are definite in specifying the class that should be selected for railroad service. The 200 ton per section scales are intended for heavy railroad and industrial service and two lengths are specified; that is, 60 feet and 75 feet.

The 60-foot scales are intended for spot weighing or for the motion weighing of cars whose wheel base does not exceed 41 feet. The 75-foot scales are intended for motion weighing of cars whose wheel base does not exceed 51 feet.

The 150 ton per section scales are selected for points where the scale traffic will be relatively light and two lengths are specified; that is, 50 feet and 60 feet. These scales, however, are not recommended for motion weighing. These specifications follow closely Bureau of Standards Circular No. 83 for 4-section scales except in so far as they are modified for the 2-section design. Some slight changes were also introduced into the limiting stresses for the materials used. For example, the working stress in tension for cast iron was changed from 1,500 pounds per square inch to 2,000 pounds per square inch. The specifications also preclude the use of high-carbon steel for pivots and bearings. The load per linear inch of knife-edge of 6,000 pounds for special alloy steel established by Bureau of Standards Circular No. 83 was maintained. The design of the weighbridges was specified to conform to the American Railway Engineering Association, general specifications for steel rail-

way bridges and the theoretical loading to be considered was specified to be Coopers E-70 for the 200 ton per section scales and Coopers E-60 for the 150 ton per section scales.

Since the specifications were issued in 1927 a large number of 2-section scales of both 200 ton and 150 ton per section have been installed, both for railroads and industrials, and they appear to have met a popular demand and are giving good satisfaction to their users.

The cost of a complete installation for a 2-section light-service track scale of 150 tons per section is somewhat higher than for a 75 ton per section 4-section track scale, varying from 10 per cent to 18 per cent. The cost of installing a heavy-service 2-section track scale 200 tons per section also runs somewhat higher than the cost of installing a 100 ton per section 4-section track scale. These higher initial costs, however, are offset by saving in operation, and it is believed that the 2-section track scales without dead rails are a better investment than the 4-section scales with dead rails.

With the advent of the large mixer cars which have recently been introduced into steel mills a demand has arisen for a 2-section track scale having a capacity of 250 tons per section and two of these scales have been built and are in successful operation. These scales were designed to comply with the Bureau of Standards Circular No. 333 except in so far as the sectional loading and the design of the girders for the weighbridge were concerned. With a loading of 250 tons per section and with the bearing pressure per linear inch of knife-edge kept at 6,000 pounds, 42-inch knife-edges are required for the load pivots in the main levers. Very heavy construction is also required in the end extension levers so as to eliminate to as great an extent as possible side sway and vibration. The scales were equipped with type-registering beams graduated 800,000 pounds by 20 pounds. These are believed to be the heaviest 2-section track scales that have been built up to the present time.

The most important advantages of the 2-section knife-edge track scales over the 4-section are the minimum number of working parts which reduces the risk of errors on account of displacement. Plain, simple, and substantial design throughout insures dependable service, and it is expected that the 2-section knife-edge track scales will give the best and most reliable service that can be expected from a knife-edge type of scale. The 2-section railroad track scale is growing in popularity, particularly for heavy weighing points. The risk of errors on account of displacement of parts or pivot wearing is reduced about in proportion to the reduction in the number of parts and to the increase in weight of individual parts of the scale mechanism. The maintenance expense is less on account of the smaller number of parts and for the same reason less time is required for making tests and adjustments. The 2-section scales are better adapted to installation without dead rails as they give a more favorable distribution of load for an equal class of equipment.

Plate fulcrum railroad track scales.—All the advantages of the 2-section knife-edge scales and none of the disadvantages due to the wearing or displacement of parts are secured by the use of the plate fulcrum construction.

The use of the plate fulcrum principle in track scales has demonstrated the following outstanding features:

1. Installation and track layout simplified, no dead rail or extra switches being required.
2. Engine time and switching saved because locomotives can pass over the scale track.
3. Maintenance reduced to a minimum, the total absence of wearing parts insuring freedom from repairs.
4. Accuracy of the weighing mechanism retained indefinitely.
5. Economies effected in operation and maintenance afford maximum return on initial investment.

Such marked and distinct advantages can be obtained solely by the use of the plate fulcrum principle and the scale design and construction that has been developed in conjunction with it.

The plate fulcrum provides a means for a direct connection between the load blocks and the lever system. They are designed with ample cross sectional area to provide ample factors of safety, and, at the same time, are capable of the slight flexure necessary to produce movement of the beam. With this type of construction the load passes directly down through the thin web section of the plate and there is absolutely no chance of wear due to contact between the pivots and bearings, such as occurs in the knife-edge construction.

The plate fulcrum scale is designed for a capacity of 200 tons per section, irrespective of the length of weighing rail. Lengths ranging from 24 feet to 76 feet have been built and are in successful operation. A sectional capacity of 200 tons in a 2-section scale is sufficiently great to withstand the shocks and vibration caused by even the heaviest locomotives passing over the scale track and in all plate fulcrum constructions throughout the country dead rails are eliminated together with their attendant switches and their necessary maintenance and upkeep.

Based on 16 years of successful experience with the plate-fulcrum principle and aided by the American Railway Engineering Association specifications for 2-section track scales, the scale has recently been redesigned by rearranging the levers and weighbridge, thereby effectively simplifying both the manufacture and the installation of the scale. The resulting new design permits economies in the use of structural steel, in excavation and in concrete, making it possible to provide this scale installed at a greatly reduced price. The strength and the operating qualities of the scale, however, have not been impaired to the slightest degree. The changes affect the construction of the weighbridge, the pit, the details of the levers, the bases on which they are supported, and the arrangement of the levers. With the new construction it has been possible to reduce the depth of the pit and the amount of excavation needed. The total installation cost is only about one-third more than for a knife-edge scale of the same size and capacity.

The plate-fulcrum principle has been successfully applied to weighing cars handled by large car dumpers which of late years have been developed for use in large central power houses. The total load of a 60-foot car dumper is 750,000 pounds so that when the weight of the loaded car is added to this, a 2-section scale having a capacity of 250 tons per section is required. In order to provide adequate support for the dumper, wide gauge main levers are required

and the end extension levers are located off center so as to clear the receiving hopper. These scales have now been in service for several years and have given good satisfaction with an entire absence of maintenance cost.

Notwithstanding the fact that many types of high grade track scales are available, in a recent report published by the Bureau of Standards, Letter Circular 295, Railroad Track Scale Testing Service of the National Bureau of Standards, Fiscal Year July 1, 1929, to June 30, 1930, we find the following:

Page 21: *Evidence of incipient decline.*—That a decline in the quality of weighing performance may be anticipated seems to be indicated by a study of Table 5 which correlates data from this and previous reports on the comparative quality of performance of railroad-owned and industry-owned track scales. Columns 4 and 7 contain the critical data which indicate that industry-owned scales are not keeping pace in improvement with railroad-owned scales. The inference may readily be drawn that this may be due to a difference in the native quality of weighing machinery and maintenance methods. Those intimately acquainted with conditions will, as a matter of course, accept the inference as a fact which requires no statistics to prove, because it is such a fact, but what is less evident is the discrepancy in the rate of improvement of the two classes of scales. The underlying truths are that the rate of improvement in railroad-owned scales is hardly what it should be considering all circumstances, and that the industry-owned scales, which as stated previously are receiving the burden of weighing freight, are falling away from a standard of performance presumably set by the carriers as being necessary for their own interests. On account of the sluggish retirement of obsolete equipment the chief credit for improvement, such as it is, must be given to diligent and intelligent maintenance methods. A structure depending upon maintenance alone, however, must ultimately break down, and the chief point of the preceding argument is that with respect to modern commercial weighing practice a manifestation of that most fundamental principle is imminent.

We feel sure that all those responsible for scale operation will regret to hear that there is evidence of incipient decline in track-scale performance, and that efforts will be made to overcome it. A campaign should be started to improve conditions, for it is believed that executives generally are alive to the importance of arriving at correct weights. The report clearly indicates that this can not be done with obsolete equipment.

On page 7 of the same report it is stated that "The average value of the underweight errors will be seen to be greater than that of the overweight errors." This is a serious condition for the owners from a financial standpoint, as it indicates that losses are being incurred.

With the introduction of 65-foot cars by some of the larger railroads and the likelihood of their numbers increasing and getting into interchange service, it is apparent that longer and heavier scales will be required to accommodate the longer wheel base of the new cars, whose length will be too great to enable them to be weighed on scales specified in Bureau of Standards Circular No. 83. It is also possible that a revision of the specifications for 2-section railroad track scales, as set forth in Bureau of Standards Circular No. 333, will be required.

The various interested parties are alive to the situation and it will undoubtedly be seriously considered in the near future.

Heavy-capacity grain-hopper scales.—The weighing of large volumes of grain in terminal elevators operating under State, board of trade, or other supervising agencies, involves exacting requirements. The loads are heavy and the tolerances of necessity are small. Interstate Commerce Commission Docket 9009 appears to be the first

attempt made by a regulatory body to control the design and manufacture of heavy-capacity grain-hopper scales. Different interpretations, however, were placed upon various parts of that report. As a result, a conference was convened at which the various interested parties were represented as follows:

Weighmasters'-Scale Men's Conference.
 Minnesota Track and Hopper Scale Department.
 National Scale Men's Association.
 Grain Dealers Grain Conference Committee.
 Elevator Builders and Designers.
 Scale and Balance Manufacturers' Association.
 The Bureau of Standards.

The result was that part of Docket 9009 pertaining to the design and manufacture of heavy-capacity hopper scales was revised and specifications were subsequently issued by the Bureau of Standards in their Circular 199. These specifications covered in detail load distributions, unit stresses, details of construction, together with maximum allowable values of the sensibility reciprocal, tolerances for the counterpoise weights, method of test, and accuracy requirements. It was specified that scales would be considered commercially accurate when any error did not exceed one-half pound per 1,000 pounds of the load of standardized test weights used. These specifications had the effect of materially improving the construction, particularly, of heavy-capacity grain-hopper scales and large numbers of both the 2,500-bushel and 2,000-bushel capacities have been installed since the appearance of the specifications in 1925.

Throughout this article no attempt has been made to describe in detail the various types of scales that have been mentioned, as it is felt that the details of construction used by the various manufacturers are well known both to the railroads and the industrials. The pictures will serve to illustrate many of these details; also the development that has occurred during the last 20 years.

Scientific design and refined manufacturing methods have produced scales that are well adapted to meet the exacting demands of commerce and industry and it is expected that the next decade will see still further improvements and advancement in the art of weighing. Speed and accuracy are the demands of the present generation.

May I take this opportunity on behalf of the manufacturers to express our appreciation to the Bureau of Standards of the very splendid progress that they have made in testing railroad track scales throughout the country both on railroads and in the large industrial plants?

This work which has been done by the bureau is something which no one corporation or railroad of the country, or no State could have done; you have been in more or less close touch with the fine character of the work. The yearly reports which are issued are fair and impartial and they give a wonderful account of the track-scale installation throughout the country. As a manufacturer's representative I want to assure you that the manufacturers are doing everything possible to improve their product.

(In presenting this subject Mr. Bousfield exhibited a large number of lantern slides. These illustrated a wide variety of scales and

installations from very early types down to those employed at the present day and, consequently, were of great interest and importance.)

THE SEALER'S RESPONSIBILITY RELATIVE TO PERSON-WEIGHING SCALES

By WILLIAM O. WILLIAMS, *Deputy Sealer of Weights and Measures, Trumbull County, Ohio*

Mr. President, members, and guests, this is a subject that should interest every weights and measures official no matter what his jurisdiction, although one to which I had not given much special thought or attention before the receipt of my program assignment from Mr. Holbrook, and right here I would like to add my thanks to all of you present for your assistance.

A member of this conference who has had considerable experience in weights and measures matters and from whom I had requested an opinion on this subject, stated that this was one of more importance than was generally recognized at the present time; also that it was one about which comparatively little was known by either weights and measures officials or any one else, and that it was quite a new comer in the field of weights and measures supervisory work.

It has been said that for many years coin-operated person-weighting devices, better known as penny-weighting scales, were good naturedly accepted as one of the standard American jokes. The most optimistic of those filling these machines with pennies hardly expected to get their correct weight. They were looked upon as sort of an amusement device; those using them seemed to get their penny's worth from laughing at the weight inaccuracies and fortune-telling quotations dispensed, and in trying to get their pennies back.

There is a definite connection between normal weight and normal health. Health campaigns of insurance companies and life extension institutes and a new system of combating human ills by preventive rather than curative methods, has gradually taught the American Nation to become weight conscious. People have become convinced that weight is of great importance in the scheme of health conservation, and so person-weighting scales have come into wide use and the attitude of the public toward them has changed. These scales pretend to furnish for a small sum a service to the person using them, and most of them have inscriptions suggestive that the instrument is of high dependability. When people want their correct weight and fail to get it, protests are made to both sealers and the newspapers. In some instances where news reporters were sent out to investigate, a flood of publicity unfavorable to coin-operated scales resulted which has had its effect. More publicity was given to the ridiculing of the coin-operated scale last December during the conference of the Ohio sealers at Columbus, Ohio, than was given to other important deliberations.

At this annual meeting of the Ohio sealers last December, conflicting opinions were expressed by many of the Ohio officials in attendance as to the desirability of the sealer extending supervision to person-weighting scales. However, since receiving answers from Ohio sealers in reply to my request recently made for their opinions on this same matter, I find there seems to be a change of attitude.

Those opposed took the stand that person-weighing scales were the least important scales to be supervised and that the time required to make a complete and accurate test of these devices had better be devoted to other more important types of devices used in determining quantities of commodities entering into commercial transactions. They felt that their other activities were far more essential, and demanded their attention, especially when considering the handicaps confronting Ohio sealers. Lack of personnel in their departments, lack of funds for the proper functioning of these departments, and no provision for the supplying of coins for proper operation of coin-operated devices to make complete and accurate tests thereof, were cited against further extension of the duties of the sealer. Some of the Ohio officials in expressing their opinion stated that they were opposed to extending the sealer's supervision or loading him with any additional work until such time as the Ohio statutes provide proper compensation for the sealers. Those of you who may be familiar with the set-up of the Ohio law for weights and measures administration will probably not wonder at this attitude. When I make this statement it is without casting any reflection on the active head of the Ohio administration, J. C. Tinkey, deputy State sealer. Were it not for the integrity of Mr. Tinkey and his unselfish loyalty in rendering to the purchasing public of Ohio every protection possible to be extended under a somewhat obsolete administrative authority, Ohio would not be able to hold her place as she does in weights and measures administration.

One Ohio sealer was opposed to supervision of person-weighers, stating that manufacturers and distributors of these devices, while seemingly anxious for the supervision, were more concerned that their devices be adorned with the aluminum seal so that the fact they were a sealed weighing device could be used to good advantage in their sales propaganda. He added that a fee was charged throughout his district, and the ease with which the fee could be collected from some owners and operators of person-weighers would have a tendency to encourage neglect of devices whose owners would be reluctant to pay the fees for the testing of devices used in commercial transactions.

My attention was also called to the fact that weights and measures authorities in several jurisdictions had been held by their courts to have no authority for such tests. Their opinions were based on the reasoning that such an act as person weighing is not a "commodity or thing" under the weights and measures acts of those jurisdictions.

Further opposition arises in that person-weighing scales are exposed to conditions which make it difficult to maintain them in proper weighing condition even for short periods of time, due to the misuse and abuse to which they may be subjected by children and irresponsible adults. Their exposure to the weather as well as the lack of attention on the part of owners in keeping these scales in proper condition and adjustment are urged as sufficient reasons why they should not come under supervision of the sealer. The difficulty which a sealer may experience in getting in touch with those responsible for the placing of person-weighers in given locations is cited, as well as the fact that many divisions of weights and measures are

undermanned making it impossible to make regular inspections and efficient tests of the devices, or to give uniform supervision to owners of all devices alike.

Replies to my inquiry of the department heads of several States would indicate that by far the majority of State departments feel that the sealer does have a responsibility relative to person-weighing scales.

I have been informed that the statutes of Massachusetts, New Jersey, Pennsylvania, and possibly one or two other States have provisions placing person weighers under supervision of the sealer the same as scales used in regular commercial transactions. I understand that cities of other States provide by their ordinances for supervision of these scales, some charging a license fee for their operation. The city of Milwaukee requires that a placard be placed in a conspicuous place on the device, bearing the name of the owner, and a statement that owner must refund to the user any money for which no service has been received. In the State of Massachusetts, I believe, a typewritten list of location and name of each owner of person-weighing scales is kept by some of the cities.

In Ohio the general specifications for scales can and are made applicable by many sealers to the person weigher. Those in the public schools possibly receive more attention than coin-operated devices. An Ohio official has expressed the thought that numerous codes of specifications and tolerances for the various types of scales are very confusing, especially to newly appointed officials. He offered the suggestion that at this conference one general code of specifications and tolerances be made applicable to all scales, instead of giving consideration to additional codes for the individual types of weighing devices.

While possibly the testing of person-weighing devices may not be considered of as great importance as that of devices in use to weigh commodities entering into commercial transactions, nevertheless, a large amount of revenue is taken from the public. Should not the public be protected so as to get correct information, in the same degree that owners or operators of these devices may be protected in the securing of this revenue for a service apparently rendered the public?

The coin-operated device holds itself forth to render a weighing service for the public and a fee is charged, which makes the scale distinctly commercial in character. As such it should be under the supervision of the sealer. This position may be supported in the fact that the public seem to attach great importance to weight representations made by the person weigher, having become aware of the fact that the person weighing proposition has outgrown the stage where curiosity to see the wheels go round was the prompting inducement to drop in their coins.

The matter of person weighing has grown out of what may be termed "the great American fad" and to quite a large part of the population of every community is a serious business of following the doctor's orders, or of controlling diet. People using weight indications of the public scale as a criterion of their health may become alarmed if the weights secured are inaccurate and may unwisely take steps for changing their weight. This situation may

become serious in case of people of poor health who may be striving to reduce or increase their weight upon advice of their physician.

George F. Austin, jr., supervisor of the department at Detroit, Mich., expressed himself that it certainly was the duty of all weights and measures departments to have supervision over and test and inspect both for type and accuracy the person-weighing scales, adding that there was necessity for prompt action for rigid supervision of these devices for the person-weigher situation had been a thorn in the side of weights and measures departments long enough. He hoped that the conference this year would adopt tentative specifications and tolerances covering these devices, with final adoption one year hence.

As to what tolerance should be allowed in making tests on this class of scales Mr. Austin states that considering the purpose for which they are principally used and the manner in which they are found placed to serve the public (such as in various locations inside of buildings, in partly protected entrances, and in front of buildings with little or no protection from the elements) that they should be considered a class "B" scale and given slightly larger tolerance than class "A" scale. Considering that people are using them in many instances to watch their weight from a health standpoint, he did not believe a tolerance of 1 per cent should be permitted. While it may seem rather drastic to insist on a tolerance of a fifth of 1 per cent, with a manufacturer's tolerance of one-half of that amount, at the same time there must be considered the huge revenue collected from these scales, which in no small degree indicates that it is economically practical to build a better scale for this purpose and maintain a more satisfactory brand of service than the picture presents at the present time. Mr. Austin believes "that people have been taxed sufficiently by these scale-operating companies for a service which, generally speaking, has amounted to more or less of a petty pilfering racket of no value to the public."

In line with the above from Mr. Austin I would like to quote George Warner, chief inspector of weights and measures for the State of Wisconsin, who is of the opinion there is great need for a code covering such scales and goes on to say that—

These scales do not and can not receive the attention that other classes of scales receive, therefore, such scales should be required to be constructed in such a way that they can not easily be tampered with. They also should be constructed to withstand the action of weather conditions.

This class of scales being operated for hire * * * there is no reason why the devices should not be just as correct as it is possible to get them even though such regulation might tend to increase the price of the machines. Proper regulation would eliminate many of the incorrect types now in use and from an investment standpoint would increase the value and utility of the better type of machines that would be used under proper regulation. If the confidence of the public was restored in the accuracy of these machines, their use would become more general and, therefore, the owners of proper machines would receive higher remuneration for their use.

For the reasons mentioned, Mr. Warner believes that—

Proper regulation which would include proper inspection, testing, approval, or condemning of devices, would be of great benefit to the manufacturers, to the owners of individual units, and to the general public who pay their money expecting to receive correct weight.

In a paper delivered before the Twenty-second National Conference Mr. Roberts, superintendent of the department of the District of Columbia stated, I believe, that a tolerance was permitted in the District of 1 pound for every 100 pounds. It seems to me that the purpose for which these scales are intended and the conditions under which they are used should be carefully considered when the subject of specifications and tolerances is considered. As is well known, most person-weighting scales are located in the most prominent of public places, are used by many different persons, and as a rule receive rough treatment. For these reasons should they not be required to be of the very best type of construction in order that their accuracy may be maintained?

Details of procedure in the supervision of person weighers need not be much different than that required in the consideration of devices used in commercial practice. There could be added requirement of the name and address of the owner or party responsible for its maintenance, this to appear upon a conspicuous part of the device but not to obscure weight-indicating elements from view of the user. There should also appear, preferably on the scale dial, some statement as to the accuracy of the device, such as, "Accuracy of this device guaranteed to be within 1 pound," or statement of similar import. Owners and those responsible at location of devices should be required to have on hand at all times sufficient coins or suitable slugs for use of the inspecting official to enable him to make thorough tests.

In Ohio owners and operators of gasoline-dispensing devices are required to have proper standard tested and sealed measures with which to test these devices each day and before commencing to use a new supply of liquids. For the protection of the public user of person-weighting scales would it not appear justifiable to require the owner or those held responsible at place of location of these scales to have on hand proper tested and sealed weight standards, at least one each of the smallest unit of weight of the device, also unit standard for one-fourth, one-half, three-fourths, and the full capacity of the device? They might then be required to make tests of their devices at specified intervals and keep record of such tests available for the inspector's perusal upon his demand. This may seem unreasonable to some, but if proper safeguards are to be made available to the public this requirement should be equally applicable to person-weighting devices as to weighing and measuring devices used in commercial transactions.

The inquiry and investigation that I have been able to conduct makes it appear to me that in those jurisdictions in which person weighers are never given any official attention by the weights and measures officials the general level of accuracy of these devices is much lower than in those jurisdictions where these scales are supervised and regularly and frequently examined by the weights and measures officials.

While it may be reasonably admitted that the person weigher is of secondary importance when compared with commercial scales, nevertheless it can not be denied that the coin-operated device is a commercial scale in the sense that it charges for a service and that as such it should receive official attention from the sealer of

weights and measures. Not much harm may be done a person who may use an inaccurate person-weighing scale, yet he expects to get his money's worth in knowing his correct weight. It is only through activities of weights and measures officials that the public may be assured of the accuracy of scales. While many types of person weighers now in use seem susceptible to frequent inaccuracies brought about by constant use, and possibly abuse, it does seem reasonable that these devices should be tested at intervals. Each sealer should be given full power to inspect and supervise all person-weighing devices, particularly upon receipt of complaint of irregularities.

The extent of the supervision which the sealer can exercise in a given jurisdiction will depend upon a variety of circumstances, principal among which will be the force at his command and the time which can be devoted to the person weighers. If this supervision can be exercised without a sacrifice of other essential testing activities, then it seems that it should be so exercised.

MOTION TO RECONSIDER ADOPTION OF CODE OF REGULATIONS

Mr. MARONEY. Mr. Chairman, in regard to the adoption of the report of the committee on specifications and tolerances on a code of regulations and to bring it properly before us, I move you, sir, that we reconsider our former action. I trust that the conference will give us an opportunity to discuss it.

(The motion was seconded, the question was taken, and the motion was lost.)

Mr. HOLBROOK. Mr. Chairman, does Mr. Maroney have in mind the action on air releases incorporated in meter systems?

Mr. MARONEY. Yes, sir.

Mr. HOLBROOK. May I say, then, that I have already made arrangements to call together the committee on specifications and tolerances to listen to the statement of some of the manufacturers in that regard and that it may be possible that we can issue a report from that committee representing the results of that conference.

Mr. MARONEY. The only object I had in mind, Mr. Secretary, was that on page 2 of that specification—

The CHAIRMAN. Let us not discuss that, if you please.

Mr. MARONEY. Was the—

The CHAIRMAN. I regret, Mr. Maroney, that you are out of order.

DEMONSTRATION OF PERSON WEIGHERS

SECRETARY'S NOTE.—At this point on the program several manufacturers of person weighers brought before the conference samples of their product and briefly explained them to those in attendance. They also expressed their satisfaction that the conference was about to undertake the regulation of this class of machine and offered to cooperate in the development of a proper code of specifications and tolerances for them.

