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**U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS**

**REPORT OF THE  
TWENTY-SEVENTH NATIONAL CONFERENCE  
ON  
WEIGHTS AND MEASURES**

**ATTENDED BY REPRESENTATIVES  
FROM VARIOUS STATES**

**HELD AT THE NATIONAL BUREAU OF STANDARDS  
WASHINGTON, D. C., JUNE 1, 2, 3, AND 4, 1937**

**MISCELLANEOUS PUBLICATION M159**







U. S. DEPARTMENT OF COMMERCE  
DANIEL C. ROPER, Secretary  
NATIONAL BUREAU OF STANDARDS  
LYMAN J. BRIGGS, Director

MISCELLANEOUS PUBLICATION M159

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UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1937



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







## OFFICERS AND COMMITTEES

### OFFICERS

(Serving during Twenty-Seventh National Conference)

President, LYMAN J. BRIGGS, Director, National Bureau of Standards, Washington, D. C.

Vice Presidents:

C. D. BAUCOM, State Superintendent of Weights and Measures, Raleigh, N. C.

C. J. P. CULLEN, Director, State Bureau of Standard Weights and Measures, Harrisburg, Pa.

JOHN J. LEVITT, State Superintendent of Standards, Springfield, Ill.

JOHN P. McBRIDE, Director, State Division of Standards, Boston, Mass.

Secretary, F. S. HOLBROOK, National Bureau of Standards, Washington, D. C.  
Treasurer, GEORGE F. AUSTIN, JR., Supervising Inspector of Weights and Measures, Detroit, Mich.

(As elected by the Twenty-Seventh National Conference for the ensuing year)

President, LYMAN J. BRIGGS, Director, National Bureau of Standards, Washington, D. C.

Vice Presidents:

W. S. BUSSEY, Chief, State Division of Weights and Measures, Austin, Tex.

C. J. P. CULLEN, Director, State Bureau of Standard Weights and Measures, Harrisburg, Pa.

JOHN J. LEVITT, State Superintendent of Standards, Springfield, Ill.

ROLLIN E. MEEK, Chief, State Bureau of Weights and Measures, Indianapolis, Ind.

Secretary, F. S. HOLBROOK, National Bureau of Standards, Washington, D. C.  
Treasurer, GEORGE F. AUSTIN, JR., Supervising Inspector of Weights and Measures, Detroit, Mich.

### COMMITTEES

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(As elected by Twenty-Seventh National Conference)

LYMAN J. BRIGGS

W. S. BUSSEY

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ROLLIN E. MEEK

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} *Ex officio.*

JAMES A. BOYLE, Sealer of Weights and Measures, Portland, Maine.

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HOWARD E. CRAWFORD, Inspector of Weights and Measures, Jacksonville, Fla.

H. N. DAVIS, Deputy State Commissioner of Weights and Measures, Montpelier, Vt.

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

C. L. KLOCKER, State Inspector of Weights and Measures, Hartford, Conn.

JAMES O'KEEFE, Sealer of Weights and Measures, Chicago, Ill.

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

CHARLES C. READ, State Superintendent of Weights and Measures, Trenton, N. J.

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

K. K. SOLBERG, Supervisor, State Department of Weights and Measures, Minneapolis, Minn.

JAMES A. SWEENEY, Sealer of Weights and Measures, Boston, Mass.  
 C. E. TUCKER, Chief, State Division of Weights and Measures, Sacramento, Calif.  
 LOUIS G. WALDMAN, Commissioner of Weights and Measures, St. Louis, Mo.  
 GEORGE WARNER, Chief State Inspector of Weights and Measures, Madison, Wis.  
 S. H. WILSON, State Oil Chemist, Atlanta, Ga.  
 WILLIAM C. WITFOTH, Sealer of Weights and Measures, Toledo, Ohio.

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(Standing committee)

F. S. HOLBROOK, National Bureau of Standards, Washington, D. C., chairman.  
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 Los Angeles, Calif.  
 JOSEPH G. ROGERS, Assistant State Superintendent of Weights and Measures,  
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 JOHN P. MCBRIDE, Director, State Division of Standards, Boston, Mass.  
 GEORGE F. AUSTIN, Jr., Supervising Inspector of Weights and Measures, De-  
 troit, Mich.

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(Standing committee)

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 Washington, D. C., chairman.  
 GLENN L. BERRY, Superintendent of Weights and Measures of Monmouth County,  
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 W. S. BUSSEY, Chief, State Division of Weights and Measures, Austin, Tex.  
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#### ACTING COMMITTEES FOR THE TWENTY-SEVENTH NATIONAL CONFERENCE

*Committee on Nominations.* JOHN P. MCBRIDE, of Massachusetts, chairman;  
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 Jersey; and ARTHUR J. WILHELM, of Hamtramck, Mich.

*In Charge of Exhibits.* BERNARD RICE.

*In Charge of Registrations.* MRS. H. E. ROSENBERGER.

## PERSONS ATTENDING THE CONFERENCE

### DELEGATES—STATE, CITY, AND COUNTY OFFICIALS

#### ALABAMA

State..... H. S. HOLLOWAY, Chief, Division of Weights and Measures, Montgomery.  
City: Birmingham..... R. M. JOHNSON, Chief Inspector of Weights and Measures, City Hall.

#### CALIFORNIA

State..... C. E. TUCKER, Chief, Division of Weights and Measures, Sacramento.  
County: Los Angeles..... CHARLES M. FULLER, Sealer of Weights and Measures, 501 New High Street, Los Angeles.

#### CONNECTICUT

State..... WALTER F. STILES, Captain, Department of State Police, 100 Washington Street, Hartford.  
C. L. KLOCKER, Inspector of Weights and Measures, 100 Washington Street, Hartford.  
THOMAS F. RICE, Department of State Police, Municipal Building, Hartford.  
City: Bridgeport..... LOUIS SNOW, Sealer of Weights and Measures, 925 Main Street.  
County: Hartford..... WALTER R. FALK, Sealer of Weights and Measures, City Hall, New Britain.