As has formerly been found to be the case¹ it seems that no good purpose would be subserved in attempting to reproduce here the remarks of the speakers,

¹ See Report of Twenty-third National Conference on Weights and Measures, p. 104, in relation to demonstration of gasoline meters by manufacturers.

since without the machines at hand, their remarks can not be made especially informative. Therefore it has been deemed wise to omit this material from this report. The members of the conference were duly appreciative of the efforts made by the manufacturers exhibiting their products.

The CHAIRMAN. In view of the closeness of the lunch hour, with the consent of the conference we will postpone consideration of the report of the committee on person weighers until this afternoon.

(Thereupon, at 12.55 o'clock p. m., the conference took a recess until 2 o'clock p. m.)

SIXTH SESSION (AFTERNOON OF THURSDAY, JUNE 4, 1931)

The conference reassembled at 2.17 o'clock p. m., H. A. Webster, a member of the executive committee, in the chair.

The ACTING CHAIRMAN. I want to say, first, that the reason for my being in the chair is due to the absence of the vice presidents. I hope you will bear with me during the time that I may preside.

Mr. NEALE. Mr. Chairman, in that talk before lunch on the subject of person weighers I forgot to say something that I think could well be brought to the attention of the committee on specifications and tolerances. Mr. Smith, of Pennsylvania, requires a means whereby a weights and measures official can plug the slot that receives the coin, sealing it up so that no coins can be put in.

The ACTING CHAIRMAN. We are very glad to receive the information.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES ON SPECIFICATIONS, TOLERANCES, AND REGULATIONS FOR PERSON WEIGHERS, PRESENTED BY F. S. HOLBROOK, CHAIRMAN

Mr. Chairman and gentlemen, the majority of you will remember that at the Twenty-second Conference on Weights and Measures, held in 1929, the subject of person weighers appeared for the first time upon a program of this conference in a paper by George M. Roberts, who spoke from the standpoint of an official who was testing person weighers at that time. He set forth the experiences of his department in relation to person weighers and pointed out the necessity for testing them.

Last year the viewpoint of the manufacturers of these machines was given by Charles E. Dartt, president of the Columbia Scale Co. Mr. Dartt enthusiastically recommended testing of all person weighers by officials.

In his paper this morning Mr. Williams gave it as his personal opinion, and quoted the opinions of others, that these devices should be reliable and accurate.

At the twenty-third conference last year the desirability of a code of specifications and tolerances for person-weighing scales was brought up and discussed. The consensus seemed to be that such a code would be desirable, and a motion was passed instructing your committee to prepare such a code.

Your committee, then, has been instructed by the conference to frame a code of specifications and tolerances, and weights and measures officials and manufacturers of the devices have suggested that this code be such a one that a correct scale will be provided for the purpose of person weighing, and furthermore that the scale will be a rugged and reliable one.

Your committee has proceeded accordingly and several days ago placed in your hands specific recommendations for these machines.

It is the recommendation of your committee that in accordance with the usual procedure this code be adopted tentatively only. In this event the code will lie on the table for a year, and ample opportunity will be given for further consideration of the provisions and for a study of the effect which this code would have on the present product. Also opportunity will be afforded for the manufacturers of the machines to consult with officials and advance any suggestions that they may have for its modification. During the year your committee will consider any suggestions submitted and will recommend any amendments that seem necessary and desirable for the consideration of the next conference before final adoption.

Your committee strongly feels that this method of procedure is the one which produces the most satisfactory results, since it minimizes the possibility of unwise or ill-considered action.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
I. L. MILLER,
JOSEPH G. ROGERS,
WILLIAM A. PAYNE,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. HOLBROOK. It is recommended that the code be preceded by a note as follows:

Note.—The following specifications, tolerances, and regulations shall apply to person weighers in those cases in which they are used or to be used commercially—that is, when a charge is made for the weighing service—and such use shall be permitted only when the provisions of this code are complied with. Whenever noncommercial person weighers are inspected and tested by the weights and measures official, it is recommended that these be officially sealed only when they comply with these specifications and tolerances.

Mr. Chairman, I presume that comment may be had upon each one of these specifications as we progress with the reading, in case it is desired.

DEFINITIONS.—A person weigher is a scale of any type which is specifically designed for the weighing of persons. This definition is not to be construed to include scales specifically designed for the weighing of infants and children.

A "beam" person weigher is one in which weight indications are obtained by the manipulation of one or more beam poises.

An "automatic-indicating" person weigher is one in which weights are automatically indicated on a reading face of any type.

A "ticket" person weigher is one in which a representation of each individual weight is automatically made upon a ticket, card, etc., which is automatically delivered to a suitable receptacle on the outside of the scale.

SPECIFICATIONS.—1. A person weigher shall have a capacity of not less than 250 pounds.

Mr. STEINEL. I would suggest making that 300 pounds.

Mr. HOLBROOK. It is felt that if it is desired to make a 250-pound machine, it will be perfectly obvious what its limitations are; if a person weighs over 250 pounds, he will not get on that machine. It seems improbable that a machine with a capacity of less than 300 pounds will be manufactured because the owner might miss a few

pennies, and that contingency will be avoided. We feel that 250 pounds is high enough as a minimum.

Mr. NEALE. Mr. Holbrook, what would happen if you had a 250-pound machine? Would the man weighing more than that get his penny back.

Mr. HOLBROOK. He might lose his penny.

2. A person weigher shall be so designed and constructed that it has a definite and clear zero graduation and gives a definite and clear indication of its zero-balance condition at all times when ready for use. In the case of an automatic-indicating or ticket person weigher the zone throughout which the zero balance condition shall be indicated shall correspond to at least 5 pounds on each side of the zero graduation.

You will recognize that that specification requires what is commonly referred to as the "free zero"; that is, the scale is not locked in position but is free to vibrate at the zero point.

Your committee considers that if a person weigher can get out of balance and remain out of balance without any indication of the out-of-balance condition being given on the face of the scale itself, the probability of having a correct person weigher is very much reduced. It is felt that these scales should show the condition of balance to the user.

3. A person weigher shall be so designed and constructed that it is susceptible of giving weight indications at all points between zero and capacity: Provided, however, That a person weigher may have an interval between zero and some definite weight value throughout which weight values are not given, but in this case the person weigher shall be so designed and constructed that whenever the weight on the platform is such as to fall within this interval, any coin inserted will be returned to the user through automatic delivery to a suitable receptacle on the outside of the person weigher.

If a scale is not graduated on its face in the lower part of its range or if it is not designed to furnish a ticket indication for weights of less than a certain minimum, then this specification requires that when such a load as falls with this nonregistering or nonrecording range is placed upon the platform, the coin which has already been dropped in the scale shall be returned to the person attempting to obtain such a weight from the scale. It is felt that these scales contract to do business with the public and require payment in advance; if a scale does not indicate the weight of a load placed upon the platform then the contract can not be fulfilled, and the coin already deposited should not be retained.

Mr. SWEENEY. Mr. Chairman, this section says: "A person weigher shall be so designed and constructed that it is susceptible of giving weight indications at all points between zero and capacity." Would not the second part of the specification be in conflict with that?

Mr. HOLBROOK. The second part is a proviso modifying the general statement contained in the first section. The fundamental requirement is that a person weigher shall give weight indications at all points; the proviso is to the effect that under certain conditions a person weigher may be so constructed that it will not indicate weights in a certain specified range, but in such case the coin must be returned.

Mr. SWEENEY. Then, Mr. President, I think it is ambiguous as it is. To me it appears rather odd to have a part of the specification demand a certain thing and have the second portion of the section

repeal or amend the first part, and I think there should be introduced a qualifying word. I make a suggestion that it would be a good idea to insert something of that nature.

Mr. HOLBROOK. It occurs to me that the words "provided, however," serve exactly that purpose. My understanding of a proviso is that it limits or modifies the preceding sentence. I think that is true in specification and in laws.

Mr. SWEENEY. I think that the words "or except as provided hereafter," inserted before the qualification of the second part of the section would make the thing clear and avoid conflict.

Mr. HOLBROOK. Then you would substitute "or except as provided hereafter" for "provided, however"?

Mr. SWEENEY. No; I would add these words, not substitute them.

Mr. HOLBROOK. I do not see what is accomplished by that. That seems to repeat without changing the sense. If the specification is not clear I think it should be modified, but I hardly am in a position to make a suggestion because it seems perfectly clear to me and in proper form.

The ACTING CHAIRMAN. Do you call for that as a motion, Mr. Sweeney?

Mr. BAUCOM. If the gentleman desires to put it in as an amendment, I think it would be well to do it and let us vote on it. That will get it before us in proper form and we can vote on it and reject it or approve it.

(The motion to insert the words was made and seconded, the question was taken, and the amendment was lost.)

Mr. CRAWFORD. Mr. Chairman. I would like to ask Mr. Holbrook why the graduations should not start from the zero? There have been times when I have found that business houses were using the scales to weigh freight and express. They might also be used to determine the weight of commodities sold.

Mr. HOLBROOK. Let me say that on some person weighers graduations are omitted between zero and some fixed point, such as 35 or 40 pounds. I do not know why they fail to put those graduations on. The reason may be that the manufacturer considers that the errors are so great in relation to the smallness of the load weighed, that the percentage of error is too great to allow. If the manufacturer desires to omit those graduations it seems to the committee that he has a perfect right to limit the contract which he will make with the public. In other words, if a person-weigher manufacturer does not consider that his device is accurate enough in the first 5, 10, or 15 pounds to be used for a weight of that character, then it is planned by this method to allow him to limit its weighing range provided he does not charge for the attempted weighing of such loads.

Mr. MEREDITH. Mr. Chairman. I have had to do with scales involving the very situation we are discussing now wherein it is definitely stated that the weighing does not commence until a 30-pound load is reached. I think you will find that is the practice.

Mr. HOLBROOK. The next proposed specification reads:

4. The maximum value of the minimum weight graduations on any person weigher shall be 1 pound.

5. A person weigher whose weight indication is changed by an amount greater than one-half the tolerance allowed, when set in any position on a surface making an angle of 5 per cent or approximately 3° with the horizontal, shall be

equipped with a device which will indicate when the person weigher is level, and in no case shall any pendulum operating the person weigher be considered a leveling device. The person weigher shall be rebalanced at zero each time its position is altered during the test contemplated by this specification.

You will recognize that language of the latter specification as being in a number of our codes at the present time. It is of particular importance in the case of a person weigher since this machine is often set upon an inclined ramp leading into a store. They will very frequently be used upon surfaces which are not level. Such scales may normally be moved indoors overnight and set out in some slightly new position the following morning.

6. All devices for adjusting the balance condition or the level of a person weigher shall be of such construction that they are operative or accessible only by the use of some tool or device which is outside of and entirely separate from the device in question, such as a screw driver, wrench, etc., but not an adjusting pin.

You will also recognize that language as being contained in other codes.

Mr. TINKEY. Mr. Chairman, it may be a little off the subject, but I would like to suggest that those specifications apply in every case in our codes, so why repeat them under the separate headings?

Mr. HOLBROOK. Those specifications would have been assembled under the heading "General Specifications" and not repeated elsewhere were it not for the fact that these specifications are not common to all codes. In the case of some scales it is very desirable that the balancing means can be operated without the use of an outside mechanical device. That is true in the case of outdoor platform scales where such conditions as dirt collecting on the platform or a rainstorm wetting a platform require frequent rebalancing. Such scales should be susceptible of being balanced by manual rather than mechanical means. It is therefore necessary to repeat the requirement under each heading where it is applicable.

Mr. GRIFFITH. Mr. Chairman, may I ask Mr. Holbrook whether an adjusting pin, when subject to sealing, would be allowed under the terms of specification No. 6.

Mr. HOLBROOK. I do not understand the question. The reason why an adjusting pin is not ordinarily allowed is that an adjusting pin could be thrust into the hole and left there, in which case the scale would be balanced by manual and not by mechanical means.

Mr. GRIFFITH. If it was sealed in a certain position it would prevent its change except under the supervision of a weights and measures official; why would not that be acceptable?

Mr. HOLBROOK. You would not want to seal the mechanical means by which you balance because in such event each time you wanted to balance a scale it would be necessary to get the sealer, as you could not balance it without breaking the seal. Our laws and regulations require the user of a scale to keep it in balance at all times and to manipulate the balancing means whenever the scale gets out of balance. It is inconceivable that these scales could be manufactured to maintain their balance throughout their natural life.

Mr. GRIFFITH. I think that is quite true, but when a location is once designated the sealer could seal it for that location. Why prevent the sealing of the adjustment pin in such case?

Mr. HOLBROOK. I am afraid we are talking at cross-purposes because I do not get the validity of your comment. My own idea is that scales must be rebalanced from time to time and that rebalancing is required to be performed by the owner of the scale. If you mean that the balancing means should be sealed so that its position could not be changed, I think the position taken is untenable.

Mr. BARNES. Mr. Chairman, I would like to ask Mr. Holbrook if that means that the balancing device must be accessible from the outside of the scale?

Mr. HOLBROOK. No; it does not.

Mr. BARNES. Then a key unlocking the device, making the adjusting mechanism accessible, would comply with that regulation?

Mr. HOLBROOK. Yes; I think it would.

7. A person weigher which is liable to give incorrect results except when special precautions are observed shall have appropriate and explicit instructions conspicuously, clearly, and permanently marked upon it.

For instance, an instruction such as "Stand still while weighing" or something of that sort.

8. A ticket person weigher shall be so designed and constructed that throughout a period when the supply of tickets is exhausted, any coin which is inserted will be returned to the user through automatic delivery to a suitable receptacle on the outside of the person weigher, or the insertion of a coin in the coin slot will automatically be prevented.

This is the idea of fulfillment of the contract again. If the tickets are exhausted, the scale is not in a position to fulfill its contract; in this case the scale should be so constructed either that the coin can not be deposited in the first place, or, if deposited, that it will be returned.

9. A ticket person weigher shall be so designed and constructed that the printing, stamping, or transferring of the weight record on the ticket will not occur until the weighing mechanism has had ample opportunity to come to rest, under normal person-weighing conditions.

In other words, if the type wheel was vibrating while the weight was being stamped obviously the weight stamped would in the majority of cases be incorrect, either too high or too low, according to the figure which happened to be under the stamping device at the time it operated.

Mr. CRAWFORD. Mr. Chairman, when I came to this meeting I had the idea that the ticket weigher would not be given any consideration. I have not seen such machines operated, as we have none in our territory.

The ACTING CHAIRMAN. There are scales of that type in many sections of the country.

Mr. HOLBROOK. Proposed specification No. 10 reads as follows:

10. A ticket person weigher shall be so designed and constructed that it is susceptible of giving a clear, distinct, and definite statement or representation of weight on the weight ticket.

This specification shall be construed to require that the specifications contained in this code and the specifications for automatic-indicating scales, relative to weight indicators, weight graduations, clear intervals between weight graduations, etc., shall apply to the representations of weight made by a ticket person weigher, when this representation is such as to make these requirements applicable. These requirements shall be broadly applied to appropriate portions of the said representations so as to require the same degree of clearness, definiteness, precision of reading, etc., in the case of both ticket and automatic-indicating person weighers.

If there are no manufacturers of person weighers here to explain the ticket weigher I will try briefly to explain its operation. A person drops a coin and a type wheel turns so that it is in proper position to record the weight on the platform; a blank ticket has been placed in the proper position to receive an impression representing this weight. Now a hammer falls or some other stamping device operates through the medium of an inked ribbon or other inking device to impress the representation of the weight on the ticket, which is then dropped through a slot into a receptacle outside the scale. The person weighed carries away with him this statement or representation of his weight. This specification requires that a weight so stamped must be just as clear and distinct and accurate as a weight obtained on an automatic-indicating scale of the conventional type.

Now, very frequently the representation of weight as shown by the ticket will consist of an inked replica of a portion of graduated weight scale with an arrow pointing out the weight in question. The requirement that I have just read provides that the graduated scale and the arrow stamped on the weight ticket shall comply with the same requirements as the dial and indicator of an automatic-indicating scale, so that on the ticket you will get just as good a representation of your weight as you would get from the dial of an ordinary automatic-indicating scale. In order to shorten the code, instead of repeating all those requirements they are simply referred to and you are sent back to the code of automatic-indicating scales in order to obtain the details.

11. When not modified by the requirements of this code the specifications given under the heading "Scales—General specifications," "Platform scales," and "Automatic-indicating scales" shall apply to person weighers in so far as they are applicable.

SENSIBILITY RECIPROCAL (SR).—The maximum SR allowable on beam person weighers shall be the value of two of the maximum graduations on the beam, at the capacity or at any lesser load: Provided, however, That the manufacturers' maximum SR or the maximum SR on all new beam person weighers shall be the value of one of the minimum graduations on the beam, at the capacity or at any lesser load.

That is identical with the requirement for platform scales, contained in our present code, and requires the same sensitiveness in the case of commercial beam scales and commercial beam person weighers.

TOLERANCES.—The tolerances to be allowed in excess or deficiency on beam person weighers shall be those specified under the heading "Platform scales." The tolerances to be allowed in excess or deficiency on automatic-indicating and ticket person weighers shall be those specified under the heading "Large-capacity automatic-indicating scales."

Again, in the tolerances no differentiation is made between commercial scales for general commercial purposes and coin-operated person weighers.

REGULATIONS.—1. A person weigher shall be maintained in level.

2. A ticket person weigher shall be so maintained in use that all statements or representations of weight printed, stamped, or otherwise transferred on or to the weight ticket during operation shall be clear and distinct.

You will recognize that in the specifications there is included a requirement to the effect that the scale as manufactured shall be

susceptible of giving clear and distinct impressions. This is a similar statement concerning the maintenance. As has been suggested the ticket is stamped by such means as an inked ribbon or an inking pad. This specification would require the replacing of the ribbon or the reinking of the pad occasionally so that the proper, clear indication of weight may be had.

3. A person weigher shall be permanently and legibly marked with a statement containing the name and address of the person, firm, or corporation responsible for placing the person weigher in service, in combination with some such words as "Operated by," "Maintained by," etc.: Provided, however, That such statement shall not be required when the person weigher is in service on the premises of such person, firm, or corporation.

Weights and measures officials in testing person weighers have often found that the greatest difficulty was experienced in finding out who was responsible for the person weigher in use. The person weigher may be placed in use without a statement as to its ownership and, while the receipts are doubtless regularly collected, this is done "by some person or persons unknown" as the coroner's jury has it. Unless the weights and measures official is able to communicate with the owner of the person weigher, difficulties are encountered in the enforcement of the specifications and tolerances. Therefore it is proposed that a statement be required upon the person weigher, showing who is responsible for it. If this is done, when the weights and measures official finds one that needs readjustment, or repair, or retirement from service, he can get in touch with the proper party and see that his instructions and recommendations are complied with.

Mr. NEALE. Mr. Chairman, in case a manufacturer of such a scale loans one or places it in use for 10 days with a prospective buyer to see how it pans out in a given location, how would you mark it?

Mr. HOLBROOK. Oh, I would have a cardboard sign printed and attached in some prominent place on the weigher, giving either the name of the scale company or of the person contemplating buying it, so that the sealer would know with whom to communicate in the event that he encounters it.

Mr. AUSTIN. Mr. Chairman, in respect to the question put by Mr. Barnes to Mr. Holbrook as to the accessibility of the balancing means, the locking of the scale was proposed. In my opinion it would be necessary that the sealer have access to that, and that would not be very handy if it were to be locked.

Mr. HOLBROOK. The difficulty lies in the fact that if the balancing means is accessible from the outside of the case, the malicious small boy who is so often criticised in connection with person weighers, and the public in general, will have access to the adjustments, and the scale will never be in balance.

Mr. AUSTIN. What I had in mind was an outside mechanical means for adjusting them. Some scales are so equipped.

Mr. HOLBROOK. That would doubtless not be objectionable. Whether it should be a mandatory requirement, I question. If a sealer finds a scale out of balance and can not balance it, he can but condemn it. As a matter of fact I think ordinarily the weights and measures official is accompanied by the owner of the scale or is furnished with a duplicate key, because sometimes it is necessary

for him to have access to the mechanism. Certainly I do not apprehend that the sealers of weights and measures are going to drop 10 to 20 pennies in the device to obtain the privilege of testing it. In other words, there must be some way by which they can test the device without depositing pennies.

Mr. AUSTIN. I should think it would be well to have something in here covering that point.

Mr. HOLBROOK. I take it that is a point that will be worked out by the weights and measures official in his own territory.

Mr. STEINEL. I dare say we are always provided with slugs from vending-machine companies, and we use those slugs. I think it is very necessary to have some person held responsible, for a dozen people may put in their money, and when they attempt to get it returned they are sent around from one person to another. That third rule would not entirely fix responsibility. Some person must be responsible, otherwise the effectiveness of the rule is nullified. One person should be put in charge.

The ACTING CHAIRMAN. Do you care to suggest an amendment?

Mr. STEINEL. I would move that the last part of that section reading "Provided, however, * * * firm, or corporation" be stricken out.

Mr. HOLBROOK. It seems to us unnecessary, when a scale is on the premises of the owner. In such case the weights and measures official is able to put his finger on the owner right away.

Mr. STEINEL. By the terms of our ordinance the owner's name is required to be on the scale, but it never worked out before; even the inspectors were sent from one person to another. In a railway station there are hundreds of employees, and you would not know where to go.

(The amendment was seconded.)

Mr. GRIFFITH. Mr. Chairman, it seems that the section as proposed to be amended certainly would not imply any hardship. We are going to require the name of the person, firm, or corporation responsible for placing the person weigher in service; it would be a very trifling matter to have it included in all instances. As we know, in very few cases are these owned by the owner of the premises on which they are found. It would relieve the work of weights and measures inspectors to know with whom they are dealing. I particularly refer to the use of these scales in chain stores where they are under the supervision of a clerk, or manager, or a superintendent who is not responsible except to his direct head.

Mr. WARNER. Mr. Chairman, may I make a statement? I think a great many cities throughout the country have ordinances now requiring the name of the operator of the device upon the scale. If we were to adopt the recommendation of the committee as it is, it would work a hardship on those cities, and, as Mr. Griffith stated, it is a very trifling requirement.

(The question was taken, and the motion was lost.)

(A motion was made and seconded that the specifications, tolerances, and regulations as read be adopted, the question was taken, and the motion was agreed to.)

ANNOUNCEMENT CONCERNING THE SEVENTH SESSION

Mr. HOLBROOK. Mr. Chairman, I would like to make a short statement at the present time.

On Friday morning ordinarily our sessions have been poorly attended in comparison with sessions on the other days. It may become necessary to decide whether this should be a 3-day or 4-day conference. Obviously either one would satisfy the Bureau of Standards. If this is going to be continued as a 4-day conference, then it is felt that we should have a good attendance upon the last day. This year, in order to stimulate attendance, we have made the last day's session of very considerable interest and importance, to induce the members of the conference to stay over for that session. One item on the program for tomorrow is Dr. W. S. Frisbie, principal chemist, Food and Drug Administration, United States Department of Agriculture, who will address you upon an important amendment which has been made in the food and drugs act. His remarks will be of the very greatest interest to all the weights and measures officials here assembled and since you have come to Washington for this meeting, I would suggest that you can not afford to miss that particular paper, Net-Content Marking of Packages under Federal Food and Drugs Act.

Other papers of interest and importance are on the program, and there will also be an important report on specifications and tolerances for odometers and on miscellaneous items relative to other codes.

The session will also, on account of an action taken to-day, become more important than it otherwise would be, since the committee on specifications and tolerances is to hold a meeting late this afternoon and may be enabled to bring in a supplementary report on the specification in relation to air-release devices on metering systems, adopted this morning. I can not tell you what the action of the committee will be, because it is, of course, not as yet determined, but there seems to be a feeling that something has been adopted which is not exactly right, and if that proves to be the case everyone will desire to correct it.

Moreover, at the meeting to-morrow morning there will be proposals at hand from several of the hotels in the city and it is probable that the headquarters hotel for next year will be selected. Those of you who are very pleased with the present headquarters will have an opportunity again to vote for the same hotel. Those of you who liked the former headquarters better or who prefer some new proposal will be able to record their preference. As you know there will be held next year the Washington bicentennial celebration, which will result in a great many visitors coming to Washington. Therefore, it will be very advisable for us to select our date now for next year's meeting, so that we can arrange to be properly provided for during the week selected.

Therefore, I want to make a special plea to anyone who is intending to leave to-night to cancel those arrangements and decide to stay over for our session to-morrow morning. If at any time the members of this conference feel that a 3-day conference is long enough and so express themselves, we will hereafter be very pleased indeed to limit the sessions to three days. That question might also be threshed out at to-morrow's meeting.

The ACTING CHAIRMAN. Before taking up the next number on the program, I wish to announce that copies of Mr. Smith's paper, which met with such hearty approval, are available and can be obtained at the desk at the conclusion of the meeting.

WHEEL WEIGHERS ON HIGHWAYS

By L. P. STRONG, *Chief, Division of Weights and Measures,
State of Michigan*

For the past several years the State of Michigan has realized the necessity of a more satisfactory method of determining wheel-load weights of trucks traveling on the State highways. After careful consideration it turned its attention to permanent installations of platform scales, set on separate runways along the highways.

It is obvious that weighing the complete truck, or even one axle of a truck and dividing the weight by the number of wheels, would not give correct results. Wheel loads on a truck, or even on a single axle of a truck, will vary in their weights, according to the manner in which the truck is loaded. To meet the requirements of the State laws, it was found necessary to obtain equipment that would weigh each wheel. Variation in axle spacing of trucks limits the possibility of weighing more than two wheels or one axle at a time. It was therefore decided to use two platform scales, set side by side, at right angles to the line of travel, of such size as would accommodate the widest spread of wheels, and to place these scales close enough together to accommodate narrow gauge trucks or trucks with multiple wheels on one axle. The size of each platform ultimately decided upon was 6 feet 6 inches by 6 feet 6 inches, set so there would be but 10 inches between the two scales giving a weighing spread of 13 feet 10 inches, across the pavement. This is 1 foot 10 inches wider than the allowable width of vehicle traveling on the highways. Each scale carries a type-recording beam of 30-ton capacity, by 10-pound graduations. Both of these beams are set on a single short iron pillar and steel shelf outfit for office fixtures.

General specifications call for a scale of two sections designed for load of 15-ton capacity per quarter or 30-ton per section; require that it shall be framed with structural steel, and carry 6½ by 6½ feet by 6 inches reinforced concrete platform curbed with 6-inch channels; the pit shall have bridged sides and ends.

Since trucks will be traveling in opposite directions it was necessary to design a special poise so that a ticket could be printed on either beam, for either right or left wheel, to accommodate the direction in which the truck was traveling. As there would be a possibility of 7 axles for any truck and trailer outfit which might be using the Michigan highways, spaces for the weights of seven axles, numbered from 1 to 7, are provided on the ticket. (It is generally understood that No. 1 axle is the front of the truck, and the positions number back consecutively through the truck or train of vehicles.) To provide space for these figures and to permit other data to be incorporated in the ticket, a ticket approximately 15 inches long and 3 inches wide was found necessary and the poise had to be constructed so that a ticket of this size could be handled. This was accom-

plished by making the ticket slot continuous through the poise, and a gauge arranged to indicate the position of the ticket for the axle being weighed.

As this was the first attempt to determine wheel-load weights in this manner and as no previous data on the results of such a theory were available, every precaution was taken to obtain satisfactory results. There were several possibilities—of which three were outstanding—that might eliminate the use of such a design for obtaining accurate weights and repeated accuracy.

The possibility of transferring loads from one axle to another by the forward or backward movement of the truck was minimized by constructing the concrete approaches level for a distance of 60 feet on either side of the scale. These approaches were formed without a crown at the longitudinal center. The distance of 60 feet was determined upon as this is the length limit set for vehicles traveling on the highways.

The possibility of a longitudinal thrust from the wheels not on the scales to cause the scale mechanism to bind and not return to normal position, especially when the brakes were applied on the wheels on or off the platforms, was largely overcome by the flexibility of the suspension bearing used in the design of the scale, the weights of the weighing system and platforms combined, and the balancing and coordination of these parts.

The possibility of tipping the small platforms when heavy loads were run over them was overcome by bridging both ends and sides of each scale so that the edges of the platform would not overhang the load bearings and would lie within the rectangle formed by lines connecting the centers of these bearings.

With these obstacles apparently overcome in theory, the State installed a single unit in June, 1930. After the completion of the installation a very rigid test was conducted. Approximately 30 days after the first test was conducted another test was made, applying moving loads and giving rough usage, to determine whether the scales would repeat their accuracy. These tests showed very satisfactory results. The State then determined to adopt this method, and has made further installations, all of which have proved equally satisfactory. At the present time there are five such weigh stations located at strategic points throughout the State of Michigan, and other installations are contemplated in the near future.

(During the presentation of this paper Mr. Strong illustrated by means of lantern slides the installation described.)

The ACTING CHAIRMAN. The next number on the program is a paper entitled, "Gages and Gaging." There is a field of industrial and precision measurement with which the weights and measures official has ordinarily little to do, but with which he should be familiar; I refer to the use of gages of various types. Moreover, the testing of gages, and research relative to gage design and construction, are functions of the gage section of the Bureau of Standards, and the presentation of information in this relation is in line with the policy of including on the conference program each year a paper having to do with the work of one of the sections of the weights and measures division of the bureau.

GAGES AND GAGING

By I. H. FULLMER, *Bureau of Standards*

In common usage the term "gage," as relating to devices for determining dimensions, is made to cover all kinds of dimensional standards and measuring devices. However, in connection with the interchangeable manufacture of machine parts, "gage" has a restricted technical meaning. This word is an example of some deficiencies in terminology, somewhat numerous in our language, by which one word is required to have several meanings.

Moreover, the art of gaging has advanced a long way since the professional "gauger" flourished in this broad land, upon whose determination of the capacity of casks, in gallons, as derived from caliper measurements and use of measuring rods, the profits of certain merchants as well as Government revenues depended.

In the technical sense a gage is a standard of comparison, or even more particularly the term designates standards or measuring devices which permit the correlation of dimensions without yielding numerical values. For example, a gage may be a model of the part to be manufactured, or it may be the counterpart of such a model, against which the parts may be matched as they are made. As an instance, in a certain factory an automobile body was used as a gage for testing the fit of rear fenders. If all fenders made fitted this particular body, and provided that the bodies as they were made were sufficiently alike, then fenders and bodies would go together. In such an operation a knowledge of the dimensions of the gage is unnecessary if it is the only one in use for the purpose, and provided that it does not wear out before the necessity for its use is at an end.

You will recognize at once, however, that duplicates of a gage will ordinarily be necessary, both for replacements and for simultaneous use in the same or other factories, and reproduction of gages is immensely facilitated by accurate knowledge of their dimensions. In practice the reproduction of gages on a large scale is accomplished by making them to specified dimensions within very small tolerances. Hundreds of thousands of gages are in daily use in the manufacture of such mechanisms as automobiles, bolts and nuts, balls and bearings, cutting tools, engines, gears, machinery of many kinds, machine tools, munitions and rifles, oil-field equipment, railroad equipment, typewriters, watches, etc. Accordingly the development or evolution of the designs of gages and of methods of gaging, together with methods of measuring gages, have given rise to a technique in metrology quite different from and greatly advanced beyond that which existed, except to a very limited extent, say 20 years ago. The ultimate resources of the metrologist by way of precision of measurement are called upon for a certain class of work, the measurement of precision gage blocks, where routine measurements to the millionth of an inch are not uncommon. Moreover this technique is coming to have an increasingly wide application in fields other than strictly the manufacture of interchangeable machine parts.

The technical definition of a gage which I have given is, I believe, concise, but because the word as generally used does have several meanings, it will help to clarify our conception of what constitutes a gage to distinguish between dimensional standards, measuring

instruments, and gages, and to note the principal subdivisions under each of these classifications.

A dimensional standard is, of course, as you well know, a specimen or model set up and established by authority as a basis for measurement, as, for example, the national prototype meter No. 27 in the custody of this bureau, or the set of length standards in any manufacturing establishment to which all measurements within the organization are ultimately referred. Dimensional standards may be classified as line standards, contact or end standards, precision screws, optical or light-wave standards, and angle standards.

The means for applying one or more of these standards to a piece of work to obtain a result which may be expressed numerically—that is, to determine a dimension or obtain a measurement—is known as a measuring instrument. The various classes of measuring instruments and the types of dimensional standards may conveniently be considered together in further detail.

As common examples of line standards applied as measuring instruments we have rules, scales, and tapes. In the manufacturing plant they are applied in such instruments as the vernier caliper, vernier height gage, and gear-tooth caliper.

Contact standards are generally, however, the basis of gaging operations. These have various forms, the most important of which are precision gage blocks, which have a commercial accuracy of 2 to 5 or 10 millionths of an inch, in length and parallelism and flatness of surfaces for lengths up to 1 inch, and corresponding accuracy per inch for longer blocks. Their advantages are too numerous to consider in detail at this time, but are derived principally from the fact that their method of manufacture is such that this high degree of accuracy is readily attained commercially, and that individual blocks may be combined to produce any desired dimension within the range of the set.

Other types of contact standards are spherical-end standards, and others of similar shape having flat or cylindrical ends. Also steel balls and cylinders are sometimes used as dimensional standards.

Contact standards are frequently used for setting or checking of the same types of measuring instruments as those to which line standards are applied. On the other hand they are most useful in setting various types of gages to size, and in checking gages, as we shall see later.

The precision screw is applied as a length standard in the micrometer caliper and other types of micrometer, such as the inside micrometer, micrometer depth gage, bench micrometer, and in the head of a universal measuring machine.

Optical or wave-length standards consist in the wave length of light of certain spectrum lines emitted by certain gases, such as helium, cadmium, sodium, krypton, etc. The most common application of such standards is in the determination of length of precision gage blocks, and the instrument for accomplishing this is the interferometer, which takes various forms. By such means measurements are readily made to the millionth of an inch. For this purpose the instrument is used by the manufacturers of such blocks; it is also used by this bureau for certifying the dimensions of about 1,000 such blocks each year.

Time does not permit an explanation in detail, but we invite any who are interested in obtaining further information on this or other methods which I may mention, to visit the gage section in the north-west building.

Angle standards are of secondary importance, as angles may be derived from length measurements. The graduated circle is one form of angle standard, applied in such instruments as the protractor, and the projection lantern for measuring the angle of screw-thread gages. Angle standards are also available in the form of cone points, and of precision gage blocks having short faces inclined to the long edges.

One important means of deriving angles from length standards is the sine bar, which consists of an accurate straightedge to which are attached two hardened and ground plugs of the same diameter, usually spaced exactly 5 or 10 inches apart, and with the line through their centers parallel with the straightedge. The sine bar is always used in conjunction with a plane surface from which the heights of the plugs are measured. The difference in these heights divided by the distance between the centers of the plugs is the sine of the angle which the straightedge makes with the plane surface.

Having briefly considered dimensional standards and measuring instruments, we now come to the third division, gages. From the distinctions which have been made you will see that on occasion a dimensional standard or measuring instrument may be used as a gage, and a gage may occasionally be used as a standard for a dimension, or for a set of dimensions, as such constituting a master, reference, or setting gage; but a gage, with certain rare exceptions, can not be used as a measuring instrument.

Gages may be classified in various ways, but I prefer to consider them under four principal headings; namely, fixed-size gages, indicating gages, progressive gages, and functional gages.

A fixed-size gage represents a specific dimension or set of dimensions. It may be adjustable as to size, but once the adjustment is made it is fixed. Fixed-size gages are commonly used as limit gages; that is, they are used in pairs, one of the pair representing the maximum dimension and the other the minimum; one being designated as the "go" gage because it enters or goes over the work, and the other being designated as the "not go" gage because the work should not assemble with the gage, if the work is correct. Such gages show that the work is somewhere between the limiting dimensions represented by the gages, or that it is outside of such limits. Limit gages are used in manufacturing to a very large extent. Types of fixed-size gages are plain gages (such as, plain plug, ring, and solid snap gages), screw-thread gages (such as, screw-thread limit plug, ring, and adjustable snap gages), profile gages (such as simple contour or receiving gage), and position gages for position of lines, shoulders, or holes, (such as surface gage and shoulder-locating gage).

Indicating gages differ from fixed-size gages in that one of the gaging contacts is movable and actuates an indicator, such as (1) a pointer moving over a scale, (2) a sliding bar the end of which is read with reference to a pair of ruled lines or with reference to a

notched surface, (3) a column of liquid the top of which moves relative to a scale, (4) a light beam and system of mirrors known as an optical lever, (5) a spirit level, or (6) an electrical device. By means of indicating gages the variations of the work from the size to which the gage is set may be measured. An indicating gage is a close approach to a measuring instrument, but it is commonly used merely as a limit gage, or to assort work into various size ranges. It can not be used independently of standards not embodied in the machine, or of setting gages, and hence it is not a measuring instrument.

A progressive or combination gage is a series of gages assembled into one unit and used for inspecting successively a number of independent dimensions on the same part. In its more elaborate forms it may be an automatic gaging machine having a hopper into which parts are fed and from which they emerge assorted as to size. Gaging machines for steel balls have been in use for at least 20 years, but in recent years there has been considerable development of machines for inspecting parts used in telephone equipment and other apparatus.

Thus far we have considered gages for individual parts but it is also frequently necessary to gage an assembled mechanism to determine whether the mating parts function properly; for example, a fixture for testing the running qualities of a pair of mating gears. Such a gage is known as a functional gage.

It may be of interest to you now to consider some of the means available for determining the size of a cylindrical hole, as an example, by way of reviewing the ground which we have covered. We have as measuring instruments the scale and caliper, the vernier caliper, the dial micrometer (applying line standards); the inside micrometer, made in a variety of forms (applying precision screw); gage block combination (applying contact standard); the plain plug limit gage, the telescoping inside gage, pin gage, adjustable limit pin gage (fixed size gages); and a variety of internal indicating gages, including the internal micrometer or adjustable plug gage, the star gage, ring gage comparator, etc.

Similar lists might be compiled for determining external diameters, distances between flat surfaces, center distances, angles, radii, composite dimensions. Other lists might be compiled relative to determining the dimensions of common machine elements such as ball and roller bearings, cams, dovetails, gears, keys and keyways, and screw threads. In addition, there are many more gages designed for a particular purpose, not so readily classified, such as a gage for the lip clearance and other dimensions of a twist drill, a gage for the alignment of an assembled engine piston and connecting rod, or a set of gages for a watch escapement to check the angles on the escape-wheel teeth, position of forks, pallet stones, etc.

In conclusion, as a further example of the application of gaging methods, which should be of particular interest to this audience as the measurement of a lever arm is involved, let me describe to you a gaging apparatus which we made and used here at the bureau to determine a distance on an electric dynamometer used in testing automobile tires. The set-up consists of two dynamometers, one used as a motor to drive the tire and the other as a generator to

absorb the power. The torques of the motor and generator are determined by weighing scales, and the power absorbed by the tire is determined from the difference in the torques. The distance in question was that from the axis of the shaft to the knife-edge upon which torque measurements were made. Access to the shaft of the machine was to be had at the ends, which were of different diameters. Accordingly a rectangular U-shaped steel frame was made up. The sides of the frame had V notches to fit over the exposed ends of the shaft. The cross member of the frame was attached by dowel pins and screws to the side arms. In order that this cross member should be parallel to the axis of the shaft, the distance from the dowel in one arm to the center of the V notch was equal to the corresponding distance in the other. For rigidity the cross member was countersunk in the side arms. Opposite each end of the knife-edge a dial indicator was mounted on a cross member. Mounted upon the knife-edge was a cylinder 2 inches in diameter from which a sector was removed, the angle of which was the same as that of the knife-edge. In order that the sector would have a sharp bottom the cylinder was made of two parts fitted together with screws. Indicator readings upon this cylinder in position were made successively with each indicator.

The entire apparatus was then removed from the dynamometer and the notches of the side bars were fitted over a ground shaft having end diameters corresponding to the diameters of the dynamometer shaft. Combinations of precision gage blocks were inserted between the shaft and the indicators, of such length that the indicator readings previously made upon the cylinder were reproduced. The other measurements necessary were the diameter of the shaft and the diameter of the knife-edge cylinder, obtained by means of micrometer calipers. Thus the distance from the shaft axis to the knife-edge was the length of the gage block combination, plus the radius of the shaft, minus the radius of the knife-edge cylinder. The measurements in our problem were: For the generator, 15.492 inches ± 0.007 and for the motor 15.509 inches ± 0.005 .

Regarding the bureau's functions in connection with the testing of gages I would say just a few words. From what has been said you will see that a very large variety of equipment is required to measure gages to a satisfactory degree of accuracy, and new devices are constantly being developed, in answer to new problems in measurement as they arise. To go into methods of checking gages in detail would be a long story. The bureau tests the dimensional standards and master gages of manufactures and trade associations, but only in exceptional cases undertakes to test or set the gages used in the inspection of product. The manufacturer checks his own inspection and working gages against the master or reference gages which we have certified for him.

(During the presentation of the above paper Mr. Fullmer exhibited many of the devices referred to and also illustrated by means of lantern slides a number of the machines and methods discussed.)

THE ACTING CHAIRMAN. It is gratifying to know that weights and measures departments are still active in improving their facilities for the testing of large-capacity scales, and I want to congratulate every official who has procured efficient apparatus of this

character or who has made plans to this end. At this time brief descriptions of two new outfits will be given, both of these having already been put into service; plans for a third outfit will also be described.

NEW EQUIPMENTS FOR TESTING LARGE-CAPACITY SCALES

PAPER OF I. L. MILLER, COMMISSIONER OF WEIGHTS AND MEASURES,
STATE OF INDIANA

Every inspector of weights and measures, whether State or local, has soon realized that the light testing equipment usually supplied the inspector for testing wagon and auto-truck scales is entirely inadequate. Ideally, of course, the equipment should be such that the scale might be tested to nearly its full capacity. Perhaps such an equipment is practicable for use in cities and counties, provided funds for its construction are available. Since, however, many of the new auto-truck scales are of capacities up to 30 tons it is scarcely practicable, due to road conditions and long hauls, for State departments to provide and maintain testing outfits heavy enough to test such scales with loads even approaching their full capacities. The increasing number of larger scales makes it the more necessary that larger testing equipments be provided that have been usually found in operation by State departments. With these facts in mind, the Indiana State Department of Weights and Measures endeavored for several years to obtain funds for the construction of an equipment of much larger capacity than had been previously provided. The funds were finally obtained and the new equipment placed in service almost a year ago.

The new test car has a gross carrying load of 14,000 pounds when carrying its full complement of weights consisting of ten 500-pound units and twenty 50-pound units. From the results obtained with this new equipment the inability of the small testing outfit to show defects existing in the larger capacity scales is clearly demonstrated.

During the last 6-month period 323 auto-truck scales and 121 wagon scales have been tested. Eighty-eight of the 323 auto-truck scales were found in error by amounts greater than permitted by the tolerances. Twelve of the condemned scales showed a plus error with a load of 3,000 pounds. When the load was increased to 12,400 pounds the error became minus. Likewise 28 of the condemned scales showed a minus error with a 3,000-pound load, but a plus error when the load was increased to 12,400 pounds.

Sixty-eight of the 121 wagon scales were condemned. Of the 68 condemned scales, 19 showed a plus error with a light load, but this changed to a minus error when the load was increased to nearly full capacity. On the other hand, 31 of the condemned wagon scales showed a minus error with a light load, which changed to a plus error when the load was increased.

In an Indiana county the local inspector had tested 28 scales and passed them as meeting the tolerance requirements. His total test load had been 3,000 pounds. When the same scales were tested with the State equipment 22 of the 28 scales were condemned because they did not meet the tolerances or because defects were discovered which made repairs and adjustments necessary. The local inspec-

tor had done a good job so far as his equipment would permit, but the inaccuracies and defects found could be discovered only through the use of a much heavier outfit than he possessed.

In this same county the local inspector, upon testing a 22-foot, 6-ton wagon scale, found a deficiency of 30 pounds on a 3,000-pound load. When tested by the State inspector with 3,000 pounds of test weights, practically the same deficiency was found; when the State car, weighing approximately 10,000 pounds was placed on the platform, the deficiency increased to a little more than 500 pounds; when the 3,000 pounds of test weights were added the scale indicated an addition of only 1,620 pounds, showing a deficiency of 1,380 pounds; the total deficiency of the load had now increased to almost 1,900 pounds. This scale with a slight adjustment would have been passed by the local inspector with his light testing equipment.

The facts above detailed indicate clearly that heavy testing equipment is absolutely necessary in the testing of large-capacity scales if more than minor defects are to be discovered.

The Indiana department's new testing equipment is not of as large capacity as is desirable, but is as large as the department can maintain until such time as additional outfits can be provided, making its possible to confine each outfit to a comparatively small portion of the State.

The following brief description of the equipment may be of interest to those who are considering the purchase or construction of new testing outfits.

Chassis.—The chassis is a model 140 Indiana truck chassis with a 6-cylinder engine and with a gross load carrying capacity rated at 14,000 pounds. The wheel base is 138 inches. The tires are 34 by 7 inches, of the balloon type, with dual tires on the rear wheels. The chassis is of sturdy construction, powered with a large, well-constructed engine, geared for four speeds forward, and reverse.

Body.—The truck body and driver's cab was built as a single unit by a local body builder. The over-all length of the body and cab is 202 inches and the over-all height 66 inches measured from the floor. The body proper is 70 inches wide at the belt line and 62 inches wide at floor level. The load-carrying space is 102 inches by 62 inches. The floor is 1-inch oak provided with angle irons properly spaced for carrying the 50 and 500 pound units. Four of the 500-pound units are carried immediately in the rear of the driver's seat arranged side by side across the width of the bed. The remaining six 500-pound units are arranged in a line extending toward the rear of the truck and immediately under the I-beam track. The twenty 50-pound weights are evenly distributed on each side of the six 500-pound units. Tool boxes approximately 54 inches long, 13 inches high, and 15 inches wide are built over each of the rear wheels. The roof is covered with $\frac{3}{8}$ -inch beaded ceiling with oak slats on the side walls spaced 3 inches wide. The entire cab and body is covered with sheet metal. The main body is provided with double doors in the rear and with a single door to the right and immediately in the rear of the driver's seat. The loading floor is supported by five floor braces of 4 by $1\frac{3}{4}$ inch channel iron, weighing 10 pounds to the foot, which are connected with uprights and top channel irons 3 by $11\frac{1}{2}$ inches which serve as a support for the 5-inch I-beam carry-

ing the $\frac{1}{2}$ -ton ball-bearing spur-gear chain fall. All channel irons are wood filled. The 5-inch I-beam is movable and may be extended outside the body about 2 feet. When not in use the beam slides inside the body and is mechanically locked in place. The beam in no way interferes with the closing of the rear doors. The $\frac{1}{2}$ -ton ball-bearing spur-gear chain fall makes it possible for one man to easily load or unload the 500-pound weights.

Weights.—The dimensions of the 500-pound weights as cast were $11\frac{1}{2}$ by $11\frac{1}{2}$ by $15\frac{1}{2}$ inches and each contained an oval cavity 4 by 8 inches for the addition of weight-adjusting material. It was intended that these weights be machined in such manner that the base would be somewhat larger than the top. The dimensions did not permit of such tapering of the weight. Further difficulty was encountered because of the extreme hardness of some of the scrap iron used in casting. This iron was of such hardness that the machining tools were quickly ruined. While it is possible to have castings made that are smooth enough that machining may be dispensed with, it is felt that machined surfaces offer much less chance for wear and for the collection of dirt in rough parts and in sand holes. When weights are to be machined very strict specifications should be made for the casting and the quality of iron to be used. When machining is contemplated, it is suggested that the dimensions above given be changed to provide for a base $11\frac{3}{4}$ by $11\frac{3}{4}$ inches and a top $11\frac{1}{2}$ by $11\frac{1}{2}$ inches with the height remaining at $15\frac{1}{2}$ inches. These dimensions would give a casting weight of somewhat more than 500 pounds. The 500-pound weights now carried with the equipment and here described, have machined surfaces painted with aluminum paint. The form of these weights, which departs somewhat from that generally used heretofore, has proved very satisfactory when used with the hand cart, described below.