#### DISTRICT OF COLUMBIA

District..... GEORGE M. ROBERTS, Superintendent of Weights, Measures, and Markets, 467 C Street, Washington.

#### FLORIDA

City: Jacksonville..... HOWARD E. CRAWFORD, Inspector of Weights and Measures, Utilities Building.

#### GEORGIA

State..... S. H. WILSON, State Oil Chemist, State Capitol, Atlanta.  
City: Atlanta..... W. P. REED, Inspector of Weights and Measures, Police Headquarters.

#### IDAHO

State..... FRANK L. HAMMON, Director, Bureau of Weights and Measures, State House, Boise.

#### ILLINOIS

State..... JOHN J. LEVITT, Superintendent of Standards, Capitol Building, Springfield.  
City: Chicago..... JAMES O'KEEFE, Sealer of Weights and Measures, City Hall.

## INDIANA

State.....	ROLLIN E. MEEK, Chief, Bureau of Weights and Measures, State House Annex, Indianapolis.
City:	
Fort Wayne.....	C. B. TOLAN, Inspector of Weights and Measures, City Hall.
Gary.....	CLEO C. MORGAN, Sealer of Weights and Measures, City Hall.
Terre Haute.....	A. EDWARD SNYDER, Inspector of Weights and Measures, City Hall.
City and County: Huntington, and Huntington County.	DEFOREST McLIN, Inspector of Weights and Measures, Huntington.

## KENTUCKY

City: Louisville.....	WILLIAM H. ISING, JR., Inspector of Weights and Measures, City Hall.
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## MAINE

State.....	G. K. HEATH, Deputy Sealer of Weights and Measures, Augusta.
City:	
Portland.....	JAMES A. BOYLE, Sealer of Weights and Measures, City Building.
Skowhegan.....	JOSEPH H. MURRAY, Sealer of Weights and Measures.
Waterville.....	WILLIAM A. JONES, Sealer of Weights and Measures, City Hall.

## MARYLAND

City: Baltimore.....	S. T. GRIFFITH, <sup>1</sup> Chief, Division of Weights and Measures, Municipal Building. CHARLES G. CROCKETT, Inspector of Weights and Measures, Municipal Building. JOHN R. GRAEFF, Inspector of Weights and Measures, Municipal Building. GEORGE H. LEITHAUSER, Inspector of Weights and Measures, Municipal Building. THOMAS J. NAPFEL, Inspector of Weights and Measures, Municipal Building. ELMER E. NICHOLSON, Inspector of Weights and Measures, Municipal Building. ELMER S. PIERPONT, Inspector of Weights and Measures, Municipal Building. HENRY J. SLITZER, Assistant Inspector of Weights and Measures, Municipal Building.
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## MASSACHUSETTS

State.....	JOHN P. McBRIDE, Director of Standards, State House, Boston. JAMES J. DAWSON, Inspector of Standards, State House, Boston. LORENZO D. F. MARSTON, Inspector of Standards, State House, Boston.
City:	
Arlington.....	ALLEN E. COWIE, Sealer of Weights and Measures, Town Hall.
Boston.....	JAMES A. SWEENEY, Sealer of Weights and Measures, City Hall Annex.
Springfield.....	WILLIAM FOSTER, Sealer of Weights and Measures, City Hall.
Taunton.....	EDWARD C. WARD, Sealer of Weights and Measures.

<sup>1</sup> Designated by the Governor to represent the State.

## MICHIGAN

City: Detroit.....	GEORGE F. AUSTIN, JR., Supervising Inspector of Weights and Measures, 1300 Beaubien Street.
Hamtramck.....	ARTHUR J. WILHELM, Sealer of Weights and Measures, 2444 Andrus Street.
Lansing.....	CHARLES T. QUINN, Sealer of Weights and Measures, City Market.
Royal Oak.....	GEORGE E. RUTLIDGE, Sealer of Weights and Measures, 221 East Third Street.

## MINNESOTA

State.....	K. K. SOLBERG, Supervisor, Department of Scales, Weights, and Measures, 216 Corn Exchange, Minneapolis.
City: Minneapolis.....	RUSSELL S. ACKERMAN, Superintendent, Department of Licenses, Weights, and Measures, City Hall.

## MISSOURI

City: St. Louis.....	LOUIS G. WALDMAN, <sup>2</sup> Commissioner of Weights and Measures, City Hall.
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## NEVADA

State.....	JOE M. MCLEOD, Inspector of Weights and Measures, Fifth and Sierra Streets, Reno.
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## NEW JERSEY

State.....	CHARLES C. READ, Superintendent of Weights and Measures, 187 West Hanover Street, Trenton.
	HARRY A. WALSH, Assistant Attorney General, State House, Trenton.
	JOSEPH G. ROGERS, Assistant Superintendent of Weights and Measures, 187 West Hanover Street, Trenton.
	R. K. BODENWIESER, Assistant Superintendent of Weights and Measures, 187 West Hanover Street, Trenton.
	ELLIOTT B. HOLTON, Assistant Superintendent of Weights and Measures, 187 West Hanover Street, Trenton.
	HARRY S. PROVOST, Assistant Superintendent of Weights and Measures, 187 West Hanover Street, Trenton.
	ARCHIE T. SMITH, Inspector of Weights and Measures, 187 West Hanover Street, Trenton.
City: Bayonne.....	WALTER J. FLYNN, Superintendent of Weights and Measures, Municipal Building.
Elizabeth.....	WILLIAM J. BENDER, Superintendent of Weights and Measures, City Hall.
Englewood.....	LEONARD DERIENZO, Superintendent of Weights and Measures, Municipal Building.
Jersey City.....	JOHN S. BURKE, Superintendent of Weights and Measures, City Hall.
Linden.....	CORNELIUS O'DONNELL, Superintendent of Weights and Measures, City Hall.
Paterson.....	JOSEPH P. LEONARD, Superintendent of Weights and Measures, 115 Van Houten Street.
Perth Amboy.....	JOHN FARKAS, JR., Superintendent of Weights and Measures.
Trenton.....	FRANCIS J. BLACK, Superintendent of Weights and Measures, 29 West Hanover Street.
Union City.....	ALFRED O. OSLUND, Superintendent of Weights and Measures, City Hall.

<sup>2</sup> Designated by the Governor to represent the State.

## County:

Bergen	A. F. BARNARD, Superintendent of Weights and Measures, Administrative Building, Hackensack.
Burlington	CURWEN B. FISHER, Superintendent of Weights and Measures, Mount Holly.
Cape May	GILBERT S. SMITH, Superintendent of Weights and Measures, Avalon.
Essex	CHARLES R. SMITH, Assistant Superintendent of Weights and Measures, Hall of Record, Newark.
Hudson	THOMAS J. WALDRON, Superintendent of Weights and Measures, County Court House, Jersey City.
Mercer	RALPH BODENWEISER, Superintendent of Weights and Measures, Court House, Trenton.
Middlesex	CHARLES H. ENGELHARD, Superintendent of Weights and Measures, County Record Building, New Brunswick.
Monmouth	GLENN L. BERRY, Superintendent of Weights and Measures, 706 Eighth Avenue, Asbury Park.
Morris	CHARLES S. WANDLING, Superintendent of Weights and Measures, Court House, Morristown.
Passaic	WILLIAM MILLER, Superintendent of Weights and Measures, Court House, Paterson.
Somerset	O. B. MATHEWS, Superintendent of Weights and Measures, Court House, Somerville.
Sussex	R. L. SLATER, Superintendent of Weights and Measures, Newton.
Warren	W. ARMSTRONG MACKEY, Superintendent of Weights and Measures, Belvidere.

## NEW YORK

## City:

New York	ALEX PISCIOTTA, Deputy Commissioner, Department of Public Markets, Weights, and Measures, 139 Centre Street. MATTHIAS A. HARRINGTON, Chief Supervisor, Department of Public Markets, Weights, and Measures, 139 Centre Street.
Poughkeepsie	LOUIS J. HOFFMAN, Sealer of Weights and Measures.
Rochester	ANTHONY C. SAMENFINK, Sealer of Weights and Measures, 34 Court Street.
White Plains	RICHARD HARDING, Sealer of Weights and Measures, 19 Waldo Avenue.

## County:

Jefferson	CHARLES H. BULSON, Sealer of Weights and Measures, 8 Park Avenue, Theresa.
Nassau	ROBERT WILLIAMS, Sealer of Weights and Measures, Court House Annex, Mineola. WILLIAM KIRK, JR., Deputy Sealer of Weights and Measures, 518 Sheridan Boulevard, Inwood, L. I.
Suffolk	C. P. SMITH, Sealer of Weights and Measures, P. O. Box 412, East Moriches.
Warren	L. J. DEAN, Sealer of Weights and Measures, 62 Elm Street, Glens Falls.

## NORTH CAROLINA

State	C. D. BAUCOM, Superintendent of Weights and Measures, Raleigh. H. W. HOOD, Inspector of Weights and Measures, Raleigh. GEORGE S. TURNER, Inspector of Weights and Measures, Raleigh.
-------	--

City:		
Raleigh-----	G. R. STALLINGS, Inspector of Weights and Measures, City Hall.	
Winston-Salem-----	B. K. JONES, Inspector of Weights and Measures, City Hall.	
City and County: Charlotte, and Mecklenburg County.	F. C. YARBROUGH, Inspector of Weights and Measures, 300 South Poplar Street, Charlotte.	

NORTH DAKOTA

State-----	A. J. JENSEN, Superintendent of Weights and Measures, Jamestown.
	ROY JENSEN, Deputy Superintendent of Weights and Measures, Jamestown.

OHIO

State-----	O. E. BRENNEMAN, Chief, Bureau of Weights and Measures, State Office Building, Columbus.
	J. C. TINKEY, Deputy State Sealer, State Office Building, Columbus.
City: Toledo-----	WILLIAM C. WITFOTH, Sealer of Weights and Measures, 555 Erie Street.
County: Columbiana-----	CHARLES CANNELL, Deputy Sealer of Weights and Measures, East Palestine.

PENNSYLVANIA

State-----	C. J. P. CULLEN, Director, Bureau of Standard Weights and Measures, Harrisburg.
	WILLIAM A. HAGAN, Supervisor, Bureau of Standard Weights and Measures, 1843 McKean Street, Philadelphia.
	W. E. MOODY, Deputy Inspector of Weights and Measures, Chestnut Ridge.
City:	
Allentown-----	JAMES E. McHUGH, Sealer of Weights and Measures, City Hall'.
Harrisburg-----	GEORGE B. NEBINGER, Inspector of Weights and Measures, P. O. Box 207.
Pittsburgh-----	H. C. PATTON, Superintendent, Weights, Measures, and Food Inspection, City and County Building.
Reading-----	WILLIAM A. HIGH, Inspector of Weights and Measures, City Hall.
York-----	IRVIN R. SHULTZ, Inspector of Weights and Measures, City Hall.
County:	
Allegheny-----	PATRICK J. HUNTER, Inspector of Weights and Measures, Court House, Pittsburgh.
Bradford-----	R. L. BLOCHER, Sealer of Weights and Measures, Wyalusing.
Clarion and Forest-----	JAMES B. CARLOS, Sealer of Weights and Measures, Clarion.
Franklin-----	ROY G. KELL, Sealer of Weights and Measures, 358 East Catharine Street, Chambersburg.
Union-----	HOBERT R. SPAID, Sealer of Weights and Measures, Mifflinburg.

RHODE ISLAND

State-----	EDWARD R. FISHER, Chief, Bureau of Weights and Measures, State House, Providence.
City: West Warwick-----	SANTO G. SACCHETTI, Sealer of Weights and Measures, Town Hall.

## SOUTH CAROLINA

State..... A. H. GIBERT, Chief Inspector, Department of Agriculture, Commerce, and Industries, Columbia.

## TENNESSEE

City: Nashville..... TOM WEBB, Sealer of Weights and Measures, City Hall.