Hand cart.—The dimensions for the hand cart given in this paper differ somewhat from those of the cart which was actually constructed. The cart as constructed was designed for use with 1,000-pound weights and is larger and heavier than is necessary for use with 500-pound units. The wheels are standard model T Ford front wheels, complete with tires, tubes, rims, spindles, bearings, nuts, spindle arm, and spindle bolt. The arch is constructed of a single piece of channel steel $\frac{1}{2}$ by 4 inches with 2-inch flanges. The wheel bearings should be firmly bolted to the legs of the arch. The handle is of wood approximately 3 by 3 by 65 inches. The handle brace plate is a single sheet of steel boiler plate $\frac{3}{16}$ inches thick, 14 inches wide, and 20 inches long. The dee handle is made from $\frac{3}{4}$ -inch round steel rod. The hook for picking up the weight should be either of square or rectangular iron so shaped as to engage the handle of the weight firmly in order to prevent side swinging and turning of the weight. In the cart now in use the hubs of the wheels extend outward about 4 inches. These extensions cause much inconvenience. Preferable dimensions would provide for a hub extending only 1 inch from the wheel. This can be accomplished by cutting off the original hub and using a cotter pin to hold the wheel in place. With the cart described, one man can easily move the 500-pound units to the various positions on the scale platform.



FIGURE 2.—General view of large-capacity scale-testing equipment of the State of Indiana

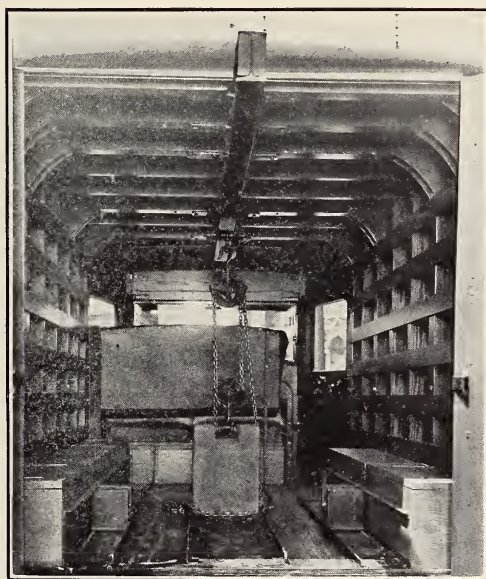


FIGURE 3.—Interior of Indiana State testing equipment

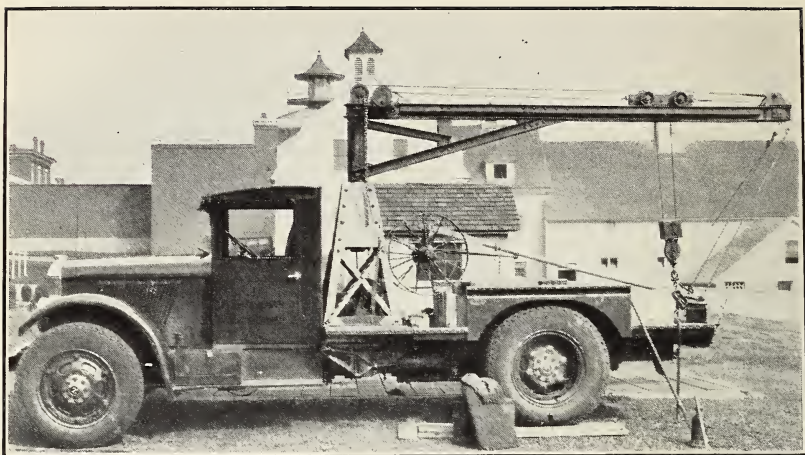


FIGURE 4.—General view of large-capacity scale-testing equipment of Monroe County, N. Y.

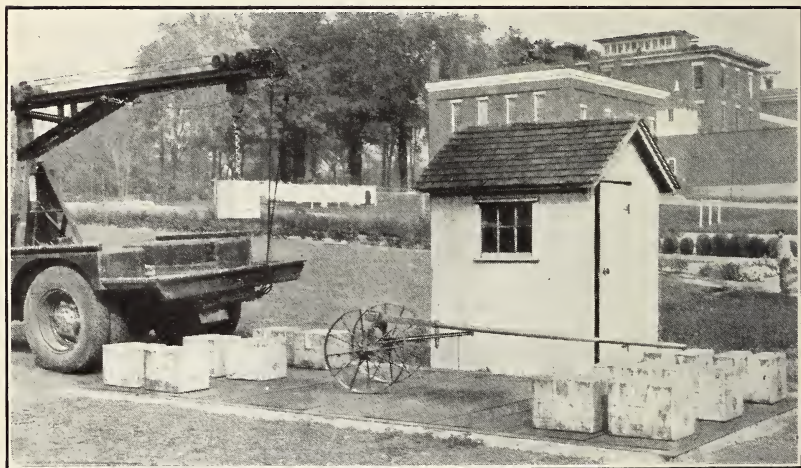


FIGURE 5.—Unloading 1000-pound weights onto scale platform. Monroe County, N. Y., equipment

The equipment now in service has been found very satisfactory. Two men handling the equipment can make the usual tests on wagon or truck scales in about 40 minutes. As already pointed out, it has shown defects in scales which have been constantly overlooked when testing with our small equipments.

We gratefully acknowledge the assistance and advice rendered by W. L. Frank, of the United States Bureau of Animal Industry, in completing plans and specifications for the hand cart and large-unit weights, and of the information and assistance received from the National Bureau of Standards. Without such assistance our task would have been much more difficult and our equipment less efficient.

(Before the presentation of the above paper, Mr. Miller placed in the hands of those in attendance specifications of the equipment as well as cuts showing details, and he also illustrated the equipment by means of lantern slides.)

DISCUSSION OF ABOVE PAPER

Mr. SWEENEY. Mr. Chairman, I would like to ask Mr. Miller a question. I noticed several of those weights were set under the seat. How do you lift them?

Mr. MILLER. Those weights can be taken out with the falls, if you wish to do so. I might say the truck is provided with closing doors at the rear end, and there is a side door which gives access to the space in the rear of the driver's seat.

Mr. C. P. SMITH. Is it not difficult to move those weights to the side?

Mr. MILLER. The inspectors have been able to do it.

Mr. ROGERS. What was the price you paid for your weights per unit? Is there any material advantage in having the weights painted with aluminum paint?

Mr. MILLER. I do not know the exact cost. The cast iron costs 4 cents a pound, or \$20 for a 500-pound weight, but, as I said, the machining of the weights cost two or three times the cost of the castings. When we received them we painted them with aluminum paint, and we found we could better the process by adding varnish, which gave a much harder surface and one that was much smoother. We find it preserves the weights materially.

Mr. HARRISON. I think perhaps Mr. Rogers and Mr. Miller would like to know, if they do not already know, that the Bureau of Standards is conducting tests in covering test weights. I do not think it would be well to draw conclusions at this time, but a report will doubtless be made by them in due time.

PAPER OF W. A. PAYNE, SEALER OF WEIGHTS AND MEASURES, MONROE COUNTY, N. Y.

Mr. Chairman and members of the conference, I have had in mind for some time trying to procure a larger equipment for the testing of our auto-truck and wagon scales. It was only a very few years ago that I had in our county no large scales of the above-mentioned type. They were nearly all wagon scales of from 4 to 10 tons capacity, and very few of the latter. Now the scales in use are

nearly all of the larger type, 10 to 24 tons capacity, so since I met with you at the conference last year I have been able to show the building commission of the board of supervisors of the county of Monroe the need of a larger testing equipment and they very generously gave me their support for this equipment.

Last September I was able to put in service a complete heavy testing apparatus. I have been in the county service of Monroe County, N. Y., for some 25 years and have done my wagon-scale testing with 20 to 40 fifty-pound weights.

First, I will give you an idea of the truck and weights. The truck is a 5-ton, 6-cylinder type with a piston displacement of 427 cubic inches, 100 horsepower at 2,200 revolutions per minute, 7-bearing crank shaft, force-feed lubrication to main connecting rod and cam-shaft bearings, five forward and two reverse speeds, mounted as a unit with engine. The rear axle is spiral bevel differential drive at center, with track gear and oscillating pinion, double reduction at the wheel, chassis mounted on live axle and below center of wheel. The propeller shaft is $3\frac{1}{4}$ inches in diameter, 3-piece construction. The frame is 11 feet back of cab, made of pressed steel channel, $8\frac{1}{2}$ inches by $3\frac{1}{2}$ inches by $\frac{5}{16}$ inches, reinforced throughout. It has two sets of brakes, operating independently, the service brakes are air operating on all four wheels and the hand brakes contracting on propeller shaft.

The forward springs are 3 inches by 42 inches, and have 12 leaves each, the rear 4 inches by 60 inches, 14 leaves each with 5-leaf helper spring.

The tires are 12-ply heavy-duty balloon, 900 by 24 forward and 975 by 24 dual in the rear, all six tires being equipped with heavy-duty puncture-proof tubes. The capacity of the fuel tank is 27 gallons. Truck has full electrical equipment. The chassis is equipped with a de luxe cab. The platform body is 7 by 11 feet, made of firm tread steel of $\frac{3}{16}$ -inch material, 3-inch side rim all around body, with a square wheel housing over the rear wheels; all joints are electrically welded; no rivets or bolts in the platform body. The truck is equipped with a Mead-Morrison heavy-duty truck winch and crane, complete with 12-foot boom, which swings around the truck in a complete circle. The winch is driven by a flexible power take-off from the transmission, the body is low, only 28 to 30 inches from the ground when loaded.

We have a guaranty in writing that the truck will consistently carry and handle an overload of 75 per cent at all times. Included in this equipment are two heavy side jacks and one 12-ton hydraulic jack which I use in the garage when not removing all of the load. We simply place the two side jacks in a receptacle on either side of the frame and the hydraulic jack at the rear and raise them up so the relief springs are clear and free. We also have a heavy tarpaulin, 9 by 12 feet, which covers the entire body back of the cab.

The weights are made of cast iron, and the 1,000-pound weights are of the approximate dimensions as follows: 15 inches high, 15 inches wide, and $19\frac{1}{2}$ inches long. The 500-pound weights are similar to the 1,000-pound weights with the exception of the dimensions, which are about $12\frac{5}{8}$ inches high, $12\frac{5}{8}$ inches wide, and $12\frac{5}{8}$ inches long.

They all have a lifting handle made of machine steel, about $\frac{3}{4}$ -inch diameter, and cast in place in recess so that weights can be stacked one upon the other. The adjusting cavity is symmetrical about center line with a 2-inch countersunk plug at either end. All the weights are sealed to the accuracy of 1 ounce. The bottom of the weights are slightly recessed in order to have uniform bearing surface around the outer edge. The figures representing the value of the weights are also recessed and do not project.

The cost of the above equipment, truck and crane complete, was \$6,877.06, and I use fourteen 1,000-pound weights and two 500-pound weights, also twenty 50-pound, costing \$738.75. The 12-ton hydraulic jack and the tarpaulin mentioned above cost \$50. I also have a dolly for moving the large weights around on the platform, which cost \$70, making the total cost for the complete equipment \$7,735.81.

The method we use in testing is as follows: First, we place our truck alongside of the scale platform and level it up. We carry some blocking and plank for this purpose as we soon found out that if our truck was not level or nearly so when we went to swing the boom with a 1,000-pound weight to the platform it was not an easy thing to do, but if the truck was level it was a very small effort to swing the boom where you wanted to place the weight on the platform. We observe that the scale platform is free and clear and the scale in balance. On a large scale we place two of the 1,000-pound weights on one end of the scale directly over the bearings, and record the reading of the beam; then we add an additional ton on the other end and record the reading as before. We continue to add so our total is from 12,000 to 16,000 pounds placed upon the platform. If this test is satisfactory, we sometimes dolly the weights off to the side of the scale platform and place our truck upon the scale and record the tare weight—in our case the truck weighs about 14,400 pounds empty. We then hoist the weights back on the truck and observe whether there is an error between the truck weight and the additional known weight of the weights.

I usually carry about 12,000 to 16,000 pounds of weights, which would make our total about 30,000 pounds when all the weights are on the truck. The use of the dolly is invaluable in moving the weights around on the scale platform or on or off the scale as the case may be. I do not generally add the weight of the truck to the test weights unless the scale shows an error at 12,000 to 16,000 pounds. If the scale tests satisfactorily at the above weight I generally seal it, for I believe in most cases if a scale is going to be faulty above this test you will observe it long before you have this amount of test weights on the scale platform. I found more scales in error from this heavy test than I had observed under the old method of testing, but far less than I had expected.

After this test, which we believe is a good one, we leave the scale with the satisfactory feeling that we have done a better job than we have ever been able to do before.

(During the presentation of this paper Mr. Payne illustrated by means of lantern slides the equipment and the method of test described.)

DISCUSSION OF ABOVE PAPER

Mr. CROCKETT. Mr. Chairman, I would like to ask a question. Is that equipment used in rainy weather?

Mr. PAYNE. We use the weights pretty constantly.

Mr. CROCKETT. Is there any difference?

Mr. PAYNE. No; we throw a canvas over them.

REMARKS OF FRANCIS MEREDITH, DIRECTOR OF STANDARDS, STATE OF MASSACHUSETTS

Mr. Chairman and gentlemen, we recognize in Massachusetts, in common with others, the necessity for something in the nature of a large-capacity scale-testing equipment. So, profiting by the experience of others, we started out. We have moved very deliberately and yet certainly in the direction of the obtaining of an apparatus of the kind. I am not prepared to say very much about it at this time for the reason that I have had greater responsibilities that required time and attention. However an appropriation of \$7,000 was secured. Later on the contract was let for the truck and at the present time we know what the chassis and the hoist are like. I have not paid any attention to the matter of weights or the matter of procedure or maintenance or anything of that kind.

I had in mind two fundamental ideas: One was that we should be provided with a truck itself of a weight of 15,000 pounds and the ability to carry 16,000 pounds of 500-pound weights. The other was to eliminate in so far as possible, the element of danger to the personnel, so that in the use of this truck there will be no handling of a boom, no use of a trolley or dolly. With the 120-horsepower engine we have sufficient power to handle the weights with perfect safety. The weights will be swung from the boom, and moved by means of levers. The boom will be moved in a similar fashion and the operator will have no occasion to touch the weights at all. As a matter of fact it is designed that he shall be free and clear from the field of danger.

(Mr. Meredith illustrated the equipment discussed by means of lantern slides.)

DISCUSSION OF ABOVE REMARKS

Mr. MILLER. Mr. Chairman, I am very glad to get this information. It might be interesting for me to state that our completed truck cost only one-half the figures that these gentlemen are mentioning.

Mr. MEREDITH. We are going to have a real truck.

Mr. STRONG. I would like to ask the Major how he will operate his truck in the case of inclosed scales?

Mr. MEREDITH. I have never attempted and do not intend to cross a bridge until I come to it, but I think in all my years of life I have heard the expression, "There is nothing impossible under the sun," and there may be a way by which those weights can be moved onto the scale under cover and we may try to find some way to accomplish it.

Mr. GRIFFITH. Do you provide for a dolly?

Mr. MEREDITH. We will not employ a dolly.



FIGURE 6.—General view of large-capacity scale-testing equipment of the State of Massachusetts

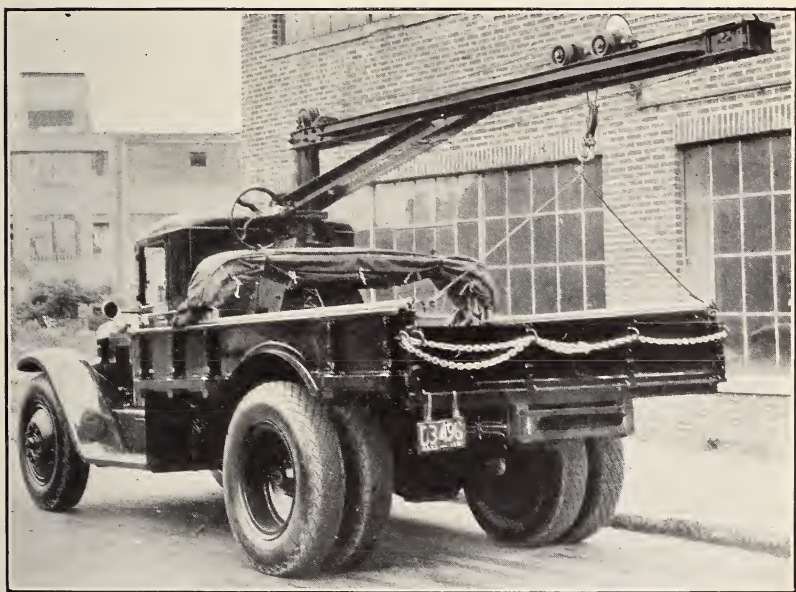


FIGURE 7.—Rear view of Massachusetts State testing equipment

GENERAL CONSIDERATION OF SUBJECTS OF INTEREST AND QUESTIONS BROUGHT UP FOR DISCUSSION BY OFFICIALS

LIQUID MEASURES OF NONSTANDARD SIZES

Mr. GRIFFITH. Mr. Chairman, under this subject, there is one item that I want to bring up. It seems that some manufacturers of liquid measures are introducing on the market sizes which are not permissible under the present specifications. I speak particularly of 5, 6, and 7 quart measures which have been found in our jurisdiction, but have not been permitted in use. The reasons offered for their introduction is their facility. Some of the vehicles, of the smaller type, have a crank case capacity of 5 quarts and garage people are insisting on using a 5-quart measure. I thought it might be interesting to have the conference look at some of these that we have confiscated [exhibiting measures]. Under the specifications they are not permissible as you know, but because of the fact that they are in use it would seem that we are not strict enough in our enforcement.

Mr. LEITHAUSER. I would like to give some experiences I have had in Baltimore. In the course of a regular inspection I went into a garage and found a 5-quart measure. I told the operator it was illegal and confiscated it, and took him to the police station to make a charge. I also found that some manufacturer was shipping into our city a measure marked "5-quart liquid container." I would like the conference to put something in the specifications for liquid measures to eliminate that. Can any container having its capacity stamped or marked in it in any way be considered a measure?

The ACTING CHAIRMAN. I am sure we would be glad to hear from Mr. Holbrook.

Mr. HOLBROOK. Well, we have a measure here marked "5-quart liquid container." If that is used in filling a crank case and 5 quarts is charged for, it occurs to me that you could proceed against the man for using as a measure that which purports not to be a measure or for using an illegal measure for determining the quantity of oil delivered. It occurs to me that a man who determines 5 quarts of oil and charges for 5 quarts of oil, by the use of a container which is not a legal measure, could be proceeded against in the majority of the States.

I may say that the committee on specifications and tolerances has been requested at various times to include in the specified sizes allowable 5, 6, and 7 quarts. However, the committee believes that standard measures should be limited to the sizes already specified. To do otherwise is to open an avenue which will extend out of sight in the distance. In times gone by the proposition has been made that we recognize the one-seventh quart measure on the ground that when cream is 35 cents a quart one-seventh of a quart represents 5 cents of liquid. Similarly we might have a one-fifth quart measure on the ground that whenever anything sells for 25 cents a quart one-fifth is worth 5 cents. In that way you might multiply the number of measures to legion with resulting loss of perception of standard sizes in the measures used. To my mind it is extremely dangerous to get away from our binary multiples and binary submultiples of the gallon. The committee on specifications and tolerances after consideration has always refused to recognize these odd sizes which manu-

facturers are attempting to put upon the market. We are now asked for 5, 6, and 7 quart sizes. Suppose a manufacturer brings out an automobile having a crank case capacity of $7\frac{1}{2}$ quarts of oil; then that new size measure would be in line for recognition under precedents that are now being sought.

Mr. TINKEY. Mr. Chairman, I agree heartily with Mr. Holbrook's definition of that. That is the position we took in Ohio. I would like to know, and I believe others would like to know, when is a container a measure. I believe a definition such as that would help our understanding of this question. Now, I was always lead to believe that a container becomes a measure when it delivers a stated quantity of a commodity. If that is not a good definition, I would like to hear about it.

Mr. MEREDITH. In that respect our experience has been this: When there is a persistent assertion that a device is a container, a conveyor, ultimately it meant that there had to be a plain and conspicuous statement on such a device that it was not a measure and that it had to be filled by means of a sealed device. On the whole we are not troubled with that sort of thing any more than we are with 5, 6, and 7 quart measures. They are not recognized as measures and consequently are taboo. They are not sealed.

LUBRICATING-OIL BOTTLE OF IMPROPER TYPE

Mr. ROGERS. Mr. President, there is a certain type of lubricating-oil bottle coming on the market which appears to be contrary to the code. It has a depressed ring near the base obviously placed there for convenience of handling; however, the code requires that the bottle shall be so designed that drainage will not be obstructed. We take the position in New Jersey that that type of bottle is illegal and we do not approve them. The representatives of the oil company know it, so that they do not ship them into New Jersey.

TWO METERS IN ONE HOUSING FOR DISPENSING DIFFERENT GRADES OF GASOLINE

Mr. CROCKETT. Mr. Chairman, there is a subject that I would like to bring up, namely, the subject of twin gasoline dispensing pumps or meters dispensing two grades of gasoline. Several manufacturers have prepared different kinds, some with housing going to the top, some with the housing split in the middle, the upper portion being two separate units, and some with the units separate almost from the base. In the city of Baltimore we made them use the last-mentioned type. Some of the manufacturers have stated that when two kinds of gasoline are dispensed from such double unit it can be made readily discernable by painting the two sections of the pump in different colors, according to those used by the various gas companies. I saw one of these meters in town that is solid all the way to the top. One part is painted orange and the other deep yellow, distinguishing colors it is true but a person who is color blind could not distinguish the two colors. If a person does not watch what he is getting, he may get straight gas when he pays for a premium fuel. We think the conference should consider that and take some action on the design of gasoline meters.

Mr. ROGERS. Is not that a matter of quality rather than quantity? That constitutes a misrepresentation, and any aggrieved party would have a remedy in law.

Mr. CROCKETT. In Baltimore we do as much to protect the consumer as we can, as the buyer is not an expert.

Mr. ROGERS. Does your jurisdiction extend over such matters?

Mr. CROCKETT. Absolutely.

The ACTING CHAIRMAN. The Chair would suggest, in order to dispose of this matter, that you make a motion for the conference to consider and act upon.

Mr. GRIFFITH. Mr. Chairman, I did not quite understand the question.

Mr. ROGERS. It is just a matter concerning quality.

Mr. GRIFFITH. The quality of the liquid is not the primary subject involved—it is the use of an instrument that will allow the perpetration of a fraud. When there are two instruments in one case, one for one kind of gasoline and one for another, the opportunity to perpetrate fraud is so apparent that I think the matter should be given consideration.

Mr. ROGERS. I can readily see how substitution could take place.

The ACTING CHAIRMAN. The Chair is ready to receive any motion concerning this matter.

Mr. STRONG. If there is nothing more to come before the conference this afternoon, I move we adjourn.

(The motion was seconded, the question was taken, and the motion was agreed to.)

(Thereupon, at 5.07 o'clock p. m., the conference adjourned to meet at 9.30 o'clock a. m., June 5, 1931.)

SEVENTH SESSION (MORNING OF FRIDAY, JUNE 5,
1931)

The conference reassembled at 9.35 o'clock a. m. at the Mayflower Hotel, Dr. George K. Burgess, president, in the chair.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES
ON SPECIFICATIONS AND TOLERANCES FOR ODOMETERS, AND
ON MISCELLANEOUS ITEMS RELATIVE TO OTHER CODES,
PRESENTED BY F. S. HOLBROOK, CHAIRMAN

The code of specifications and tolerances for odometers, adopted tentatively last year, has been found to be entirely satisfactory. Therefore, your committee recommends at this time that this code be finally adopted, without amendment, by the present conference.

In relation to miscellaneous items relative to other codes, your committee has to recommend the transfer of certain specifications in our present codes, from the subheading "Specifications" to the new subheading "Regulations," under the appropriate main heading, and the replacement of these by new specifications relating to the same subject matter; and the amendment of certain other requirements by the addition of new material.

Your committee also recommends the final adoption at this time of a specification requiring the indication of an exhaustion of supply in the case of grease-measuring devices. The text of the specification recommended is the same as that which has been carried for several years in a "general note" at the foot of this code suggesting that this requirement might be adopted at some time in the future. In the case of the latter proposal your committee recommends that this be not put into force prior to July 1, 1932, and that it be non-retroactive.

The text of the various modifications now proposed was placed in your hands several days ago.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
I. L. MILLER,
JOSEPH G. ROGERS,
W. A. PAYNE,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. HOLBROOK. I move that we finally adopt the code of specifications and tolerances on odometers, as tentatively adopted last year.

(The motion was seconded, the question was taken, and the motion was agreed to.)

Mr. HOLBROOK. The first of the miscellaneous items recommended is to transfer specification No. 20 under the heading "Liquid-

measuring devices" to the subhead "Regulations," without amendment, and insert in lieu thereof a new specification to be numbered "20" and to read as follows:

20. PISTON DISPLACEMENT.—A defined-stroke liquid-measuring device shall be so designed and constructed that it will have a piston displacement per cycle, of 231 cubic inches per indicated gallon of delivery.