## TEXAS

State..... W. S. BUSSEY, Chief, Division of Weights and Measures, Austin.

O. A. KIRKLAND, Inspector of Weights and Measures, Dallas.

City:  
Dallas..... R. L. FULLEN, Sealer of Weights and Measures, City Hall.

San Antonio..... JOHN C. SPEIER, Sealer of Weights and Measures, City Hall.

## VERMONT

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

## VIRGINIA

State..... J. H. MEEK, Director, Division of Markets, State Office Building, Richmond.

M. A. HUBBARD, Supervisor of Weights and Measures, State Office Building, Richmond.

City:  
Martinsville..... R. M. WILSON, Sealer of Weights and Measures.  
Richmond..... B. W. RAGLAND, Chief, Bureau of Weights and Measures, City Hall Annex.

County: Arlington..... EUGENE M. MORELAND, Sealer of Weights and Measures, Court House, Arlington.

## WASHINGTON

State..... R. E. WHITE, Supervisor of Weights and Measures, Olympia.

City: Seattle..... L. J. ALLEN, Chief Inspector of Weights and Measures, County-City Building.

## WEST VIRGINIA

State..... P. J. PELLEGRINI, Inspector of Weights and Measures, Charleston.

S. M. MILLER, Inspector of Weights and Measures, Martinsburg.

County: Monongalia..... BROOKS F. MILLER, Sealer of Weights and Measures, Morgantown.

## WISCONSIN

State..... GEORGE WARNER, Chief Inspector, Division 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

ALLEN, KENNETH C., Development Engineer, Dayton Scale Division, Hobart Manufacturing Co., Dayton, Ohio.

BEAN, H. S., National Bureau of Standards, Washington, D. C.

BEARCE, H. W., National Bureau of Standards, Washington, D. C.



BRIGGS, LYMAN J., Director, National Bureau of Standards, Washington, D. C.  
 CROUCH, RALPH W., JR., National Bureau of Standards, Washington, D. C.  
 GOULD, R. E., National Bureau of Standards, Washington, D. C.  
 HOLBROOK, F. S., National Bureau of Standards, Washington, D. C.  
 HOLMES, EDWARD H., Highway Engineer Economist, Bureau of Public Roads,  
 United States Department of Agriculture, Washington, D. C.  
 HORTON, C. F., National Bureau of Standards, Washington, D. C.  
 LETZKUS, C. R., National Bureau of Standards Master Scale Depot, 5800 West  
 69th Street, Clearing Station, Chicago, Ill.  
 MILLER, D. R., National Bureau of Standards, Washington, D. C.  
 MONTGOMERY, D. E., Consumers' Counsel, Agricultural Adjustment Adminis-  
 tration, United States Department of Agriculture, Washington, D. C.  
 PEPPER, E. L., National Bureau of Standards, Washington, D. C.  
 PIENKOWSKY, A. T., National Bureau of Standards, Washington, D. C.  
 RICHARD, C. L., National Bureau of Standards Master Scale Depot, 5800 West  
 69th Street, Clearing Station, Chicago, Ill.  
 ROPER, HON. DANIEL C., Secretary of Commerce, Washington, D. C.  
 RUSSELL, H. H., National Bureau of Standards Master Scale Depot, 5800 West  
 69th Street, Clearing Station, Chicago, Ill.  
 SAUTHOFF, HON. HARRY, Member of Congress, Second District, Wisconsin,  
 House Office Building, Washington, D. C.  
 SMITH, RALPH W., National Bureau of Standards, Washington, D. C.  
 SOUDER, WILMER, National Bureau of Standards, Washington, D. C.

#### GUESTS REPRESENTING MANUFACTURERS OF WEIGHING AND MEASURING DEVICES

American Can Co.:

ELMER NALL, Special Representative, 104 South Michigan Avenue, Chicago,  
Ill.

H. B. TOURTELLOT, 230 Park Avenue, New York, N. Y.

Aqua Systems (Inc.): WILLIAM J. PETER, Chief Engineer, 2443 Third Avenue,  
New York, N. Y.

Barnes Products (Inc.): W. J. BARNES, President, Detroit, Mich.

Black & Decker Manufacturing Co.: E. E. POWELL, Manager, Loadometer Sales,  
Towson, Md.

Bowser, S. F., & Co. (Inc.):

E. C. MARSH, Vice President, Fort Wayne, Ind.

C. P. GRIFFITH, Chief Engineer, Fort Wayne, Ind.

Buffalo Meter Co.: T. J. HARRINGTON, 2917 Main Street, Buffalo, N. Y.

Chatillon, John, & Sons:

P. T. BORTELL, Vice President, 89 Cliff Street, New York, N. Y.

J. GEORGE HUGEL, 89 Cliff Street, New York, N. Y.

Dayton Pump and Manufacturing Co.: ANTHONY G. HORVATH, Chief Engineer,  
Dayton, Ohio.

Erie Meter Systems (Inc.): L. R. OLSEN, Chief Engineer, Erie, Pa.

Ex-Cell-O Corporation: RICHARD E. KRENGEL, Experimental and Research  
Department, 1200 Oakman Boulevard, Detroit, Mich.

Fairbanks, Morse & Co.:

J. F. CRUIKSHANK, General Scale Sales Engineer, 900 South Wabash Avenue,  
Chicago, Ill.

C. A. HENNIE, Sales Representative, 205 Water Street, Baltimore, Md.

JEROME KENNEY, Sales Representative, 415 Normandy Avenue, Baltimore,  
Md.

Gilbert & Barker Manufacturing Co.: J. A. LOGAN, Springfield, Mass.

Gurley, W. & L. E.: FRANKLIN G. WILLIAMS, Washington Representative, 3616  
Newark Street, Washington, D. C.

Hobart Manufacturing Co.:

S. M. TEMPLETON, Special Representative, Dayton Scale Division, Troy,  
Ohio.

KENNETH C. ALLEN, Development Engineer, Dayton Scale Division,  
Dayton, Ohio.

Howe Scale Co.:

C. A. LINDSAY, Special Representative, 1305 Euclid Street, Washington,  
D. C.

ELWOOD P. VROOME, Eastern Sales Manager, 111 Eighth Avenue, New  
York, N. Y.

- International Business Machines Corporation: L. S. SMITHERS, Special Representative, 270 Broadway, New York, N. Y.
- Jacobs Bros. Co. (Inc.): J. E. WOODLAND, Sales Manager, Detectogram Division, Main and Water Streets, Brooklyn, N. Y.
- Moore & Kling (Inc.): ELMER M. KLING, President, 221 High Street, Boston, Mass.
- National Meter Co.: R. H. BARGE, Engineer, 4207 First Avenue, Brooklyn, N. Y.
- Neptune Meter Co.:  
 R. K. BLANCHARD, Vice President, 50 West Fiftieth Street, New York, N. Y.  
 GLENN D. FRYE, Sales Engineer, 50 West Fiftieth Street, New York, N. Y.
- Owens-Illinois Glass Co.: W. S. RICHARDS, Toledo, Ohio.
- Peerless Weighing and Vending Machine Corporation:  
 L. D. CHAMBERS, Vice President, 22-19 Forty-first Avenue, Long Island City, N. Y.  
 A. J. LILLIEDAHL, Traffic Service Manager, 22-19 Forty-first Avenue, Long Island City, N. Y.  
 E. M. SCHIEMER, Representative, 22-19 Forty-first Avenue, Long Island City, N. Y.
- Pittsburgh Equitable Meter Co.: H. I. BEARDSLEY, Manager, Oil and Gasoline Division, 400 North Lexington Avenue, Pittsburgh, Pa.
- Robinson Seal Co.: W. M. ROBINSON, 170 Summer Street, Boston, Mass.
- Schirmer-Dornbire Pump Co.: W. P. SCHIRMER, Manager, Cleveland, Ohio.
- Seederer-Kohlbusch (Inc.): J. E. SEEDERER, President, 149 New York Avenue, Jersey City, N. J.
- Seraphin Test Measure Co.: THEO. A. SERAPHIN, President, 1314 North Seventh Street, Philadelphia, Pa.
- Service Station Equipment Co.: D. S. WILLSON, Research Engineer, Muskegon Heights, Mich.
- Sharpsville Boiler Works Co.: CHARLES D. FAGAN, President, Sharpsville, Pa.
- Standard Computing Scale Co.: MATTHEW D. RIBBLE, Vice President, Sales Department, Detroit, Mich.
- Streeter-Amet Co.: HARRY M. ROESER, Mechanical Engineer, 4101 Ravenswood Avenue, Chicago, Ill.
- Tokheim Oil Tank & Pump Co.: GEORGE U. BRAKE, Engineer, Fort Wayne, Ind.
- Toledo Scale Co.:  
 S. Q. BENNETT, Manager of Service and Weights and Measures, 1805 Clinton Street, Toledo, Ohio.  
 H. W. HEM, Engineer, Toledo, Ohio.
- Torsion Balance Co.: A. T. MILLROY, Sales Manager, 92 Reade Street, New York, N. Y.
- Wayne Pump Co.:  
 E. J. GALLMEYER, Vice President and General Manager, Fort Wayne, Ind.  
 F. S. SHUMAKER, Vice President, 60 East Forty-second Street, New York, N. Y.  
 CHARLES C. NEALE, Manager, Weights and Measures Division, Fort Wayne, Ind.  
 JOHN MACARTHUR, District Manager, 4030 North Broad Street, Philadelphia, Pa.  
 M. C. BROWN, Sales Supervisor, 609 American Building, Baltimore, Md.
- Wood, Gar, Industries (Inc.): B. AUSTIN COOPER, Sales Engineer, Detroit, Mich.
- Wood, John, Manufacturing Co. (Inc.): ERIC H. BRADLEY, Chief Engineer, Bennett Pumps Division, Muskegon, Mich.

#### GUESTS REPRESENTING TRADE AND ENGINEERING ASSOCIATIONS

- Gasoline Pump Manufacturers Association: G. DENNY MOORE, Managing Director, 420 Lexington Avenue, New York, N. Y.
- National Scale Men's Association: C. R. LETZKUS, President, 5800 West 69th Street, Clearing Station, Chicago, Ill.

#### GUESTS REPRESENTING BUSINESS AND INDUSTRY

- BOHART, JAMES G., Sinclair Refining Co., 630 Fifth Avenue, New York, N. Y.
- BUCKINGHAM, HAROLD SCOTT, Research Engineer, Silver Seal Dairy Products Corporation, 612 South Twenty-fourth Street, Philadelphia, Pa.
- HANNA, J. P., Sinclair Refining Co., 630 Fifth Avenue, New York, N. Y.
- MARCHANT, HARRY, Scale Inspector, Bethlehem Steel Co., Sparrows Point, Md.

- NORMAN, C. H., Carolina Scale Shop, 112 East Morehead Street, Charlotte, N. C.  
PAIGE, J. B., Chief Scale Inspector, New York Produce Exchange, 2 Broadway,  
New York, N. Y.  
WHITLEY, ROBERT J., Socony Vacuum Oil Co., Church Street, Albany, N. Y.  
ZEIBEL, A. G., Scale Inspector, American Bridge Co., Ambridge, Pa.

#### GUESTS REPRESENTING RAILROADS

- CLARK, ALEX. D., Scale Inspector, Delaware, Lackawanna & Western Railroad,  
Bayonne, N. J.  
HARRISON, M. J. J., Supervisor of Scales and Weighing, Pennsylvania Railroad,  
Altoona, Pa.  
HOSFORD, C. C., Scale Inspector, Pennsylvania Railroad, Pittsburgh, Pa.  
LAWRENCE, E. KENT, General Scale Inspector, Baltimore & Ohio Railroad Sys-  
tem, Baltimore, Md.  
PHERIGO, J. L., Chief Scale Inspector, Southern Railway System, Washington,  
D. C.  
PROBST, H. C., Chief Scale Inspector, Chesapeake & Ohio Railway, Richmond, Va.