The specification in our code recommended to be transferred and amended is headed "Use of adjustments" and reads as follows:

20. USE OF ADJUSTMENTS.—No adjustment of the delivery of a defined-stroke liquid-measuring device shall be permitted except that intended to produce a piston displacement per cycle, of 231 cubic inches per indicated gallon of delivery. Adjustments of piston displacement to correct for leaks, slippage, excessive length of pipe line, or other defects of the device or of the installation shall not be permitted.

Now, that is obviously a regulation under our definition, because it refers to adjustments in the field. It seems then that that is properly to be transferred to "Regulations." However, a specification in relation to piston displacement for new devices, for the information of the manufacturers, should be included in the code and for that reason the new specification, which is recommended, has been written.

The next recommendation is to transfer specification No. 16 under the heading "Grease-measuring devices" to the subhead "Regulations," without amendment, and insert in lieu thereof a new specification to be numbered "16" and to read as follows:

16. PISTON DISPLACEMENT.—A defined-stroke grease-measuring device shall be so designed and constructed that it will have a piston displacement per cycle, of 28.875 cubic inches per indicated pint of delivery.

The situation in relation to this specification is identical with that just described under the similar specification for liquid-measuring devices.

Mr. SWEENEY. Mr. Chairman, I would like to ask Mr. Holbrook a question. The other evening there was displayed a grease-measuring device in which the complete cycle of the indicator was a pint, but to deliver this it was not only necessary to make a revolution of the handle which operation would bring the indicator part way around the face of the dial but also to reverse the direction of motion of the handle to complete the cycle. I wonder if that would comply with this specification.

Mr. HOLBROOK. You mean you have to crank the handle back to the starting point to obtain full delivery?

Mr. SWEENEY. Starting at zero you make a forward turn, bringing the indicator about three-quarters around the face of the dial, and in completing the stroke you have to reverse on account of the system of gears, working it backward and forward until it reaches the desired point.

Mr. HOLBROOK. I am unfamiliar with that device.

The next recommendation is to amend the code of specifications for grease-measuring devices by adding a new specification to be numbered "20," and to read as follows:

20. INDICATION OF EXHAUSTION OF SUPPLY.—*All grease-measuring devices shall be provided with a device which will make the unit inoperable when the supply of grease or transmission oil has reached a point where the accuracy*

of delivery would be affected, or shall be so constructed as to warn the purchaser and the operator in a conspicuous and distinct manner that the level of the supply is so low as to endanger the accuracy of the measurement.

It is recommended that this specification be not put into force and effect prior to July 1, 1932, and that it shall be nonretroactive.

Now, gentlemen, as you realize, this is an important specification. It has been carried in our code for several years in the form of a note rather than of a specification, the note indicating that at some time in the future the conference might deem it advisable to adopt a specification of this character. It seems to be rather the consensus that this specification is the keystone of the grease-measuring device arch, in that without this specification a full delivery will not and can not at all times be guaranteed to the purchaser. We all know that upon some devices the cranking of the indicator will represent the delivery of grease upon the indicating elements of the pump, although no grease in fact may be delivered if the level of the grease in the device is too low. Therefore, the specification is recommended for adoption at this time.

Formerly a device of the character mentioned in the requirement was almost unknown; later, while not unknown, they were uncommon. Your committee is now informed that there are a large number of devices on the market which comply with this specification and that there are a number of means available by which the specification can be complied with. This being a new specification, under our usual procedure, it would be adopted tentatively and laid on the table for a year, then, if satisfactory, finally adopted to take effect some time after its final adoption.

After mature consideration your committee has decided that this procedure need not be followed in its entirety in this case. This has been carried in a note for several years and the language has apparently been satisfactory to the manufacturers and weights and measures officials. It is considered that this is equivalent to a tentative adoption of the specification, so far as familiarity with the specification is concerned. Therefore, in this case, it is recommended that this specification be finally adopted at this time to take effect approximately one year from date. It is thought necessary to postpone its effect for a year in order to give the manufacturers not having a device at the present time—and of course there are a number of them—an adequate opportunity to work out their devices and incorporate them in their finished product.

Mr. FLAHERTY. Mr. Chairman, I move you that this recommendation of the committee be adopted.

The CHAIRMAN. We have proceeded in the usual way, on the basis that, if there were no objections, a motion would be made at the end. If there is any objection to this, we may vote on this item separately. Is there objection?

Mr. RAGLAND. I object to anything which will give a 12-month extension on this proposition.

Mr. FLAHERTY. The motion is that the item be approved as presented by the committee.

The CHAIRMAN. You may state your objection, Mr. Ragland.

Mr. RAGLAND. Mr. President and gentlemen, I believe you will agree with me that there is no need of giving 12 months more. We

have given 13 months, we have given 6 months, and the footnote there told the manufacturers plainly and explicitly what we expected. To be perfectly frank with you, no objection will be raised if you cut that 12 months off and make it 6 months. Last year you folks misunderstood me. On Tuesday we had a great victory. On Wednesday poor J. Harry Foley made the motion to postpone and I seconded it. I took my little brief case and went out. Somebody said "Rags is mad." As a matter of fact, I had a sick daughter at home and I drove home just as fast as I could. I have never been mad. I love to fight because I am a Welshman. I hope the conference will cut that 12 months out and make it 6. I move we substitute "6" for "12" months.

(The substitute motion was seconded.)

Mr. HOLBROOK. Mr. Chairman, I would like to say a word or two about this. It is suggested that the manufacturers will not object and that this proposition will involve an extension of time of 12 months. I do not believe that the word "extension" is well taken. I do not believe there can be said to be an extension of time when there will not have been a specification to this effect in the code of the conference prior to the time when this shall have been adopted. It is suggested that the manufacturers were duly notified that this specification would become part of the code but I submit that that is not correct. The general note now reads:

GENERAL NOTE.—Device to indicate exhaustion of supply.—The conference goes on record to the effect that it is its opinion that such a device as is mentioned in the following paragraph is a very desirable one, but considers that the time is not yet ripe to recommend its adoption. The conference suggests, however, that at some future time steps may be taken to incorporate the following paragraph in the code of specifications:

"All grease-measuring devices shall be provided with a device which will make the unit inoperable when the supply of grease or transmission oil has reached a point where the accuracy of delivery would be affected, or shall be so constructed as to warn the purchaser and the operator in a conspicuous and and distinct manner that the level of the supply is so low as to endanger the accuracy of the measurement."

Now, to go back a few years, in determining whether this language means that this is a regulation that the conference will adopt, let me say that 10 or 12 years ago¹ a specification similar to this was proposed for liquid-measuring devices. Its enforcement was postponed but the manufacturers were put on notice that something of this sort was desired and that the specification might be enforced in the future. In 1920 the material was put in the form of a general note—almost identical with the one we are considering here—and it was so carried in the specifications for liquid-measuring devices for several years. Finally, instead of being adopted as might have been expected, the note was dropped and the proposed specification is not included in our code, on account of the difficulties of arranging a device which would produce this effect.

This whole question, it seems to me, goes deeper than the question of this particular specification—it is a question of keeping faith by this conference with the manufacturers of devices. We all know

¹ At the Twelfth Conference, held in 1919, see pp. 192–193, Twelfth Annual Conference Report.

that the manufacturers of devices are our very good friends. We all know that cooperation between the manufacturers of devices and the conference will produce results. If we had no cooperation of the manufacturers, while the adoption of specifications would be easy, the putting of them into effect would be an extremely difficult and tedious operation and there would be a great deal of trouble involved in enforcing them.

Now it has been the policy of this conference, over a very long period of years, to allow one year from the date of the final adoption of a specification before the specification is to go into effect. I think that it is transcendently important that, regardless of what the specification is, the conference stick to its precedent in that regard. In that way I think that you will find that the cooperation of the manufacturers will be retained. To adopt any other method, to shorten this period, to appear to be radical in the immediate forcing of a proposition as important as this, would, it seems to the committee, be extremely unfortunate. Therefore, disregarding the particular specification at hand, I will ask you to think in voting on this question, of the importance of maintaining precedent in this regard, a precedent which has always been considered proper by the conference and by the manufacturers, and a precedent which is firmly fixed in the proceedings of this conference.

The importance of the specification is great, but think of this: This conference has existed since 1905 and for the first 23 years of its existence it did not pay any attention to grease-measuring devices at all. Grease-measuring devices were not mentioned. Why, then, should we quibble now about the adoption of a specification either six months or one year hence, when over this long period of time we have considered grease-measuring devices so unimportant that we have not legislated on them before?

MR. RAGLAND. Mr. President, I have the highest regard for Mr. Holbrook. This question of grease-measuring devices is not a small matter. Do you gentlemen know that there was spent in the United States \$30,079,000 in a year for gear grease alone? He speaks about quibbling. I conceded last year; I gave in and agreed to a six months' continuance. Mr. Holbrook is wrong—he is entirely wrong. Mr. Holbrook, do you know there are 14 equipment companies that do not want an extension?

MR. HOLBROOK. I am speaking of the manufacturers who do not have it perfected.

MR. RAGLAND. I was premature once, but I am telling you that there are 14 grease guns that will suit anybody's requirements, and the oil industry is satisfied. The equipment is satisfactory, and I ask you gentlemen one thing: Let us give them 6 months and not 12. The guns are ready and anybody who wants a grease gun can get it. The reason why I agreed with our dear departed friend, J. Harry Foley, was that I realized that great corporations make their annual budgets in January. We are meeting here in June. Let us be fair with everybody and honest with ourselves. Why, they are already complying with this in Pennsylvania, New Jersey, and Richmond. I will take my seat with this one statement—I yielded last year and I am not going to yield this time—we will give them six months, which is sufficient.

The CHAIRMAN. Gentlemen, the question is on Mr. Ragland's substitute motion which provides that the requirement may be put into effect in 6 months rather than 12. I remind you in voting that weights and measures officials only are entitled to vote.

(The question was taken, and the substitute motion was agreed to.)

Mr. HOLBROOK. The next suggestion is to amend specification No. 19 under the heading "Scales—General specifications," reading as follows:

19. Reading edges or indicators of poises shall be sharply defined, and all reading edges shall be parallel to the graduations on the beam.

by changing the period at the end of the specification to a semicolon and adding thereto the following words:

indicators shall reach to the graduations, or if the construction is such that the indicator and the graduations are in the same plane then there shall not be a separation of the ends of the graduations and the end of the indicator of more than 0.04 inch, this distance to be measured along the line of the graduations.

That makes the requirement for poises the same as for the indicator of automatic-indicating scales.

Transfer specification No. 23 under the heading "Scales—General specifications" to the subhead "Regulations," and amend to read as follows:

Wet fish or other wet commodities shall be weighed only on scales the pan or platform of which will properly drain.

and insert in lieu thereof a new specification to be numbered "23" and to read as follows:

23. The pan or platform of a scale intended for the weighing of wet fish or other wet commodities shall be so constructed as to provide for drainage.

Mr. BAUCOM. When you weigh pickles out of the brine you should always have a pan that will drain, and I was wondering if you should put in there "or other wet commodities."

Mr. HOLBROOK. The words "or other wet commodities" are already in the specification.

Mr. BAUCOM. That is all right then.

Mr. HOLBROOK. Amend specification No. 10 under the heading "Counter scales," by adding in line 11 after the words "removable weights" the following:

in the table under the heading "Tolerances," subject, however, to the limitations as to minimum tolerances which shall be allowed:

to make the specification read as follows:

10. All scales shall be so constructed that when a weight whose body has approximately equal diameter and height and which represents one-half of the capacity of the scale is shifted in any direction on the weight plate or on the commodity plate, pan, or scoop to a point one-half the distance between the center and edge of the weight plate or the commodity plate, pan, or scoop, the additional resulting error in the weight indication, due to this cause alone, shall not exceed the tolerance allowed at the load in question given in the column headed "Tolerance on parts requiring employment of removable weights" in the table under the heading "Tolerances," subject, however, to the limitations as to minimum tolerances which shall be allowed: Provided, however, That in this test the edge of the weight shall not be made to project over the edge of the weight plate or the commodity plate, pan, or scoop.

The next suggested amendment relates to the same subject. It is proposed to amend the paragraph headed "Tolerances" under the heading "Counter scales" by adding at the end thereof the following:

The minimum tolerances arrived at by application of the provisos above shall also apply in the shift test.

Let me say there has been a question in the minds of many as to whether minimum tolerances derived by applying the provisos in the introductory material to the tolerance table limited or did not limit the values to be applied in the shift test. In connection with the examination of post-office scales that question has been very prominent in the last year and the specification was not definite in that regard. It is felt by the committee that the proper solution of the question is to have minimum tolerances applied in all cases and the amendments have been so written as to produce this result.

Amend specification No. 3 under the heading "Automatic-indicating scales," reading as follows:

3. There shall be a clear interval between the weight graduations on the dial or reading face and this interval shall in no case be less than 0.04 inch. This interval is to be measured between the adjacent edges of successive graduations representing the smallest subdivision on the dial or reading face, and along the line of travel of the index of the indicator and shall be maintained whether or not the graduations are "staggered" or arranged alternately; that is, when the graduations are staggered the interval shall be construed to be the space from one graduation to the next consecutive graduation extended, if necessary, to intersect the line of measurement. When the graduations are not parallel the interval shall be construed to be the widest separation of the graduations which is included within the travel of the index of the indicator.

by adding at the end thereof the following:

When the graduations are not equally spaced throughout the range of the reading face the interval shall be measured between the graduations most closely spaced.

The specification provides for a minimum space between graduations but it was not stated in the case of nonequal graduations that the measurement should be on the shortest space. That seems to be a reasonable interpretation and matter has been written in to clear it up.

Amend "Definition" under the heading "Computing scales," reading as follows:

A computing scale is a scale which, in addition to indicating the weight, indicates the total price of the amount of commodity weighed, for a series of unit prices.

by adding at the end thereof the following words:

throughout all or a portion of the weighing range of the scale.

When a computing scale has a tare beam or employs removable weights the computing range of the scale is usually less than its total weighing range, yet strictly construing the definition it might be considered as requiring that a computing scale compute the value of every load which can be weighed. The reason these words are recommended to be added is to clear up that slight ambiguity.

The CHAIRMAN. That concludes the report of the committee. The question now before the house is the acceptance of the report of the committee.

(It was moved and seconded that the report of the committee be adopted, the question was taken, and the motion was agreed to.)

SUPPLEMENTARY REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES IN RELATION TO REGULATION NO. 2 FOR LIQUID-MEASURING DEVICES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN

Your committee on specifications and tolerances, finding that there was considerable objection on the part of many manufacturers of meter systems to the final adoption of the second paragraph of Regulation No. 2 in relation to air-release devices on meter systems, have held a meeting at which the protesting manufacturers were heard. At that meeting arguments which seemed to your committee to have merit were advanced, and it was especially emphasized that the proposed conference regulation would be in conflict with the Underwriters' requirements. It was also felt by the manufacturers that the final adoption of the regulation at this time would be unfair to many of them who had not yet been able to develop effective units of the character in question.

In view of the fact that it appears to your committee that the whole matter is of such importance as to warrant further consideration, and in view of the further fact that it is believed that in the meantime the matter can be successfully handled by strictly adhering to the conference tolerances in accepting or rejecting metering systems, your committee now recommends that the adoption of the second paragraph of the regulation in question be considered as tentative only, and that the whole subject be reviewed by the next conference in the light of data collected in the meantime.

Respectfully submitted.

(Signed) F. S. HOLBROOK, *Chairman*,
I. L. MILLER,
JOSEPH G. ROGERS,
W. A. PAYNE,

Committee on Specifications and Tolerances.

(It was moved and seconded that the report of the committee be adopted, the question was taken, and the motion was agreed to.)

FACTORS INVOLVED IN LARGE-CAPACITY WEIGHING

By M. J. J. HARRISON, *General Scale Inspector, Pennsylvania Railroad*

I have been asked to appear before you to-day for the purpose of discussing the subject, Factors Involved in Large-Capacity Weighing, and it has been suggested to me that I might specifically discuss variations between origin and destination weights of carload shipments, especially of coal. The basis for this suggestion appears to have been that retail coal dealers often call on their local weights and measures officers for advice in connection with this subject, and it is represented to me that, due possibly to changes in per-

sonnel, those local weights and measures officers are in some cases not sufficiently well posted on this particular subject to be of material assistance. This checks with my personal experience at State weights and measures meetings, where I have frequently been sought out by one or more of the members in attendance and asked for specific information regarding some phase or other of the general subject of carload weighing.

Before going further with my remarks, I wish it to be clearly understood that I do not appear before you on behalf of the railroads in general or of any specific railroad. I would further say for the purposes of the record that much of the familiarity that I have with my subject is due to my work on a committee set up to investigate the technical side of this question, to which committee I was appointed during March, 1930, as the representative of the American Railway Engineering Association.

As I see the situation which might confront a local weights and measures officer, it would be about as follows: A retail coal dealer has been buying his season's supply of coal in carload lots, and has been paying for it on the basis of shipping weights—the usual trade custom. He has sold this same coal in relatively small lots over his wagon or motor-truck scale until, at the end of the season, he finds either that his yard is cleaned up or that he has practically the same amount of coal on hand as he had the last time he made a check. The dealer takes this opportunity to balance his total sales against his total receipts, and he finds that one of three things has apparently happened. First, he may apparently have come out about even; second, he may apparently have sold more coal than he received; or, third, he may apparently have received more coal than he sold. In the first case there would be no particular point in taking the matter up with the weights and measures officer, and we may therefore assume that the weights and measures officer would not hear of this situation. Still less can I imagine a coal retailer admitting to his local weights and measures officer that he has sold more coal than he received. Therefore we see that the only time the weights and measures officer would hear of the coal dealer's troubles along this line would be when the coal dealer apparently wound up his season with a shortage. It is then that the weights and measures officer may be consulted and, if that weights and measures officer is well posted on the matter, it is possible that he will be of real assistance to everybody concerned.

Obviously, the first thing to be considered is the accuracy of the coal dealer's wagon or motor-truck scale. Of course, if the wagon or motor-truck scale is found to be incorrect, that may be the answer to the whole question. If, however, the scale over which the coal was retailed is in satisfactory weighing condition, and it is known that it has been in that satisfactory condition during all of the time involved, then something else must be looked for. Incidentally, it is necessary to point out to the coal dealer at this time that his wagon or motor-truck scale weights do not necessarily constitute a satisfactory check against track-scale weights. This is a principle which has been so universally accepted that I do not feel like taking up the time of this conference to demonstrate its basic truth. I would, however, like to mention two States which, to my knowledge, by

specific act of legislature or assembly, have established tolerances on retail deliveries of coal. The States are New York and Pennsylvania, and their respective tolerances are 30 pounds per ton (or $1\frac{1}{2}$ per cent) (New York laws, 1922, ch. 48, art. 18, p. 172, sec. 222) and 40 pounds per ton (or approximately 2 per cent) (Penn. Stats., 1920, p. 2089, sec. 21599). If a dealer were consistently to send out loads of coal which varied from true weight by these amounts, it obviously would not be long until the total difference was considerable.

The next thing to be considered is the amount of the dealer's apparent shortage, and it would be well to express this in one of three ways—in pounds per car, in pounds per ton, or in per cent. When this is done, it frequently happens that the resulting figure is so small that the coal dealer immediately realizes that it is negligible, and sees that he has little if any complaint.

It is assumed that, as a matter of good business, the coal dealer has questioned the weight of any car delivered to him where there has been an indication of loss of lading en route. Cases of this kind, where for instance there is a marked depression in the surface of the load, should be taken up with the delivering railroad before any part of the lading is removed from the car.

It is further assumed, also as a matter of good business, that any cases of obvious error in billing have similarly been taken up with the delivering railroad. In this category would fall such cases as, for example, billing prepared for a 70-ton car when, as a matter of fact, the car received by the coal dealer was of only 50-ton capacity.

It is still further assumed that all concerned are satisfied that there have been no thefts from the dealer's yard during the period covered by his check.

These points are mentioned here chiefly as reminders to the weights and measures officer.

If the procedure above indicated is followed, and the coal dealer is still of the opinion that somebody owes him something, then about the only thing left for the weights and measures officer to suggest is that the coal dealer order a car reweighed by the railroad. This service will be performed by the railroad at its nearest convenient weighing point, but there will naturally be a delay in the final delivery of the car. Furthermore, the coal dealer will learn, if he does not already know it, that he may have to pay for this additional service in accordance with the provisions of the railroad company's tariff. It is not within the purview of this discussion to consider the individual tariffs of all the railroads in the United States. However, since almost all of our railroads have embodied in their tariffs the National Code of Rules Governing the Weighing and Reweighing of Carload Freight, specific mention should be made here of those rules.

Briefly, the National Code of Weighing Rules is a set of rules worked out in joint sessions of the weighing committees of the National Industrial Traffic League and the American Railway Association, and approved and adopted by those organizations in May, 1914. Each of the meetings and hearings which led to the formulation of the rules was also attended by an official representative of the Interstate Commerce Commission. The rules were later indorsed

by the Interstate Commerce Commission, and the following statement was issued over the signature of the secretary of the commission on June 9, 1914:

The American Railway Association has adopted the code of rules governing the weighing and reweighing of carload freight reported by its weighing committee, and recommends that it be made generally applicable on interstate traffic. These rules have been considered and approved by the National Industrial Traffic League. The Interstate Commerce Commission, recognizing the great benefits to be derived from uniformity in weighing and reweighing rules, is desirous of lending its influence to the movement. The commission therefore indorses the rules governing the weighing and reweighing of carload freight adopted by the American Railway Association, and recommends that they be made effective on interstate transportation throughout the country.

This action of course is subject to the right and duty of the commission to inquire into the legality or reasonableness of any rule or rules which may be made the subject of complaint.

Pursuant to the above recommendation, and with the encouragement of both the American Railway Association and the National Industrial Traffic League, general adoption of these rules and publication thereof in the tariffs of the railroads of the United States have followed.

The rules contemplate, first, that the charges for transporting freight will be based on the weight obtained at or near point of origin of the shipment. This principle has been approved by the Interstate Commerce Commission (28 I. C. C. 7), and the commission has further indicated that coal should be weighed on track scales located not more than 50 miles from the mine (Opinion 2399). The rules then provide that this point-of-origin weight shall not be set aside as a basis for determining transportation charges except in case of obvious error or unless subsequent weighing discloses a difference in excess of a certain amount. In the case of coal shipments, this amount or tolerance is variously stated in existing tariffs as 1 per cent or $1\frac{1}{2}$ per cent of the weight of the lading, with appropriate minimum. The rules further provide that a stipulated charge will be made for reweighing at the request of consignors or consignees, but go on to say that, if the reweighing discloses a difference in excess of the tolerance between the reweight and the point-of-origin weight, the reweighing charge will be canceled.

Then, in so far as our illustrative coal dealer is concerned, he will find that he will be charged by the railroad for the reweighing of all cars where the difference between the reweight and the original weight does not exceed the tariff tolerance. As to cars where the reweighing does not check the original weight within the tariff tolerance, he will not be charged for the reweighing service.

At this point I want to digress just a little and mention a situation that has sprung up in comparatively recent years. I refer to the formation throughout the country of numerous associations of retail coal dealers, operating under a variety of names—some as traffic associations, some as traffic advisory bureaus, some as service bureaus, etc. Now, I do not want to be understood as belittling in any way the accomplishments of legitimately organized cooperative effort, and I want to say definitely that I believe that some of these associations have been of invaluable service to their members. At the same time, I would remind you that an association of the sort I am talking about is all too frequently organized by some hustling young man for no

better reason than to make a job for himself. It follows, in such cases, that the policies of the association are very largely those of its organizer, whom we now find with the title of executive secretary, or the equivalent, of the organization. Now, it is a fact that some of these gentlemen have definitely and consistently recommended to the members of their organizations the reweighing of all cars of coal received by them. As a hard and fast policy this is, to say the least, very questionable from the standpoint of net value to the consignee. He will have to pay reweighing charges on a certain number of cars, and while, of the remainder, he may be successful in getting his freight bills reduced on some cars, he certainly is apt to have his freight bills increased on others. The net result is more than likely to be that the individual member is out of pocket before he gets through, and this has been found to be exactly the case by two large concerns of which I happen to know. Both of these concerns are receivers of coal in carloads in large quantities. Both concerns consistently reweighed all the coal that they received for a substantial period of time, and both of them found that it did not pay. Consequently, as a matter of sound business judgment, both concerns stopped paying out money for something that was doing them no good, and confined their reweighing orders to those few cars where there was ground for suspecting that part of the lading had been lost en route, or where there was evidence of error in the preparation of the billing.