#### GUESTS REPRESENTING GOVERNMENT DEPARTMENTS

- DAY, LUCIAN C., United States Tariff Commission, Washington, D. C.  
FRISBIE, W. S., Chief, Division of State Cooperation, Food and Drug Adminis-  
tration, United States Department of Agriculture, Washington, D. C.  
GAST, FRED W., Chief, Division of Engineering and Weighing, Bureau of Customs,  
Treasury Department, Washington, D. C.  
HOLMES, EDWARD H., Highway Engineer Economist, Bureau of Public Roads,  
United States Department of Agriculture, Washington, D. C.  
MONTGOMERY, D. E., Consumers' Counsel, Agricultural Adjustment Adminis-  
tration, United States Department of Agriculture, Washington, D. C.

#### OTHER GUESTS

- BUCK, CARL J., Lieut. Commander (S. C.), United States Navy, Naval Powder  
Factory, Indian Head, Md.  
JACOBS, EDITH G., Secretary, Scale Journal Publishing Co., 1703 East Eighty-  
fourth Street, Chicago, Ill.  
KEBLER, LYMAN F., 1322 Park Road, Washington, D. C.



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# REPORT OF THE TWENTY-SEVENTH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

HELD AT THE NATIONAL BUREAU OF STANDARDS,  
WASHINGTON, D. C., JUNE 1, 2, 3, AND 4, 1937

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## FIRST SESSION—MORNING OF TUESDAY, JUNE 1, 1937

(The Conference was called to order at 10:50 a. m., by Dr. Lyman J. Briggs, President of the Conference.)

The CHAIRMAN. Members of the Twenty-Seventh Conference on Weights and Measures, ladies, and gentlemen: It is a great pleasure to welcome you to this Twenty-Seventh Conference on Weights and Measures. Mr. Holbrook advises me that more delegates have announced their intention of attending this Conference than at any preceding Conference. To those who are joining with us in these deliberations for the first time I extend a special welcome.

I shall now ask your indulgence while I review briefly the history of weights and measures in this country, in order to provide a background for your consideration of a bill to fix the standards of weights and measures.

### A PROPOSAL FOR LEGISLATION TO FIX THE STANDARDS OF WEIGHTS AND MEASURES IN THE UNITED STATES

By LYMAN J. BRIGGS, *Director, National Bureau of Standards, and President, National Conference on Weights and Measures*

It seems strange, 150 years after the founding of this Republic, that legislative action should be necessary to fix the value of the inch and pound with which we are so familiar. Nevertheless, the fact is that we have never had a statute which defines the way in which these units shall be determined. As a background for the legislation under consideration, it may be of interest to review briefly the legislative history of weights and measures in our country.

Presumably the difficulties under which commerce had been carried out among the 13 Colonies, owing to the lack of uniform standards, were responsible in part for that wise and far-sighted provision of the Constitution which delegated to Congress the authority "to fix the standard of weights and measures." It is remarkable that under such circumstances Congress did not take prompt steps to correct the situation. In the early days of the new Republic, Washington in his presidential messages to Congress, repeatedly urged the importance of carrying out this constitutional provision; but for 80 years no formal action was taken by Congress to "fix" the standard, save for the adoption in 1828 of a standard troy pound for coinage purposes.

Not that the subject was ignored. Repeatedly the matter came up for discussion, without definite action. A standard of length which could, if necessary, be independently reproduced from physical obser-

vations repeatedly intrigued the interest of Congress. Jefferson, as Secretary of State, presented in 1790 an elaborate report on weights and measures, including the proposal of a standard of length based upon the length of a uniform cylindrical pendulum beating seconds at sea level at  $45^{\circ}$  N. lat. In 1795, President Washington presented to Congress a communication from the Minister of the French Republic suggesting the adoption by the United States of the metric system of weights and measures, which France had adopted 4 years earlier. This proposal, however, met with little favor. A standard based on the length of one ten-millionth of the earth's quadrant apparently had less appeal from the standpoint of reproducibility than one based on the length of a pendulum beating seconds.

Meanwhile, various State legislatures were imploring Congress to take some action to bring about uniformity; and in 1821, John Quincy Adams, as Secretary of State, urged Congress "to fix the standard with the partial uniformity of which it is susceptible at present, excluding all innovations. To consult with foreign nations for the future and ultimate establishment of universal and permanent uniformity."

In 1830 the United States Treasury Department, which was charged with the collection of customs, was instructed through a resolution of the Senate to investigate the weights and measures in use in the various customs houses of the country, with a view to bringing about uniformity in the collection of customs. The Secretary of the Treasury gave a broad interpretation to this authority to "investigate" and the outcome was the adoption by the Treasury Department, without further action by Congress, of an avoirdupois pound of 7,000 grains, a yard of 36 inches, a wine gallon of 231 cubic inches, and a Winchester bushel of 2,150.42 cubic inches, for use in the collection of customs.

So well pleased was Congress with this solution of its difficulties that the Secretary of the Treasury in 1836 was directed through a joint resolution to deliver to the Governor of each State a complete set of all the weights and measures adopted as standard by the Treasury Department. Although no congressional action was taken to legalize these standards, many of the States adopted them independently, and a groundwork for uniform weights and measures was at last provided.

It was not until after the Civil War that Congress took the first formal steps to legalize a system of weights and measures, and this oddly enough did not refer to the weights and measures in common use, but to the metric system, rejected in 1795. The act of 1866 reads as follows: "It shall be lawful throughout the United States of America to employ the weights and measures of the metric system; and no contract or dealing, or pleading in any court, shall be deemed invalid or liable to objection because the weights or measures expressed or referred to therein are weights or measures of the metric system."

We have thus the anomalous situation in this country of a legalized system of metric weights and measures which is not in common use, and a customary system of weights and measures which has never been formally legalized. However, in the act of 1866 Congress did include a table of conversion factors which "may lawfully be used" in going from one system to the other. That Congress intended this table only as an approximation to the true ratio of the units in the two systems is evident from the fact that the meter is given as equivalent to 39.37 inches, while the millimeter is rounded off to 0.0394 inch.



The platinum-iridium meter and kilogram, supplied to our Government as a result of its participation in the Metric Convention, provided this country with far better material standards than it had ever had before. Both the meter bar and the kilogram had been carefully compared with the international prototypes, and the coefficient of expansion of the meter bar had been measured. Moreover, they constituted, together with the troy pound, the only legal material standards possessed by the Government. Accordingly, in the absence of further congressional action, Superintendent Mendenhall, of the Coast and Geodetic Survey, in 1893 issued the following order: "The Office of Weights and Measures, with the approval of the Secretary of the Treasury, will in the future regard the international prototype meter and kilogram as fundamental standards, and the customary units, the yard and the pound, will be derived therefrom in accordance with the act of July 28, 1866." To pass from the meter to the inch the Office of Weights and Measures adopted the conversion factor, 1 meter equals 39.37 inches exactly, as set up in the act of 1866; and this ratio has been adhered to since that time.

The British inch, derived directly from the Imperial yard, is about four parts in a million shorter than the United States unit. The conversion factor, 1 inch equals 25.4 millimeters exactly, as specified in the proposed legislation, falls between the present accepted values of the British and the United States inch.

The change of two parts in a million in the magnitude of the inch will not affect industry in the slightest because it falls far within the tolerances employed in industrial measurements. (A change of only 1° C in the temperature of a steel gage block changes its length by 10 parts in a million—five times the proposed change in the unit itself.) As a matter of fact, the conversion factor, 1 inch equals 25.4 millimeters, has recently been adopted for industrial purposes by standardizing groups in 15 countries, including the United States and Great Britain.

In certain kinds of precise measurements of length, such as the difference in length of two gage blocks, it is often advantageous to use the optical method of interferometry. When employing this method, one must know the exact wave length of the light being used. The proposed legislation authorizes this procedure for purposes of standardization and specifies the wave length of the strong red line in the spectrum of cadmium, together with its reciprocal—the number of these light waves in 1 meter.

The bill which has been submitted to the Secretary of Commerce for transmittal to Congress reads as follows:

#### A BILL

To define certain units and to fix the standards of weights and measures of the United States.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the meter adopted by Congress July 28, 1866 (U. S. Code, title 15, chap. 6, sec. 205), as a legal unit of length shall be defined as the distance, at 0° centigrade, between the axes of two median lines engraved upon the bar of platinum-iridium deposited in the International Bureau of Weights and Measures, and declared to be the international prototype of the meter by the First General Conference on Weights and Measures, this bar being subjected to normal atmospheric pressure and supported by two rollers not less than a centimeter in diameter situated symmetrically in the same horizontal plane and at a distance of 571 millimeters the one from the other.

SEC. 2. That the United States inch shall be a legal unit of length defined as the distance comprising two hundred fifty-four ten-thousandth parts (0.0254) of the distance defined as the meter.

SEC. 3. That the United States primary standard for the determination of the legal units of length, the meter and the inch, from which all other legal units or measures of extension, whether linear, superficial, or solid, and all legal units of capacity, except as otherwise provided herein, shall be derived and ascertained, shall be the platinum-iridium bar known as National Prototype Meter No. 27, which was received by the United States from the International Bureau of Weights and Measures in 1890, and which is now in the custody of the National Bureau of Standards. The length of the graduated interval on the bar shall be the value certified by the International Bureau of Weights and Measures: *Provided, however,* That it shall also be legal to use for standardization purposes the following supplementary relations: (a) the wave length of the red radiation from cadmium equals six thousand four hundred thirty-eight and four thousand, six hundred ninety-six ten-thousandths times ten to the minus tenth power ( $6438.4696 \times 10^{-10}$ ) meter, under standard conditions as specified by the International Committee of Weights and Measures, and (b) one (1) meter equals one million, five hundred fifty-three thousand, one hundred sixty-four and thirteen one-hundredths (1 553 164.13) wave lengths of the red radiation from cadmium, under the same specified conditions, these values being those provisionally approved by the Seventh General Conference on Weights and Measures, held in 1927, and published in *Comptes Rendus des Séances de la Septième Conférence Générale des Poids et Mesures*.

SEC. 4. That the kilogram shall be a legal unit of mass defined as the mass of the cylinder of platinum-iridium deposited in the International Bureau of Weights and Measures and declared to be the international prototype of the kilogram by the First General Conference on Weights and Measures.

SEC. 5. That the United States avoirdupois pound shall be a legal unit of mass defined as the mass comprising four billion, five hundred thirty-five million, nine hundred twenty-four thousand, two hundred seventy-seven ten-billionth parts (0.453 592 427 7) of the mass of the kilogram.

SEC. 6. That the United States primary standard for the determination of the legal units of mass, the kilogram and the pound, from which all other legal units of mass or weight, and units involving mass or weight, shall be derived and ascertained, shall be the platinum-iridium cylinder known as National Prototype Kilogram No. 20, which was received by the United States from the International Bureau of Weights and Measures in 1890, and which is now in the custody of the National Bureau of Standards. The mass of this cylinder shall be the value certified by the International Bureau of Weights and Measures.

SEC. 7. That the United States troy ounce, and the United States apothecaries' ounce, shall each be a legal unit of mass defined as a mass comprising four hundred eighty seven-thousandth parts ( $480/7000$ ) of the mass of the United States avoirdupois pound. The carat shall be a legal unit of mass defined as a mass comprising two ten-thousandth parts (0.0002) of the mass of the kilogram.

SEC. 8. That the United States gallon shall be a legal unit of capacity defined as a capacity of two hundred thirty-one (231) cubic inches.

SEC. 9. That the United States bushel shall be a legal unit of capacity defined as a capacity of two thousand, one hundred fifty and forty-two one-hundredths (2,150.42) cubic inches.

SEC. 10. That the liter shall be a legal unit of capacity defined as the volume occupied by the mass of one kilogram of pure water at its maximum density and under normal atmospheric pressure.