The recital of the situation just mentioned may appear somewhat extraneous in this discussion, but it has resulted in another situation which is intimately a part of the general problem. What has happened is this. The executive secretary has, as stated, recommended general reweighing of coal to his members. The members have gone ahead in line with that recommendation, and found that it was costing them money. Naturally enough, they have told their executive secretary about it, and possibly criticized him for leading them astray. The executive secretary takes stock of the situation, and sees that if his members did not have to pay so many reweighing charges they would stand a better chance of coming out ahead of the game. Then it occurs to him that the size of the tolerance allowance is what determines whether his individual member is or is not charged for the reweighing service. This leads to the rather brilliant conclusion that if he can contrive in some way to get the tolerance allowance reduced, there will be fewer reweighing charges to be paid and he will be in the good graces of his members again, without having had to admit that his original recommendation was unsound. So up before the Interstate Commerce Commission bobs our executive secretary with a formal complaint to the effect that the tolerance rule, in so far as it applies to his members, is unjust or unreasonable or discriminatory, and the argument is on.

In the most recent case of this kind that I have noted as coming before the commission the complainants have, strangely enough, apparently relied primarily on the reports of the National Bureau of Standards to support their contention. They have argued that the National Code of Weighing Rules was set up in 1914, which is uncontested. They have argued that there has been a great improvement in the mechanical accuracy of track scales in the 17 years that

have elapsed since that time, a fact which, far from being contested, is regarded with more or less pardonable pride by owners of track scales generally, and it seems appropriate at this point to mention that considerably more than half of the track scales in the United States are owned by other than railroads. The complainants have then argued that this improvement in the mechanical accuracy of track scales should be reflected in a drastic reduction in the value of the reweighing tolerances.

The defendants' answer to this argument has been, in effect, that the original tolerance figures applying to differences in indicated weights were never set up on the assumption that shipments would be weighed on incorrect scales (a fact which I personally find easy to believe), and that the facts that the National Bureau of Standards has tested a certain number of track scales in each fiscal year since 1914, and has found, generally speaking, an increasingly large percentage of the scales tested each year to be within its tolerance under test conditions, have nothing whatever to do with the case. The defendants have further argued that the factors which are of the most importance in their effect on the accuracy of a given weight determination are outside of human control, and are entirely separate and apart from mechanical accuracy of track scales. These additional factors will be summarized a little later herein.

Just as a side light, in the case before the commission to which I just referred, complainants asked specifically for a tolerance rule which would operate in this way. When a car was reweighed at destination, and the destination weight was less than the original weight, then the destination weight would be used as the basis for freight charges. If, however, the destination weight was greater than the original weight, then that destination weight would be disregarded and forgotten. A sort of "heads-I-win, tails-you-lose" proposition. This is mentioned here merely to illustrate the attitude of some of these executive secretaries of whom I have spoken.

And now, to get back to my statement to the effect that, when certain things had been done, the local weights and measures officer could do nothing further than suggest that our hypothetical coal dealer order a car reweighed. I would especially caution the weights and measures officer against recommending or even suggesting that the coal dealer order all of his cars reweighed. Should this course be taken by the coal dealer, not only would his cars be delayed, but I am satisfied that his experience would be essentially the same as that of other parties mentioned herein, and that he would find that he was losing money.

Let us consider now the factors which the tolerance allowance of 1 per cent or $1\frac{1}{2}$ per cent covers. Coal, as you all know, is generally exposed to the weather while in transit because of being shipped in open-top cars. This type of equipment is, of course, practically demanded by the coal trade from considerations of business economics. At the same time, the very fact that the coal is exposed to the weather means that it both absorbs and loses moisture while en route, and the moisture contained in the load is obviously always weighed with it. For this reason, the indicated weight of a carload of coal will vary directly with the amount of moisture present in the load. It is perfectly obvious that a load of coal exposed to rain or snow will

soak up moisture, and therefore gain in weight. It is well known that coal will dry out and lose moisture, and therefore weight, when exposed to dry air. What is not so well known is that coal will absorb atmospheric moisture, and therefore gain weight, when it is relatively dry and is exposed to moist air.

I will cite two examples which will tend to show how large the variations in weight due to absorption and loss of moisture may be.

In the first example, 50 newly built cars were loaded with coal and weighed. The loaded cars were then hauled back and forth over the railroad on which they were loaded a total distance of 834 miles, and on the eleventh day after the original weighing they were reweighed on the same scale. During the 11 days, as nearly as could be determined, a total of 1.23 inches of rain fell, about 1 inch of which fell on the seventh day of the period; clear weather prevailed during the last four days of the period; 1.23 inches of water in an area equal to the top opening of the cars used in this test would add more than 2,400 pounds to the weight of each car. However, when the cars were reweighed, it was found that the increase in weight varied from 500 to 1,700 pounds per car, with an average increase per car of 1,254 pounds.

Another lot of cars, this time 10 in number, had passed through a rather heavy rain between the mine and the track scale. The amount of rain falling on these cars is, unfortunately, not a matter of record. These 10 cars were placed in a closed building immediately after having been weighed and stored there for 10 days. At the end of this period water was still dripping from the bottom of the cars, and reweighing showed that some of the cars had lost as much as 3,500 pounds, all of which was necessarily the weight of the water that had run out at the bottom of the cars and evaporated from the surface of the coal.

In addition to variations due to the causes just referred to, it must be kept in mind that the operation of weighing cars in a busy railroad yard is not, nor can it be made a precision operation. I do not mean to infer that weighing is slighted or carelessly performed. It just simply is not a laboratory operation and, furthermore, there is no practicable way of knowing how nearly the indicated weight of a carload shipment agrees with the real weight. The problem is to say what constitutes commercially practical agreement between one indicated weight at point of origin and another indicated weight at destination. And even between "correct" scales, the maximum apparent variation in net weight of the general average carload of American freight may be as much as 0.82 per cent of such net weight. (The term "correct" as used here means "within tolerance under specified test conditions.") This, again, is cited to give you an indication of the values which must be anticipated.

I have previously mentioned that the tariff tolerances applying to differences between two weights of the same car do not exceed 1½ per cent. When this value is considered in comparison with the difference that may occur between two "correct" scales (0.82 per cent) and the variations due to absorption and emission of moisture, which can in no way be humanly controlled, and when it is further considered that no attention has thus far been given to such sources of variation as the zero-load balance of the scale, the balance of the

scale when the car is being weighed, the personal equation of the weigher, the pressure of the wind on the car, and all other matters which are encountered under practical operating conditions, it becomes obvious that the figures 1 per cent and $1\frac{1}{2}$ per cent must have been compromise figures, as indeed they were. That they have worked so well in practice is a tribute to the sagacity and prudence of those gentlemen who evolved them in 1914, and it would be highly unfortunate if they were upset by some ill-considered agitation from purely selfish motives, when they have been demonstrated to be so satisfactory in the vast majority of cases.

THE ITINERANT SCALE MECHANIC

By DEFOREST MCLIN, *Sealer of Weights and Measures, Huntington County, Ind.*

Mr. President and gentlemen of the conference, the purpose for which you and I labor in our calling is to give service to the merchant and to the public, to aid and assist both the seller and the buyer in arriving at a correct measure, to reduce fraud to a minimum, and, if possible, to eradicate it, in short, our mission is to make fair dealing the basis of every transaction involving either weight or measure.

In order that we may accomplish our aims, the instruments of the merchant must be in good condition at all times. One of the greatest obstacles in the path of a city or county sealer, is the scale mechanic who goes from place to place, always tinkering with the very instruments we want and must keep correct, but seldom, if ever correcting even the slightest of faults.

Until other arrangements are made, there is need of the itinerant scale mechanic in the more or less isolated communities, where there are no scale-repair shops maintained and supported by interested scale manufacturers, or individuals, who have chosen this work as their vocation.

To those mechanics who serve the users of scales in an honorable way, and through whose efforts a needed service is established and maintained in the commercial field, it is desired to give worthy praise.

But the man who misrepresents himself as a scale mechanic by carrying with him a few short-test weights and who is a genius in the art of deception, and who is void of any semblance of a conscience, has no place in our economic plan. This paper is intended to aid in stopping the practices of this type of man. Such a man is a menace to the community, the scale industry, and the department of weights and measures, all of whom he chooses to prey upon, for the sole purpose of furthering his own selfish ends.

The itinerant mechanics, as far as I have been able to ascertain from those met with, have had the compulsory training given by scale firms to new salesmen, to enable them to intelligently demonstrate scales and make minor adjustments; or they are men who have been formerly employed by scale companies in factories or repair centers. They may have had some training in setting up new scales, or repairing old ones. They at least, have had the opportunity to observe men skilled in their trade. These men start out, calling themselves scale experts, to defraud an unsuspecting public. Through necessity and

contact with other repairmen they develop their unscrupulous methods.

Often these men introduce themselves as scale inspectors, gain the confidence of the scale owner, and are then permitted to test the scale. Through the use of test weights that are not correct he soon convinces the owner that he is short weighing the public. If the owner of the scale refuses to let him make repairs, he then tells him he has to make a report to the sealer, which will mean that his scale will be condemned. Oftentimes this argument or method of intimidation convinces the merchant, who tells him to proceed with the necessary repairs. There being no necessary repairs, the scale receives a partial cleaning and is put back together. The mechanic collects for his unnecessary services and seeks another victim. Other methods employed by these mechanics to show defects in computing scales are: Hampering the scale's action by impeding the freedom of the rack, throwing the scale out of level, tightening the thrust bearings, placing small articles between the knife-edges and their bearings, and adding weight to the pendulum, or to the platter. Any one of these petty tricks is sufficient to cause the scale to become inaccurate. Through these practices they gain permission to repair the scale.

To further his cause, after he gets the scale torn down, the "mechanic" shows the owner the need of new parts, such as springs and bearings. These he replaces at extremely high prices and by the time the repairing is completed, the cost is greater than it would have been, had the scale been sent in to the manufacturer and completely overhauled, assuming the scale needed mechanical attention in the first place.

Employing the above methods and a confederate, these so-called mechanics are not only in the scale-repair business, but have gone into the rebuilt-scale business also.

After gaining permission to work on the scale, the repairman explains that it is necessary to take the scale to his repair shop, as it needs extensive repairs. He has in his car a rebuilt and refinished scale, which he sets up for the merchant to use, until he returns the repaired scale, but before leaving, makes the owner an offer to sell the set-in scale for a substantial sum and the merchant's scale. He then instructs the merchant to call the sealer and have the scale tested. In this way he can take out a mechanically correct scale, and set his in and be gone when the sealer arrives. Of course the sealer finds the scale correct and it is sealed.

The itinerant's confederate in the next few days, places a new scale on the counter, and offers to take the scale set in by his partner, at a valuation much higher than it was offered to the merchant, thus inflating the value of the worked-over scale. The merchant is inveigled into this scheme, and upon the return of the repairman, the merchant trades scales, paying the difference. He now has a scale 15 years old, while the one he lost he had purchased new a few years ago.

The confederate to-day is able to procure new charts and other parts, which he uses to recondition scales, repairing types that are obsolete, and which have been condemned by the specifications of the State department years ago.

Itinerant scale repairmen of the type under discussion show utter disregard in defrauding innocent people, by misrepresenting themselves, and by infringing on the good name built by reputable manufacturers. They are a menace to the scale industry and to the users of both small and heavy-duty scales as well.

Methods commonly used to show needed repairs on heavy-duty scales are: To add weight to the poise, to obtain a correct balance and then lighten the hanging weights, to tighten or loosen the turn-buckle on the beam rod, or to impede this rod's action by some other method. All of these tricks are perpetrated on the scale owner, oftentimes in his very presence, for the sole purpose of either gaining permission to repair the scale, or gaining admittance to the scale pit. Once having gained admittance to the scale pit, the mechanic is able to move the nose irons and pin pivots in their shackles, in some truck types to shorten or lengthen the saddle bolts in the main levers, or to loosen the extension levers.

After any of these false adjustments mentioned are made, the scale is easily proven inaccurate and oftentimes this is confirmed by the sealer. Thus gaining permission to repair the scale, it is torn out and the knife-edges reground and reinstalled. In this manner the mechanic covers up his methods of deception by removing the trick causes of inaccuracy.

The itinerant seldom sees to it that the pit is properly cleaned and would rather cause a drain to be clogged up than to be free. The condition of the weighbridge and the end sills are never checked. In his mania to grind a knife-edge, cut and defaced bearing surfaces are seldom if ever reground. Here he often neglects a very serious defect, that causes great loss to the scale owner, and usually the itinerant leaves a scale in worse condition than he found it.

These men often repaint parts of the scale, then resell them to the original owner as new replacement parts, in this manner collecting greater fees.

An itinerant, after working on a 6-ton loose-weight scale, told the owner he could make the scale a 12-ton auto-truck scale by selling him a secondhand 12-ton weighbeam. Again preying on the ignorance of the scale owner, this man at the same place impeded the action of a portable scale by placing a wooden block under one of the bearing plates.

The itinerant not only passes himself off as an inspector of weights and measures, but as a special representative of the various scale firms. Going to the extent of making a survey of a selected territory and noting the different makes of scales, they return appearing in "cover alls" with the scale firm's name woven in the garment. The impostor in this way has greater opportunity to defraud and ruin established reputations of reliable scale firms.

Apparently no job is too big or too small for the unscrupulous itinerant scale repairmen. A small even-arm balance, repaired by one of these itinerants, was found upon examination to have had one of its bearings replaced. This bearing was prepared from a $\frac{1}{2}$ -inch die, of the type usually found in crap games, by filing a crude rectangular groove in one side. The die was then placed in a very

poorly constructed tin holder which was in turn crudely soldered to the scale frame. The merchant, satisfied for the time being at least, paid the bill and the repairman went happily on his way to find another victim.

The inspector of weights and measures may unconsciously become a confederate of the unscrupulous scale mechanic. He may be called by the repairman to test the scale, with which he has tampered, in order to have his statements as to the scale confirmed. Generally, however, the itinerant endeavors to avoid the inspector of weights and measures. Instances are reported in which scale owners have refused to pay repair bills until the repairs were pronounced satisfactory by the inspector of weights and measures and the scale sealed. In these cases the itinerant never returns for his money.

As already stated, the scale-repair mechanic holds an important position in our present plan of organization. The scale owner is furnished an invaluable service by the honest mechanic who can examine the scale, diagnose its trouble, and make such repairs as can be made in the field. Such a mechanic can furnish further valuable service if he has a shop in which major repairs can be made at reasonable cost, or who can advise the scale owner how and where he can obtain such service at reasonable prices. The unscrupulous mechanic, however, must be eliminated if scale manufacturers, scale owners, weights and measures departments, and the public are to be fully protected from his nefarious practices. Two plans for obtaining this end suggest themselves—education and legislation. Scale manufacturers can do much in educating scale owners and scale users by instructing them in the proper installation and care of scales and by furnishing efficient service at reasonable cost.

Weights and measures departments and sealers can do much to eliminate the itinerant repairman by acquainting the owners and users of scales with his methods and the damage to the scales and the financial loss that may result. The unscrupulous repairman fears publicity. A few stories of his work in a public press will go far in curtailing his activities.

It is the belief commonly expressed that too many laws already encumber the statute books. Perhaps this may be so. It would seem, however, that a law reasonably regulating the activities of scale-repair mechanics would place no hardship upon honest mechanics but would give needed protection both to them and to all those interested in the maintenance of scales in good repair. Such a law might require the licensing and bonding of scale mechanics after some authorized authority has passed upon their qualifications. Existing weights and measures laws might be amended to require the mechanic to obtain a permit from the State commissioner of weights and measures upon satisfying the commissioner that he is qualified to perform the duties of an expert scale mechanic, and that he is a man morally who will render honest service.

Until satisfactory legislation can be obtained, education must be depended upon to free the scale industry and those who use scales from the parasite that has so long preyed upon them.

DISCUSSION OF ABOVE PAPER

Mr. FOSSETT. In the State of Illinois we tried to get some legislation through in regard to the bonding of scale repairmen, but we did not have any success at all in having it brought up.

NET-CONTENT MARKING OF PACKAGES UNDER FEDERAL FOOD AND DRUGS ACT

By W. S. FRISBIE, *Principal Chemist, Food and Drug Administration, United States Department of Agriculture*

Mr. President and members of the conference, first of all I want to say that the Food and Drug Administration appreciates the opportunity accorded it in presenting briefly our operations under the net-weight amendment because of the fact that we appreciate it is somewhat apart from the work of weights and measures officials who are charged with the standardization of measures and weights. I have attempted to set forth briefly our requirements here, but we do not include all of them. Consequently, if, when I have finished, you have some questions, I will be glad to attempt an answer.

The Federal food and drugs act—signed by President Roosevelt exactly 25 years ago on June 30—in spite of its valuable provisions for public health and financial well being, contained no provision to regulate a most fruitful source of deception. I refer to the absence in the original statute of a clause requiring a statement of quantity of contents on packaged food.

The act, drawn up by the late Dr. Harvey W. Wiley and introduced by Senator Weldon B. Heyburn, of Idaho, was literally forced into enactment by public demand and was passed in spite of the ardent protests of influential members of the food and drug manufacturing trades. A number of recurrent attempts at food and drug regulation in several States had built up in the public mind the realization that unethical, if not downright dangerous, practices on the part of the trade demanded a Federal law. The same period made it possible for unscrupulous business interests to create in Washington one of the most powerful lobbies that ever fought the passage of a law designed to protect the public interest.

The food and drugs act became effective January 1, 1907. It committed the execution of the law to the Bureau of Chemistry of the Department of Agriculture and defined in specific terms the duties of the bureau and of the Secretary of Agriculture with regard to its enforcement. Briefly, it required the Bureau of Chemistry to examine all samples of foods and drugs for the purpose of determining whether they were adulterated or misbranded and it required the Secretary of Agriculture to grant hearings to parties accused of adulterating or misbranding, in order to determine whether the methods of the bureau were in error. The findings of the bureau were to be transmitted to the Department of Justice for judicial action. This procedure is still followed to-day.

The act is intended to be an economic as well as a public health measure. As an economic measure, it protects the honest producer from unfair competition and insures to the consumer a product that

conforms to the statements on its label. As a health measure, it prohibits added poisonous or deleterious ingredients in the case of domestic foods and authorizes the exclusion from importation of foods that may be dangerous to the health of the people of the United States. The law applies to interstate and foreign commerce in all foods and drugs and to imported food and drug products.

It will be noted, then, that the law as originally enacted contained no provision as to statements of net weight or quantity of contents on the labels of packaged food, in spite of the fact that many of the State laws already in force and those enacted in the year 1907 contained such provision. This omission was corrected March 3, 1913, when the so-called net weight act was passed. Briefly stated, this amendment requires that all food in package form shipped in interstate commerce shall be plainly and conspicuously marked to show the quantity of the contents in terms of weight, measure, or of numerical count. The amendment itself was amended by a clause in an appropriation act of July 24, 1919, bringing wrapped meats, such as hams, sides of bacon, and similar meat products, within its provisions. The equitable enforcement of the net-weight amendment requires allowances for reasonable variations and tolerances as well as exemptions for small packages. These tolerances are issued as regulations signed by the three Secretaries—Agriculture, Commerce, and Treasury.

The pertinent provisions with respect to the tolerances under the net-weight amendment are set forth in regulation 26 of the Service and Regulatory Announcements of the Food and Drug Administration which was created by act of Congress in 1927 to carry on the work originally committed to the Bureau of Chemistry. This regulation declares in part that statements shall be made plainly and conspicuously on the outside of the container and that such statements shall not be obscured by legends or designs and shall be clearly legible when viewed, with due consideration to the ordinary circumstances under which it is observed by the prospective purchaser. All statements of content are to be made in terms of the largest unit of the package, unless there is a definite trade custom otherwise. Weight statements are to be made in terms of avoirdupois pounds and ounces; statements of liquid measure in terms of the United States gallon of 231 cubic inches and its customary subdivisions, quarts, pints, and fluid ounces; and statements of dry measure in terms of the United States standard bushel of 2,150.42 cubic inches and its customary subdivisions. There is a further stipulation that articles in barrels may be labeled as to quantity of contents in terms of the United States standard barrel, as fixed by the act of March 4, 1915, which makes the lawful subdivisions as third, half, and three-quarters of a barrel. There is a further proviso that quantity of contents may be declared on the appropriate metric terms. Solids are to be stated in terms of weight and liquids in terms of measure. Viscous or semisolid food may be stated either by weight or measure but the declaration shall inform the consumer as to which basis is employed. In other words, a declaration of 12 ounces avoirdupois, or 12 fluid ounces as the case may be, instead of the ambiguous term, 12 ounces. If a definite consumer acceptance exists as to quantity

of contents in viscous or semisolid foods, the statement shall be made in accordance with such understanding.

Statements of numerical count are permitted only when such statements give accurate or definite information as to quantity of contents in the package; otherwise a weight or measure statement is required.

Tolerances provided in the regulation are general and not specific and they include—

(1) A recognition of the discrepancies which are due exclusively to errors in weighing, measuring, or counting, conducted in accordance with good commercial practice;

(2) Discrepancies which are due exclusively to differences in capacity of bottles which can not be obviated on account of difficulty of manufacturing; and

(3) Discrepancies in weight or measure due exclusively to variations in atmospheric conditions, particularly with respect to moisture.

The first two discrepancies—that is, errors in weight and variations in containers—shall be as often above as below the marked quantity and the reasonableness of discrepancies due to atmospheric conditions must be determined in each individual instance. The exemptions as to net weight markings are packages containing one-half avoirdupois ounce of food or less and packages containing 1 fluid ounce of food or less, and, in the case of count goods, six units or less, unless such package otherwise is required to bear a weight or measure statement.

In spite of the opposition attendant upon the passage of the food and drugs act originally, the department experienced a rather prompt acceptance on the part of the manufacturing industry to comply with the provisions of the net-weight amendment, so much so that only infrequently was it necessary to apply measures to enforce a recognition of these provisions. This situation has prevailed to the present. Lately, however, there is observed a tendency in certain sections of the trade to ignore not only the spirit but the letter of the law which requires a plain and conspicuous statement of quantity of contents. It is extremely rare to find an instance where net-weight statement does not appear on food in package form but not at all unusual to find the statement as to quantity of contents either in faintly legible or small type, not always on the main label, and all too frequently obscured by legends or pictorial designs. In many instances the statement as to net weight is illegible due to a lack of contrasting background. These statements are not to be accepted as an indictment in general terms of the food-manufacturing industry or even of certain industries. The Food and Drug Administration does not believe that these inconspicuous or obscure statements as to net weight are a result of conscious deliberation on the part of the manufacturer but due more likely to carelessness or to a consideration first of all of the arrangement of a label which shall be attractive to the purchaser. The intent of the law, however, is plain and it means that the prospective purchaser shall be enabled readily and understandingly to select food in package form with an accurate knowledge of the quantity in the package. The administration is at the present time considering the advisability of making a public announcement to the manufacturing industry calling attention to the requirement of the act for a plain and informative statement as to quantity of contents in all food in package form.

There is another tendency which has been observed which, while not illegal so far as the Federal food and drugs act is concerned, nevertheless may in some instances contribute to a deception of the purchaser unless he continually obeys the injunction to read and read carefully the label. I refer now to a practice of marketing certain articles of food in what is presumably a standard-size container, 1 pound, for example, but containing actually, and so labeled, 14 or 15 avoirdupois ounces. Similar departures to the same degree are also noted in packages of other so-called standard sizes. For example, a carton of butter containing 14½ or 15 ounces would ordinarily be purchased as a pound carton. That such a practice tends to deceive has been recognized in at least one instance in a State where legislation requires that all cartons of butter shall contain 16 avoirdupois ounces. There is also a tendency on the part of some manufacturers to market liquid commodities in terms of weight, contending that such is a recognized trade practice. While we know that olive oil, for example, is sold in bulk to bottlers on a pound basis, there is ample evidence that the consumer thinks of the olive oil in terms of liquid measure, and consequently a statement on a package of olive oil such as "one-half pound" will not be as informative as its equivalent in terms of quarts or pints. An analogous situation exists in the marketing of sirup. A can of sirup, for example, containing exactly 10 pounds avoirdupois looks like a gallon of sirup and is frequently offered, particularly in the retail markets, by advertisements or otherwise, as a gallon of sirup, when in fact a gallon should contain 11 pounds.

There is at least one other practice which, although by no means general, deserves attention. I refer now to understatement as to quantity of contents. Our attention has been called to understatements on certain commodities, the most conspicuous example of which appears to be in the labeling of bread. A loaf of bread weighing 22 to 23 ounces may bear a label, "Not less than 18 ounces." There would perhaps be no objection on the part of the consumer to being supplied with more food than he expected but it is often a fact that there is another factor involved. There are a number of the States which have enacted so-called standard weight bread laws, specifying usually loaves of 1 pound or 1½ pounds, or even multiples thereof. It is obvious that if a loaf of bread weighing 22 to 23 ounces would compare favorably in size with the standard 24-ounce loaf, it might undersell that loaf and evade the intent of the legislature by an understatement as to quantity of contents if not constituting actually an illegal size loaf.

There is another amendment to the food and drugs act, the most recent one, signed July, 1930, which is of interest to weights and measures officials. This is known as the Mapes amendment or, as it is sometimes termed, "the canners' bill." By the terms of this amendment the Secretary of Agriculture is authorized to declare standards of quality, condition, and fill of container for all canned goods, excepting canned milk and canned meat and meat products. The purpose of the amendment is to segregate canned food into a standard class and a substandard class. The department is empowered to determine which of these commodities fall into the substandard class, which, although still legal under the terms of the act, must bear a special label showing the purchaser that they are classed as substandard. Under the proviso as to fill of container, the Secretary of Agriculture,

on February 16, 1931, announced the position of the department as to the fill of container for all such commodities in the following words: "Canned foods shall be considered as of standard fill if the entire contents occupy 90 per cent or more of the volume of the closed container." While this decision regulates the head space in the cans the general terms of the act take care of the liquid or vehicle in which the fruit or vegetables or other commodities are packed.

We may perhaps be justified in conclusion in attempting to prophesy what may be the future legislation so far as net-weight amendment is concerned. We have seen in the Federal food and drugs act a development from the statute which originally made no requirements whatever as to statement of the quantity of contents to the present time when the most recent amendment authorizes the Secretary of Agriculture to make a requirement as to how much of the package shall be filled regardless of the statement of quantity of contents on the label. A forerunner of this public opinion has been expressed repeatedly in a bill before Congress known as the "Slack-fill bill," which had its inception probably as the result of the practice during the war period of slack filling containers on account of the rapidly advancing cost of food. This bill when first introduced encountered active opposition on the part of the manufacturing industries. According to the department's information at the present time this has been largely withdrawn so that we may perhaps before long see enacted a statute which would make illegal not only the slack filling of any package of food but at the same time rule out of the channels of trade those containers so formed as to deceive the purchaser as to quantity of contents when reliance, as is too frequently the case with the purchasing public, is placed on the appearance of the package itself.

We may perhaps anticipate even a type of legislation embodying the principles advocated by the Department of Commerce in simplifying trade practice, particularly in eliminating superfluous sizes and units. If the size of food containers could be restricted to those representing commonly accepted units such as pints or pounds and to their common multiples or subdivisions, it would prove a boon to the purchasing public and conceivably to the manufacturer. If such legislation is ever considered it will undoubtedly emanate from the trade itself in order to be relieved of the countless unnecessary sizes of food containers entailing wide opportunities for unfair competition.

THE PRESENT STATUS OF STANDARD-WEIGHT BREAD LEGISLATION

By F. S. HOLBROOK, *Bureau of Standards*

In order to obtain a comprehensive viewpoint of the present status of standard-weight bread legislation it seems advisable first to review very briefly one or two of the outstanding cases decided in the past, since these have a bearing on the present status and will help us to understand the present situation.

The first of these cases that will be referred to is that of *Schmidinger v. The City of Chicago*, decided by the Supreme Court of the United States in 1913 (226 U. S. 578). This case upheld the right

of the legislature, or the municipality under legislative authority, to regulate the making and selling of bread in the exercise of the police power. It was held that local legislative authorities, and not the courts, are primarily the judges of the necessities of local situations calling for police regulation, and the courts can only interfere when such regulations arbitrarily exceed a reasonable exercise of authority. Mere inconvenience to merchants conducting a business subject to police regulations does not vitiate the exercise of the power. Finally it was decided that the ordinance of Chicago fixing standard sizes of bread loaves and prohibiting the sale of other sizes was not unconstitutional as depriving those dealing therein of their property without due process of law, or as denying them equal protection of the law, or as interfering with their liberty of contract.

This is a very broad decision and effectively disposes of constitutional objections to the regulation of the sale of bread in so far as the principles underlying the standard-weight method are concerned. In applying it to some of the more recent cases it must be borne in mind that no tolerances were specified in the original Chicago ordinance litigated. This is important since it is upon the rock of numerical tolerances contained in the laws themselves that two good standard-weight bread ships have more recently foundered.

The question of shrinkage has played an important part in some of the recent cases. But the mere fact that bread shrinks and loses in weight after it is baked is not, in and of itself, a vital factor. For the problem of shrinkage was raised on behalf of the bakers in the Schmidinger case; it was pointed out that this was not uniform and depended upon quality and size of the loaf, the atmospheric conditions, and the dryness and temperature of the place where the bread was kept. The court realized that shrinkage might make it inconvenient to bake a standard-weight loaf but disposed of this contention in the words "But inconveniences of this kind do not vitiate the exercise of legislative power."

A significant element in the case which helps to clarify decisions in following cases is the citation by the United States Supreme Court of a statement made by the Supreme Court of Illinois in its decision, to the effect that the ordinance was not intended to limit the weight of a loaf to a standard size, but was passed with a view only to prevent the sale of loaves of bread which were short in weight.

It seems that the Schmidinger case still stands unmodified; later cases in which at first glance contrary conclusions seem to have been reached can be distinguished from and fully harmonized with the reasoning in this case.

The next case which may briefly be alluded to in the development of the subject, is that of *Jay Burns Baking Co. v. Chas. W. Bryan et al.*, also decided by the United States Supreme Court (264 U. S. 504). This case has already been described at some length in a former conference report. (Seventeenth National Conference Report, p. 51.) It need only be said here that the Nebraska law to which the decision referred contained a provision to the effect that loaves of bread should not be in excess of the standard weights by more than a certain allowable amount, namely, 2 ounces per pound. The court held the law unconstitutional on account of this provision. In reference to it the court said that "imposition through short

weights readily could have been dealt with in a direct and effective way," and concluded that the provision that the average weights should not exceed the maximums fixed is not necessary for the protection of purchasers against imposition and fraud by short weights and is not calculated to effect this purpose.

This case conclusively denies the power of the legislature to fix tolerances in excess for the purpose of requiring a loaf to conform to a definite standard size. There can be no question that small tolerances in excess will no longer be countenanced. Certain words in the case, however, suggest that if there were to be fixed an excess tolerance calculated solely to prevent the perpetration of fraud by the baking of such a size that it simulated the next larger size, a different decision might be reached. It is for this reason that large tolerances have been incorporated in the conference recommendations. If it shall be demonstrated by future decisions that tolerances in excess are so far legal, then no one will have cause to quarrel with the decision. For certainly there is no logical reason for excess tolerances other than the prevention of fraud upon the consumer.

In the paper, heretofore mentioned, dealing with the above decision it was strongly urged that tolerances should not be included in the law itself, but that the law, instead, should confine itself to providing power in the enforcing authority to fix tolerances. This recommendation is reiterated and emphasized at the present time.

Following the decision mentioned in which the Nebraska law was found unconstitutional, a new law was passed in that State. Numerical tolerances were again included, these conforming in size to those recommended by this conference; it was provided in this connection that these tolerances should be applicable for "12 hours after baking or delivery to retailer."

Shortly after its passage this new statute was attacked in the courts in injunction proceedings, and arguments similar to those urged against the former law were repeated in the second case. This case is known as *P. F. Peterson Baking Co. et al. v. Arthur Weaver, Governor, et al.*, in the District Court of the United States for the District of Nebraska, Lincoln Division. It was decided in 1930. The new law suffered the same fate as the old; it was declared unconstitutional. It is probably of great significance that although the new excess tolerances fixed were strongly attacked, the decision did not turn on this point. Instead the court took exception to the general provisions of the law, which were believed to make the baker responsible for the weight of his loaves after they had passed out of his possession and, consequently, after he had lost all control over them. The basis of the decision may best be given by quoting the words of the court.

The statute now in question requires the average weight to be below the maximum and above the minimum weight for 12 hours after baking "or delivery to retailer." Under this statute the baker or wholesaler may have kept his loaves of bread within the legal limits of weight at all times until he has sold and delivered the loaves to a retailer, and until his possession and right of control has terminated, and yet be subject to a penalty because the loaves shrink in weight within 12 hours after the retailer has taken possession of the bread.

The evidence shows that evaporation of moisture from the loaves may, and probably will, continue after the bread is in the retailer's hands. It may be exposed in show cases, or in open racks, to drying conditions caused by modes

of heating the retailer's place of business, and it may shrink in weight from exposure to sunlight or currents of air, or from many other causes.

The danger of excessive shrinkage is greater when the bread has been shipped to dealers at some distance from the baker or wholesaler, and has already suffered some loss of weight before it reaches the retailer. The portion of the statute exposing the baker or seller of bread to liability for the payment of a fine, not because of any acts of negligence on his part, but because of the manner in which bread may be kept by the retailer to whom it has been sold, is an essentially arbitrary and unreasonable restriction upon his right to transact business, and is invalid under the provisions of the fourteenth amendment to the Constitution of the United States.

We have no recollection that an objection such as influenced the court in this case has been included in the decision of any other weights and measures case in a court of record. If this case becomes settled law then it is possible that it may be necessary for some of you to adopt a somewhat different procedure than that heretofore used. It would seem that evidence for a prosecution of a baker for short-weight bread must either be collected while the bread is still in his hands and under his control or, if the bread is weighed while in the hands of the retailer, that it must be proved that the shortage is such that it must necessarily have been in violation of law upon its delivery to the retailer. The other alternative is the prosecution of the retailer for the sale of bread not in compliance with law. While this latter method would result in proceedings against a party not primarily responsible, it would probably be almost equally effective as proceedings directly against the baker himself since retailers would not be slow to demand that bread furnished them be such as fully to protect their interests.

It is unfortunate that this case was not appealed so that the decision of a higher court upon the validity of the law could have been obtained. If the Nebraska law was unconstitutional on this ground it is difficult to understand why the original Chicago ordinance upheld in the Schmidinger case was not similarly open to objection. It seems that both enactments are on the same footing in this respect—it may even be said that the Chicago ordinance was the more drastic of the two. The latter ordinance required that the loaves be full weight until such time as the bread shall become "what is commonly known as 'stale bread,' sold as such, provided the seller shall, at the time of sale, expressly state to the buyer that the bread so sold is stale bread." The Nebraska law, as stated above, applied to the bread only through what would ordinarily be a shorter interval, "for a period of 12 hours after baking or delivery to retailer." However, an examination of the record in the Schmidinger case discloses that in this case the objection governing the decision in the Peterson case was not urged.

I have said this case was not appealed. However, the State of Nebraska did not, by this omission, desert the standard-weight principle. Rather the State legislature at its last session adopted still another standard-weight law, this time omitting from the law all numerical tolerances and providing that—

The Secretary of Agriculture shall prescribe reasonable tolerances or variations in excess, but not under the weights mentioned in the preceding section, within which all loaves shall be baked, and also the time for which said weights shall be maintained.

The record demonstrates that Nebraska is unflinchingly committed to the theory of standard-weight bread as well as to the principle of excess tolerances in carrying it into effect. If any and all tolerances in excess are unconstitutional, then the new law may fail as its predecessors have done. If, on the contrary, such excess tolerances are to be permitted as are clearly necessary to prevent the perpetration of fraud through the medium of a loaf so much in excess of its nominal weight that it appears to be a loaf of the next larger legally specified size, but which is, in reality, short of this size, then it seems that this latest law should stand up under whatever assaults may be made upon it.

The recent case in Ohio mentioned by Mr. Tinkey in his State report is known as *Holsum Baking Co. v. Perry L. Green et al.* and was decided in the District Court of the United States for the Northern District of Ohio, Western Division, October 14, 1930. As explained by Mr. Tinkey the Ohio law was found unconstitutional. This law contained the following language in relation to tolerances:

The Secretary of Agriculture shall prescribe such rules and regulations as may be necessary to enforce the preceding section, including reasonable tolerances or variations within which all weights shall be kept: *Provided, however*, That such tolerances or variations shall not exceed 1 ounce per pound over or under the standard unit for single loaves; *Provided, however*, That tolerance permitted in the weighing of 25 or more loaves shall not exceed one-half ounce per pound.

Elsewhere it is provided, "The weights herein specified shall be construed to mean net weights 12 hours after baking."

Here we encounter tolerances in excess, or, as the court referred to them, "maximum surplus tolerances," smaller than those specified in the Nebraska law, litigated in the Burns case, cited above. It is not surprising, then, to find that the court declared this provision of the law unconstitutional. The court said in this connection:

Practically the question is here which was raised and decided by the Supreme Court of the United States in *Burns v. Bryan*. (264 U. S. 504.)

And after quoting from that case:

With this record before us it seems inevitable to hold that the decision * * * should be controllingly applied to the issue here.

It seems clear from the decision that only one point in the Ohio law has been held unconstitutional, namely, the tolerances in excess, and the officials of Ohio can proceed to enforce the present law in all other respects. We understand that Mr. Tinkey in his report suggested that the attorney general of Ohio had reached this same conclusion in a memorandum submitted to the State weights and measures department.

The only other case of interest in this summary is that of *Webben & Zeller Baking Co. v. Ivy L. Miller*, Commissioner of Weights and Measures, et al., now being tried in the District Court of the United States for the Southern District of Indiana, Indianapolis Division. This case, like the others, turns upon the legality of excess tolerances in connection with a standard-weight bread law, the provision of the law reading:

The State commissioner of weights and measures shall adopt and establish by rules such reasonable tolerances or variations within which these weights

of standard loaves shall be kept: *Provided, however,* That such tolerances and variations shall not exceed 1 ounce per pound over and 1 ounce per pound under the standard unit weight.

The case has up to this date only reached the stage where the court has overruled the State's motion to dismiss the bill of complaint. Perhaps in the decision of this case some additional light will be shed upon a somewhat complex subject.

That concludes the recital of facts of interest in connection with standard-weight bread legislation. It remains, in conclusion, to apply these facts to present conference recommendations in relation to bread, to determine whether these actions should be allowed to remain in status quo or whether amendments are indicated.

The conference actions in relation to standard-weight bread are as follows:

Model bread law, and revised section on bread to be substituted for bread section formerly included in model State law on weights and measures, both adopted by the Fourteenth National Conference, 1921. The text of these actions will be found on pages 131 and 132 of the Fourteenth Conference Report.

Proposed tolerances for loaves of bread adopted by the Eighteenth Conference, 1926, the text of which will be found on page 164 of the report of that conference.

The model bread law and the bread section of the general model law fix standard weights for loaves, provide for rules and regulations for enforcement, including "reasonable variations or tolerances in excess or deficiency," exempt from the provisions of the law "stale bread" and certain baked products in small units, and make it unlawful to make or sell other sizes, providing a penalty for violation. The drafts omit all mention of numerical sizes of tolerances. They do not require weight labels on bread loaves.

Applying the principles contained in the cases cited heretofore it seems that the present recommended law is unobjectionable except, possibly, in one particular, namely, that tolerances "in excess," while not enumerated in the law, are provided for by it. As has been pointed out in the foregoing it is not entirely clear whether tolerances in excess are banned in toto or whether such tolerances will be unobjectionable if, by reason of their size, it is demonstrated that overweight, as such, is not being prohibited, but that they are included to prevent the commission of a fraud through the baking or sale of a loaf which will simulate and be mistaken for the loaf of the next larger standard size. We consider it vital for the success of a standard-weight law that excess tolerances on the second basis mentioned, be maintained. After consideration of the Burns case it was decided that the language in that case sufficiently suggested that such excess tolerances might be allowed. More recent cases do not appear to upset this conclusion.

The omission of numerical tolerances and of periods of time within which they are to apply seems to have the effect of rendering inapplicable to the proposed law, the principle laid down in the most recent Nebraska case. (*Peterson v. Weaver, supra.*) This, you will remember, was to the effect that the baker might be penalized for bread which was legal when sold by him but which thereafter, as a result of shrinkage, weighed less than the legal weight.

It would be my conclusion from the above that the present model bread law should be allowed to stand unamended. If the time ever comes when it is clearly enunciated by the courts that no excess tolerances are to be permitted, then—but not until then, in my opinion—should our recommendation be changed accordingly.

The present recommended tolerances stand on the same footing. It will be remembered that these were framed and adopted after the United States Supreme Court decision in the Burns case and naturally were intended to bring the new tolerances within the principles therein laid down. The large excess tolerances allowed are not calculated to prevent the giving of overweight but to prevent the perpetration of fraud. The provision that the bread shall be full weight "at any time up to and including the time of delivery to the retailer in respect to such bread as is sold or to be sold by a baker to such retailer for resale" with an additional allowance for actual shrinkage after that time, seems to be admirably adapted to conform with the most recent Nebraska decision. Therefore, there seems to be no present necessity indicated for a modification of our proposed tolerances.

In conclusion, it may be said that we will doubtless have additional litigation in relation to present laws in the next few years. The court decisions handed down in these cases will probably further delineate the requirements which must be fulfilled by valid legislation. However, we have no occasion to feel discouraged. Details of specific laws may have to be modified to meet constitutional objections but the decisions of the courts conclusively prove that standard-weight bread legislation is intrinsically sound and that this principle can be maintained and enforced by those jurisdictions subscribing to this policy.

DISCUSSION OF ABOVE PAPER

Mr. TINKEY. Mr. Chairman, I would like to make one little correction. The tolerances are provided in the statute instead of by regulation in Ohio.

Mr. HOLBROOK. Not under the law that was decided in the most recent case?

Mr. TINKEY. Yes.

Mr. HOLBROOK. I understand the provision was to the effect that the Secretary had the power to fix tolerances not to exceed 1 ounce per pound over or under the statutory weight.¹

CURRENT ACTIVITIES OF NATIONAL SCALE MEN'S ASSOCIATION

By C. L. RICHARD, *Secretary, National Scale Men's Association*

If that mythical individual, Mr. Average American Citizen, were given an opportunity to attend the sessions of this conference, follow its discussions, and study the many regulatory measures adopted at past conferences, he would surely feel greatly comforted to learn of the numerous safeguards which you gentlemen have provided for the protection of his interests as a purchaser of commodities by weight and measurement. If, in his study of your activities, he were to con-

¹ The provision in question, of the Ohio law, is quoted in the above paper. (See p. 166.)

sider the various requirements stipulated for the design and performance of weighing devices, he might feel some sympathetic interest in the affairs of those whose business it is to provide weighing facilities conforming to those requirements and maintain them within requisite tolerances.

The National Scale Men's Association, an organization which forms a composite representation of the man who must so provide and so maintain the public's weighing facilities, is not in the position of desiring sympathy, but it does desire you to have an understanding of what its purposes are and of what it is doing by way of supporting and supplementing your worthy endeavors. Therefore, before informing you of what the association's current activities comprise, I will state briefly just what the organization is, whom it represents, what its objects are, and why, lately, it has taken independent action in establishing some specifications and standardization codes based upon long study of matters within its particular field of endeavor. The association is not a trade group or commercial organization. It is fundamentally a technical body composed of some 225 men who are prominently engaged in the practical work of providing adequate weighing equipment and correct weighing service in American commerce, transportation, and industry. For reasons which will be cited later the problems which have mainly engaged the attention of the association are those which relate to the weighing of materials in large lots on such installations as railroad track scales, grain-hopper scales, or other forms of large-capacity weighing machines.

The several agencies which are interested in these problems and which find the association an admirable medium for forming desirable contacts and for securing concerted action toward mutually desired ends include the National Bureau of Standards, which is the custodian and distributor of mass standards; the Department of Agriculture, which supervises the weighing of livestock at public stockyards; scale manufacturers, who produce large-capacity weighing devices; railroad operating departments that maintain freight car weighing facilities; grain exchanges or boards of trade, which superintend the weighing of grain cargoes; large industrial plants, whose operations require special weighing machinery; and weight-supervision bureaus which are maintained jointly by the carriers for investigating and adjusting differences regarding weights of freight consignments.

As a general rule, large-capacity scales, such as railroad track scales and grain-hopper scales, are employed in interstate commerce transactions which do not directly concern the general purchasing public. Partly for this reason and partly because testing of such scales requires special expensive apparatus, local weights and measures departments have generally concentrated their attention on other phases of their work. Thus such regulation and supervision as there are over large-capacity scales have been developed largely by the owners of such scales and by the various agencies directly interested. It is through the National Scale Men's Association that the interests previously named have cooperated to improve the quality of the weighing equipment and the efficiency of weighing practices.

By study, research, and investigation of every subject pertinent to the general field the association has developed and disseminated

much information useful to its members. The results of such investigations are presented at annual meetings and published in the official organ, the *Scale Journal*.

Three years ago the association surveyed the scope of its past endeavors and took note of the fact that certain practices in the field were not conducted along lines of uniformity and best efficiency. Moreover, existing specifications for scales did not provide for the needs of a certain class of service. Accordingly, as the only body recognized as being qualified and competent to render authoritative judgment on these matters, the association adopted a policy common to modern technical organizations and began to create its own code of standards for the guidance of the members and for the general welfare of the various agencies it represented.

The projects conceived and already completed with these objects in mind have been reported to you at the two past conferences of your group, and you were kind enough to adopt resolutions indorsing them. To review them, I may say that the first was a code of specifications for the repair of heavy-duty scales, the intent being to establish a standard of practice which should protect scale owners from the faulty workmanship performed by the casual scale-repair man operating without adequate experience or equipment. The second was a code of specifications for railroad track scales suitable for use by minor industries where the volume of traffic weighed did not justify purchase of the expensive track scale specified for railroad yard service. A third project was adoption of a standard test report form for use by various scale-testing organizations which exchange reports. Another work of standardization was preparation and formal adoption of specifications for track scale test-weight cars. Since the last report was made to this conference, the specifications for track scale test-weight cars were slightly revised to conform to certain construction requirements suggested by the car construction committees of the American Railway Association. As revised and adopted, the specifications now constitute the formal definition of what a satisfactory track scale test car should be.

An interesting item of work accomplished this past year was preparation of a report analyzing the wearing properties of lever bearings and knife-edges. This report adopted at the last meeting and published in the *Scale Journal* of March, 1931, forms a distinct and valuable contribution to the literature available on the subject of scale-lever design.

As regards new measures begun by the association, I may inform you that three separate projects have been assigned to committees with the expectation that their completed work will form a basis for new specifications and standards of procedure. Project No. 1 is to prepare a definition of what constitutes a proper test of a railroad-track scale. There is considerable variety of opinion on this subject and it is desirable to establish a uniform and adequate system of test which shall yield the essential information required.

Project No. 2 is to establish a code of rules for the operation and maintenance of track-scale test-weight cars. This will supplement the previously adopted standards for test-car construction and will serve as a guide for scale inspectors as regards methods of weight

control, frequency of calibration, and general details of test-car maintenance.

Project No. 3 contemplates preparation and publication of a glossary or dictionary of scale terms. Confusion and controversy resulting from misuse of terms is expected to be largely eliminated in consequence of this undertaking and a better understanding of scale terminology will certainly result.

In conclusion, you are assured that the National Scale Men's Association is directing all its activities toward the same ends which your group has in mind—the continued advancement of accuracy and efficiency in weighing and weighing equipment. The association appreciates the interest you have shown in its work and offers you its promise of continued cooperation.

REPORT OF COMMITTEE ON UNIFORMITY IN WEIGHTS AND MEASURES REQUIREMENTS¹

Mr. Chairman and members of the conference, we, your committee appointed to consider ways and means for bringing about a more general uniformity in weights and measures regulations and requirements, recommend:

1. That members of the conference continue consideration of the recommendations printed on page 116 of the Report of the Twenty-second National Conference on Weights and Measures.

2. That a committee be continued to further investigate ways and means of bringing about uniformity in weights and measures requirements and regulations, and to take such action as authorized in correspondence by the members of this conference.

(Signed) J. H. MEEK, *Chairman*,
PHILIP T. PILON,
C. P. SMITH,
ALBERT B. SMITH,

Committee on Uniformity in Weights and Measures Requirements.

(A motion was made and seconded that the report be accepted, the question was taken, and the motion was agreed to.)

REPORT OF COMMITTEE ON NOMINATIONS, PRESENTED BY H. S. JARRETT, CHAIRMAN, AND ELECTION OF OFFICERS

We, your committee on nominations, beg leave to submit the following report.

We present the following as officers of the National Conference on Weights and Measures for the ensuing term: S. W. Stratton, honorary president; George K. Burgess, president; Albert B. Smith, first vice president; I. L. Miller, second vice president; F. S. Holbrook, secretary; and George F. Austin, jr., treasurer.

Executive committee: George K. Burgess, Albert B. Smith, I. L. Miller, F. S. Holbrook, George F. Austin, jr., D. P. Kimball, Thomas Flaherty, Edward J. Maroney, George M. Roberts, Howard E. Crawford, W. T. Fossett, P. T. Sullivan, C. V. Fickett, S. T. Griffith, Francis Meredith, S. C. Dinsmore, H. A. Webster, Joseph G. Rogers,

¹In the absence of Mr. Meek, chairman, this report was read to the conference by F. S. Holbrook, secretary.

William A. Payne, William A. Graham, J. C. Tinkey, H. N. Davis, B. W. Ragland, George Warner, and John H. Hennessey.

The CHAIRMAN. I will ask Mr. Jarrett to take the chair.

(Mr. Jarrett, first vice president, took the chair.)

Mr. RAGLAND. Mr. President, I have been placed in many embarrassing positions. I have the highest regard for the committee on nominations. Every separate individual is a personal friend of mine, but unfortunately this conference in all its wisdom has failed to adopt any by-laws or constitution, and therefore it is necessary to resort to parliamentary procedure. I move that we vote on each separate recommendation of the committee.

The ACTING CHAIRMAN. Is there a second to the motion?

Mr. RAGLAND. According to parliamentary proceedings, I do not think a motion needs a second.

(There was no second to the motion.)

(It was moved and seconded that the report of the committee be accepted, the question was taken, and the motion was agreed to.)

(It was moved and seconded that the nominations be closed, and that the secretary be directed to cast the ballot of the conference for the officers and members of the executive committee, as nominated, the question was taken, and the motion was agreed to.)

(Accordingly, the secretary cast the ballot of the conference for the officers and members of the executive committee as nominated by the committee on nominations, and they were declared duly elected.)

(Doctor Burgess assumed the chair.)

The CHAIRMAN. Regarding the question of constitution and by-laws, it is the opinion of your chairman that we get along pretty well as it is, but if it is the desire of the conference to set up a set of rules and regulations to guide its activities, of course that may be done.

REPORT OF COMMITTEE ON RESOLUTIONS, PRESENTED BY C. D. BAUCOM

Mr. Chairman, your committee on resolutions respectfully submit and recommend for adoption the following resolutions:

IN MEMORY OF WILLIAM F. CLUETT

Whereas we have lost from our ranks a beloved coworker, William F. Cluett, and

Whereas in all our associations with Mr. Cluett he has given us an ideal to strive for in our public service, and

Whereas he has done much for the advancement of the honest weights and measures cause in this country: Therefore be it

Resolved, That we, the National Conference on Weights and Measures, assembled at the Bureau of Standards, Washington, D. C., June 2-5, 1931, do hereby draw up this resolution as an expression of our sincere sorrow at his passing; and be it further

Resolved, That this resolution be made a part of the records of this conference, and that the secretary send a copy to Mr. Cluett's family.

IN MEMORY OF A. W. SCHWARTZ

Whereas by the death of A. W. Schwartz, this National Conference on Weights and Measures has lost one of its most valued members, and

Whereas Mr. Schwartz was ever ready with counsel and encouragement, based on long experience, to assist any one of us in meeting the problems of this work: Therefore, be it

Resolved, That we, the National Conference on Weights and Measures, assembled at the Bureau of Standards, Washington, D. C., June 2-5, 1931, do hereby pass this resolution in memory of our departed brother; and be it further

Resolved, That this resolution be made a part of the records of this conference and a copy be sent by the secretary to Mr. Schwartz's family.

IN MEMORY OF J. HARRY FOLEY

Whereas in the plan of Divine Providence our good brother, J. Harry Foley, has been called from his work among us, and

Whereas Mr. Foley made equity and justice a part of his every-day life that will ever be an inspirational memory of him: Therefore, be it

Resolved, That we, the National Conference on Weights and Measures, assembled at the Bureau of Standards, Washington, D. C., June 2-5, 1931, do hereby pass this resolution of deep regret at the loss of Mr. Foley from our work and association: And be it further

Resolved, That this resolution be made a part of the records of this conference and that a copy be sent by our secretary to Mr. Foley's bereaved family.

PROVISION OF PLACE FOR SEAL ON SCALES

Whereas the seal of approval, be it a lead seal, seal tag, or other mark or device, placed on a scale by the inspector or sealer of weights and measures, is the indication of accuracy and conformity to regulations and specifications passed by this conference and is the only mark of assurance to the public and others interested: Be it

Resolved, That this National Conference on Weights and Measures in convention assembled this 5th day of June, 1931, recommend to the manufacturers of scales intended or distributed for use in retail trade that a suitable place for the fastening or stamping of the annual lead seal, seal tag, or other mark or device be designed and made a part of the scale so that the approval of the inspector or sealer shall be in plain view of the public or trade.

APPRECIATION TO E. O. WAY AND D. J. McLEAN

Whereas E. O. Way, Director, Weights and Measures Inspection Service, Department of Trade and Commerce of Canada, and D. J. McLean, superintendent of this service, have prepared and presented a splendid and inspiring paper at this, our Twenty-fourth National Conference on Weights and Measures, and

Whereas by the presence of Mr. McLean and the delivery of the above-mentioned paper written by Mr. Way, these gentlemen have contributed to the success of our conference: Therefore be it

Resolved, That the National Conference on Weights and Measures extend its appreciation and thanks to Mr. Way and Mr. McLean.

APPRECIATION TO HON. CHARLES WEST

Whereas Hon. Charles West, Member of Congress, seventeenth district of Ohio, has by his inspiring and educational address aided the delegates to better serve their respective States: Therefore be it

Resolved, That we, the Twenth-fourth National Conference on Weights and Measures, extend our grateful appreciation to Hon. Charles West.

APPRECIATION TO THE DIRECTOR AND STAFF OF THE BUREAU OF STANDARDS

Whereas the President of our National Conference on Weights and Measures and his able staff have extended valuable assistance and guidance to the conference: Therefore, be it

Resolved, That the conference records its sincere and grateful appreciation to Dr. George K. Burgess and his staff.

INDORSEMENT OF ACTIVITIES OF NATIONAL SCALE MEN'S ASSOCIATION

Whereas the National Scale Men's Association, through its secretary, C. L. Richard, has presented to this conference a report outlining its several current activities, and

Whereas we believe those activities to be conceived and executed in harmony with the aims of this conference: Therefore be it

Resolved, That this National Conference on Weights and Measures express its indorsement of these projects of the National Scale Men's Association, and that the secretary of the conference be directed to transmit a copy of this resolution to the National Scale Men's Association.

APPRECIATION TO THE PRESS

Whereas the representatives of the press of Washington have given valuable space in their papers and have given freely of their time in the interest of publicity of the proceedings of our conference: Therefore be it

Resolved, That we, the Twenty-fourth National Conference on Weights and Measures, express our appreciation to the press for such services.

APPRECIATION TO THE MANAGEMENT OF THE MAYFLOWER HOTEL

Whereas the management of the Mayflower Hotel has rendered most courteous and efficient service to the delegates of the Twenty-fourth National Conference on Weights and Measures: Therefore be it

Resolved, That the conference extend its appreciation and thanks to such management.

Respectfully submitted.

(Signed)

GEO. WARNER, *Chairman*,
MILO C. GRIFFIN,
HAROLD A. WEBSTER,
SANFORD C. DINSMORE,
C. D. BAUCOM,
Committee on Resolutions.

DISCUSSION OF ABOVE REPORT

(It was moved and seconded that the report of the committee on resolutions be adopted.)

Mr. WOODLAND. In regard to the placing of a suitable plate on the scale for sealing, I believe as a matter of fact that that may be impossible until the sealers fix upon a certain kind of seal. In some jurisdictions they employ a lead and wire seal hooked through a hole; in others, a paper seal. If the method were standardized the manufacturers could provide for that.

Mr. GRIFFITH. I might say that the object of the resolution is to assure the public or trade that the device is approved. As it is to-day scales are sealed in some very awkward places and usually with the lead seal out of sight of the public, and it should be the concern of all manufacturers, sealers, and users of scales that the seal of approval is in view of the public. The scale manufacturers should accept the recommendation and provide a place for the seal.

Mr. CARLETON. Mr. President, you gentlemen in the East may make it a practice to use lead and wire seals, but I know in Illinois and Wisconsin they use a paper sticker and it would be unnecessary to provide a special place for this. I think it would be a good idea for you to decide at some future time to have a uniform type of seal over the country. I do not think it would be fair at the present time to require manufacturers to provide a place for a wire seal.

Mr. BAUCOM. This is only a recommendation or suggestion that the manufacturers give the matter consideration.

The CHAIRMAN. The question is on the adoption of the resolutions presented by the committee.

(The question was taken, and the motion was agreed to.)

REPORT OF THE TREASURER, GEORGE F. AUSTIN, JR.

Gentlemen of the conference, I herewith submit my report as treasurer of the National Conference on Weights and Measures, for the year ending June 1, 1931.

Receipts:

Balance on hand June 3, 1930	\$443.01
Dues received from delegates	200.00
Interest on bank deposit	9.93

Total receipts 652.94

Disbursements:

Flowers in memory of L. A. Fischer	\$10.00
Flowers for William F. Cluett (June 5, 1930)	10.60
Cigars for reporter	15.00
Candy for stenographers	9.00
R. W. Smith—special services incident to meeting	10.00
R. N. Smith—miscellaneous expenses, telephone, etc.	3.50
Conference gift for relief of William F. Cluett (approved by vote of conference on June 6, 1930)	500.00
Flowers in memory of William F. Cluett (October 18, 1930)	10.00
Flowers in memory of A. W. Schwartz (February 6, 1930)	10.00

Total disbursements 578.10

Balance on hand June 1, 1931 74.84

Respectfully submitted.

(Signed) GEO. F. AUSTIN, *Treasurer.*

MR. R. W. SMITH. Mr. President, before that vote is taken may I make an explanation of those miscellaneous items. It is necessary in the conduct of our conference to make certain miscellaneous expenditures. Usually I take care of those personally and in all cases turn over the receipted vouchers to the treasurer and he looks to me to report what advances I have made. I want to assure you that none of the funds involved are for my personal credit.

(The report was duly accepted.)

MR. GRIFFITH. Mr. Chairman, this conference has been of most unusual interest to me, and apparently one that has been of interest to others as well as myself.

I wonder if anyone has knowledge of the number of delegates present.

MR. R. W. SMITH. I believe our total registration is well over 250 this year.

MR. RAGLAND. Mr. President, I was elected a member of the executive committee against my wishes. I wish we could deviate just a little from precedent and that this executive committee, which has the decision in its hands, would bring the conference to Richmond, Va., as the guest of the greatest Commonwealth in the world. I hope you will think over it, dream over it, and next year you will be right down in Virginia.

WREATH IN MEMORY OF LOUIS A. FISCHER

MR. HOLBROOK. Mr. President, may I announce that in accordance with the usual practice of the conference, the grave of Louis A. Fischer, our beloved former secretary, was decorated on the day before Memorial Day. This year, in view of the fact that the com-

mittee on specifications and tolerances was in session, the group paying this tribute consisted of Mr. Miller, Mr. Payne, Mr. Rogers, Mr. Ralph Smith, and myself.

MOTION IN RELATION TO EXPENDITURES

Mr. HOLBROOK. I move that the regular and customary expenses of the conference be voted as in the past.

(The motion was seconded, the question was taken, and the motion was agreed to.)

FIXING OF TIME AND PLACE OF NEXT MEETING

The CHAIRMAN. Is there any new business?

Mr. HOLBROOK. Mr. President, we are given to believe that next year is going to be a very crowded year in Washington. The George Washington Bicentennial celebration will occur, and if plans mature as it is expected they will mature there will be a very large number of visitors in town from time to time and the hotel facilities will be taxed to a great extent. In view of this and in view of the large number of conferences which will be held in town, it may be advisable at this time to depart from our usual practice of fixing the date of the conference only a few months before the conference is to take place and instead, fix the date, at least tentatively, now. I say tentatively because this conference is relatively a small one and did we fix a date now that was afterwards found to be in conflict with a very large organization, it might be incumbent upon us to vary from the date fixed now, and to fix on some more favorable date. It is also a fact that the hotels next year will probably book very many more advance reservations than usual and could the hotel be selected now it would be possible to guarantee the accommodations needed upon the dates fixed.

Next year there will be special celebrations in town during the week of Memorial Day, and also I understand during the week including June 14, which is Flag Day. We are advised by the centennial organization that in both those weeks unusually large crowds are expected; this might interfere with our accommodations. We have, if you desire to consider them, proposals from three hotels in this city submitting rates for the next conference, with guaranties that if the date is now fixed, the convention will be taken care of. If it is desired by the conference, the proposals can be read and the consensus of the conference developed as to the proper hotel and the proper dates for next year's meeting.

Mr. BAUCOM. Mr. President, I move that we pass on the time and place now, subject to change.

(The motion was seconded, the question taken, and the motion was agreed to.)

The CHAIRMAN. Is there any suggestion as to the date?

Mr. HUBELE. How about in May; it may be a better month to get away from the crowd?

The CHAIRMAN. The Chair recalls that due to the reduced railroad fares that become effective about June 1, we have been meeting after that date to give our friends from the west the advantage of those rates. That is important.

Mr. HOLBROOK. Some of the hotels offer extremely special rates, but it was specified that those rates will be granted only after June 1.

Mr. FLAHERTY. I move you, Mr. Chairman, that the conference be held during the first full week in June.

The CHAIRMAN. The Chair understands the motion to be that the conference be held the first full week in June, subject to revision if found necessary, and that the details of that be left to the secretary.

(The motion was seconded, the question was taken, and the motion was agreed to.)

(After consideration the conference decided to meet at the Willard Hotel.)

The CHAIRMAN. The last item on the program, Suggestions for Program of Twenty-fifth Conference, is of very considerable importance. I think the executive committee is to be congratulated on the program which has been prepared for this year. However, continuous efforts must be made if we are to keep the programs up to the fine standards set. At any time suggestions as to program items are very welcome. Is there any further business, gentlemen?

(A motion was made and seconded that the conference adjourn, the question was taken, and the motion was agreed to.)

(Thereupon, at 12.17 p. m., the Twenty-fourth National Conference on Weights and Measures adjourned sine die.)

APPENDIXES

APPENDIX I.—SPECIFICATIONS AND TOLERANCES FOR LUBRICATING-OIL BOTTLES, AS AMENDED BY THE TWENTY-FOURTH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, JUNE 2, 1931

FOREWORD

As adopted by the Twenty-first National Conference on Weights and Measures held in 1928 the code of specifications and tolerances for lubricating-oil bottles contained a note reading as follows:

NOTE.—These specifications and tolerances are to be put into force and effect on January 1, 1929, and are to be nonretroactive. However, after July 1, 1930, all bottles in use may be required to comply with these specifications and tolerances.

Since both of the dates mentioned in the above note have now passed it has no further application and it is therefore dropped in this republication. Whether the code is to be retroactive or non-retroactive in any jurisdiction seems largely to depend on what has been done up to the present time in relation to its adoption in the jurisdiction in question. Thus in a jurisdiction hereafter adopting the code for the first time, it seems that it should at first be made nonretroactive as of the date of adoption, and that at some following date all bottles in use might be required to comply, as was the recommendation in the original instance. In the meantime in dealing with bottles in use, the official will doubtless enforce the same requirements which he was accustomed to enforce up to the time of adoption, in the elimination of incorrect bottles or those of such construction that they should not be permitted in use. In a jurisdiction which has adopted this code in the past the effective dates may already have been set. Since the amendments made at the twenty-fourth conference were largely in the nature of liberalization of existing requirements it is considered that no additional time need be granted as a result of such changes. If dates were not settled at the time of adoption, then there should be fixed such dates as are indicated as reasonable in view of conditions existing in the jurisdiction.

SPECIFICATIONS AND TOLERANCES FOR LUBRICATING-OIL BOTTLES

DEFINITION.—Lubricating-oil bottles shall be construed to include all bottles used for the sale of lubricating oils for immediate delivery to the crank case of a motor vehicle, whether or not the bottle is used to determine the quantity of oil sold and whether or not it is sealed with a cap or some other device.

SPECIFICATIONS.—1. Lubricating-oil bottles shall be made of clear, uncolored glass and only in sizes heretofore specified under the heading "Liquid capacity measures." They shall be made to contain their

indicated capacities at a temperature of 20° C. (68° F.), and they shall not be subdivided.

2. A lubricating-oil bottle shall be marked on the side with its capacity and on the side or bottom with the name, initials, or trademark of the manufacturer.

3. A lubricating-oil bottle shall be provided with a clearly defined graduation line indicating its capacity, and with the words "Fill to line," "One quart to line," or a similar and suitable inscription, clearly referring to this capacity line. The capacity line shall occupy at least one-half of the circumference of the bottle, and shall not be more than 0.10 inch in width. This specification shall not be construed to prohibit the placing of an auxiliary line above the capacity line, to serve as a guide for filling with an excess measure of oil, but in case such auxiliary line is provided it shall be undesignated and shall be less prominent than the capacity line so that it will not be confused therewith.

4. A lubricating-oil bottle shall be so designed and constructed that the capacity of that portion of it above the capacity line is at least 3 cubic inches and that there shall be at least one-fourth inch clear space between the capacity line and any metal or other opaque top or spout when such top or spout is screwed firmly into place or otherwise securely attached.

5. A lubricating-oil bottle shall be correct within the tolerance provided when filled so that the top of the meniscus of the water which is used in the test of the bottle coincides with the bottom of the capacity line.

6. A lubricating-oil bottle shall be so designed and constructed that free and unobstructed drainage is provided.

7. All markings or graduations required by the provisions of these specifications shall be blown or otherwise permanently marked in or on the lubricating-oil bottle, and shall be clear and distinct.

TOLERANCES.—The tolerances to be allowed on lubricating-oil bottles shall be in excess only and shall be the values shown in the following table. There shall be no tolerance allowed in deficiency.

Capacity of bottle	Tolerance	
	Drams	Cubic inches
2 quarts.....	12	2.7
1 quart.....	8	1.8
1 pint.....	6	1.4

APPENDIX II.—TENTATIVE SPECIFICATIONS, TOLERANCES, AND REGULATIONS FOR PERSON WEIGHERS, ADOPTED BY THE TWENTY-FOURTH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, JUNE 4, 1931

FOREWORD

The Twenty-fourth National Conference on Weights and Measures adopted the following code of specifications, tolerances, and regulations for person weighers tentatively, in accordance with its usual custom. It will accordingly be reviewed by the committee

during the coming year, and will be offered for final adoption at the next conference. In the interim, officials, manufacturers, users, and all other interested parties are invited to submit to the committee any suggestions and criticisms which may occur to them, in order that the code may be revised, if necessary or advisable, before it is presented for final adoption. Such comments may be addressed to the chairman of the committee on specifications and tolerances, National Conference on Weights and Measures, or to any member of the committee, which is as follows:

F. S. Holbrook, Bureau of Standards, Washington, D. C.

Charles M. Fuller, city and county sealer of weights and measures, Los Angeles, Calif.

I. L. Miller, State commissioner of weights and measures, Indianapolis, Ind.

Joseph G. Rogers, assistant State superintendent of weights and measures, Trenton, N. J.

W. A. Payne, county sealer of weights and measures of Monroe County, Rochester, N. Y.

SPECIFICATIONS, TOLERANCES, AND REGULATIONS FOR PERSON WEIGHERS

NOTE.—The following specifications, tolerances, and regulations shall apply to person weighers in those cases in which they are used or to be used commercially—that is, when a charge is made for the weighing service—and such use shall be permitted only when the provisions of this code are complied with. Whenever noncommercial person weighers are inspected and tested by the weights and measures official, it is recommended that these be officially sealed only when they comply with these specifications and tolerances.

DEFINITIONS.—A person weigher is a scale of any type which is specially designed for the weighing of persons. This definition is not to be construed to include scales specifically designed for the weighing of infants and children.

A “beam” person weigher is one in which weight indications are obtained by the manipulation of one or more beam poises.

An “automatic-indicating” person weigher is one in which weights are automatically indicated on a reading face of any type.

A “ticket” person weigher is one in which a representation of each individual weight is automatically made upon a ticket, card, etc., which is automatically delivered to a suitable receptacle on the outside of the scale.

SPECIFICATIONS.—1. A person weigher shall have a capacity of not less than 250 pounds.

2. A person weigher shall be so designed and constructed that it has a definite and clear zero graduation and gives a definite and clear indication of its zero balance condition at all times when ready for use. In the case of an automatic-indicating or ticket person weigher the zone throughout which the zero balance condition shall be indicated shall correspond to at least 5 pounds on each side of the zero graduation.

3. A person weigher shall be so designed and constructed that it is susceptible of giving weight indications at all points between zero and capacity: Provided, however, That a person weigher may have an interval between zero and some definite weight value throughout

which weight values are not given, but in this case the person weigher shall be so designed and constructed that whenever the weight on the platform is such as to fall within this interval, any coin inserted will be returned to the user through automatic delivery to a suitable receptacle on the outside of the person weigher.

4. The maximum value of the minimum weight graduations on any person weigher shall be 1 pound.

5. A person weigher whose weight indication is changed by an amount greater than one-half the tolerance allowed, when set in any position on a surface making an angle of 5 per cent or approximately 3° with the horizontal, shall be equipped with a device which will indicate when the person weigher is level, and in no case shall any pendulum operating the person weigher be considered a leveling device. The person weigher shall be rebalanced at zero each time its position is altered during the test contemplated by this specification.

6. All devices for adjusting the balance condition or the level of a person weigher shall be of such construction that they are operative or accessible only by the use of some tool or device which is outside of and entirely separate from the device in question, such as a screw driver, wrench, etc., but not an adjusting pin.

7. A person weigher which is liable to give incorrect results except when special precautions are observed shall have appropriate and explicit instructions conspicuously, clearly, and permanently marked upon it.

8. A ticket person weigher shall be so designed and constructed that throughout a period when the supply of tickets is exhausted, any coin which is inserted will be returned to the user through automatic delivery to a suitable receptacle on the outside of the person weigher, or the insertion of a coin in the coin slot will automatically be prevented.

9. A ticket person weigher shall be so designed and constructed that the printing, stamping, or transferring of the weight record on the ticket will not occur until the weighing mechanism has had ample opportunity to come to rest, under normal person weighing conditions.

10. A ticket person weigher shall be so designed and constructed that it is susceptible of giving a clear, distinct, and definite statement or representation of weight on the weight ticket.

This specification shall be construed to require that the specifications contained in this code and the specifications for automatic-indicating scales, relative to weight indicators, weight graduations, clear intervals between weight graduations, etc., shall apply to the representations of weight made by a ticket person weigher, when this representation is such as to make these requirements applicable. These requirements shall be broadly applied to appropriate portions of the said representations so as to require the same degree of clearness, definiteness, precision of reading, etc., in the case of both ticket and automatic-indicating person weighers.

11. When not modified by the requirements of this code the specifications given under the heading "Scales—General specifications," "Platform scales," and "Automatic-indicating scales" shall apply to person weighers in so far as they are applicable.

SENSIBILITY RECIPROCAL (SR).—The maximum SR allowable on beam person weighers shall be the value of two of the minimum graduations on the beam at the capacity or at any lesser load: Provided, however, That the manufacturers' maximum SR or the maximum SR on all new beam person weighers shall be the value of one of the minimum graduations on the beam, at the capacity or at any lesser load.

TOLERANCES.—The tolerances to be allowed in excess or deficiency on beam person weighers shall be those specified under the heading "Platform scales." The tolerances to be allowed in excess or deficiency on automatic-indicating and ticket person weighers shall be those specified under the heading "Large-capacity automatic-indicating scales."

REGULATIONS.—1. A person weigher shall be maintained in level.

2. A ticket person weigher shall be so maintained in use that all statements or representations of weight printed, stamped, or otherwise transferred on or to the weight ticket during operation shall be clear and distinct.

3. A person weigher shall be permanently and legibly marked with a statement containing the name and address of the person, firm, or corporation responsible for placing the person weigher in service, in combination with some such words as "Operated by," "Maintained by," etc.: Provided, however, That such statement shall not be required when the person weigher is in service on the premises of such person, firm, or corporation.





Miscellaneous Publication No. 130,
"National Directory of Commodity
Specifications," is too large in
size to be bound in with these
publications.