It will be evident from the wording of the proposed legislation that it is not in any sense a proposal to use the metric system in place of our present customary system of weights and measures. On the contrary, it is a proposal to establish legally the standards which define the weights and measures now in use. It uses for this purpose the platinum-iridium meter no. 27 and kilogram no. 20, because they are the best material standards of length and mass which this Government possesses. By defining the inch and the pound as certain specified fractions of the meter and the kilogram, we base our customary system of weights and measures on material standards that have been shown through the observations of the past 40 years to be highly stable and constant in value. But in so doing, we do not for a

moment relinquish the units of our customary system of weights and measures. On the contrary, for the first time in the history of our country their values will be definitely established by this legislation.

### ABSTRACTS OF STATE REPORTS <sup>3</sup>

#### ALABAMA

By H. S. HOLLOWAY, *Chief, State Division of Weights and Measures*

Mr. Holloway reported an amendment to the law in relation to milk bottles, fixing a penalty on the dealer in illegal bottles, and observed that the stamping out of illegal sizes, especially the  $\frac{1}{2}$  quart, was a principal problem in law enforcement. He stated that the State rules and regulations for weighing and measuring devices were amended from time to time to keep these in conformity with the Conference recommendations.

#### CALIFORNIA

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

In the absence of Mr. Tucker, who had been delayed in arrival, Mr. Fuller reported the passage of several amendments to the State law; one of these had the effect of putting all county sealers under civil service, another made it the duty of local officials to attend annual meetings of the State association, a third required the sale by weight of all meats, poultry, and fish. He mentioned the success obtained by various methods of publicity, including newspaper articles, radio talks, and motion pictures.

#### CONNECTICUT

By C. L. KLOCKER, *Inspector, Department of State Police*

Mr. Klocker reported that one amendment to the law had been passed providing a penalty for removing an official seal or condemning tag from apparatus; other amendments under consideration would require that fuel oil and gasoline at wholesale be sold by vehicle-tank compartment or by meter, and that coal be weighed by a licensed public weigher. He mentioned that the State was procuring a large-capacity scale-testing equipment.

#### DISTRICT OF COLUMBIA

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

Mr. Roberts reported that the increase made last year in his inspection staff had rendered it possible to give especial attention to the suppression of dishonest competition. He mentioned a provision in the current appropriations bill providing for the enforcement of the license laws by his department. He also spoke of the loss sustained through the death of W. C. Diller, his principal assistant for 15 years.

#### FLORIDA

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

Mr. Crawford reported that no general State-wide inspection of weights and measures was required by law; however satisfactory prog-

<sup>3</sup> For convenience of reference, these reports have been arranged in alphabetical order throughout.

ress was being made in Jacksonville. He mentioned the tests of vehicle scales made in his jurisdiction by the National Bureau of Standards equipment. This had resulted in much good; one of the results was that installations of these scales would hereafter be made under his supervision.

#### GEORGIA

By S. H. WILSON, *State Oil Chemist*

Mr. Wilson reported the continued failure of the State to enact a general weights and measures law; however the visit of the vehicle-scale testing equipment of the National Bureau of Standards had stimulated interest and had provided accurate data as to conditions in this respect which could not have been obtained in any other way; he hoped this would ultimately result in the passage of legislation. Meanwhile, the State-wide inspection of gasoline-measuring equipment was continuing.

#### IDAHO

By FRANK L. HAMMON, *Director, State Bureau of Weights and Measures*

Mr. Hammon reported that a great deal of difficulty was being caused by the installation of obsolete scales which were not susceptible of indicating accurate weights, for the purpose of weighing livestock. An attempt would be made to secure a law requiring that a used scale could not be installed before its approval by his Bureau had been obtained. He also said that new and heavier apparatus for the testing of large-capacity scales was being procured.

#### ILLINOIS

By JOHN J. LEVITT, *Superintendent, State Division of Standards*

Mr. Levitt reported that the outstanding accomplishment of the year was the inauguration of a competent large-capacity scale-testing service. The new equipment was very dependable and economical in operation, it was revealing inaccuracies in scales which were resulting in their condemnation for repair or replacement, and it had the universal approval of owners and operators of motortruck scales.

#### INDIANA

By ROLLIN E. MEEK, *Chief, State Bureau of Weights and Measures*

Mr. Meek reported that the State was continuing its policy of keeping its codes of specifications and tolerances uniform with the Conference codes by incorporating amendments adopted by the Conference. He also reported increased activity on the part of local weights and measures officials. The State equipment actively continued its work of testing large-capacity scales and is gradually eliminating scales which are inaccurate, poorly installed, or of faulty construction.

#### KENTUCKY

By WILLIAM H. ISING, JR., *Inspector of Weights and Measures, City of Louisville*

Mr. Ising reported that in his State there still was no State-wide inspection of the commercial weights and measures in use. In Louisville a special survey on accuracy of marked weights on package goods had been made; 15 percent of the packages were found not to be

accurately marked. In the absence of a proper vehicle-scale testing equipment these scales were being tested with heavy loads weighed on a master scale.

#### MAINE

By G. K. HEATH, *Deputy State Sealer of Weights and Measures*

Mr. Heath reported the adoption of new rules and regulations, one outlawing the measuring stick for the determination of quantity in sales of gasoline and fuel oils, another requiring air eliminators on new installations of gasoline pumps other than those of the visible-bowl type; a number of the codes of specifications and tolerances of the National Conference had also been adopted. The law was amended specifically to include devices indicating prices, as well as weight or measure.

#### MARYLAND

By S. T. GRIFFITH, *Inspector of Weights and Measures, City of Baltimore*

Mr. Griffith reported the passage by the legislature of a resolution requesting the Governor to appoint a committee to make a survey of weights and measures conditions throughout the State and to make a report, with recommendations, before the next session. It is felt that this may result in the passage of competent State legislation. As a result of the passage of a law requiring that coal be sold only over tested scales, Baltimore is now obliged to test large-capacity scales located outside the city limits.

#### MASSACHUSETTS

By JOHN P. MCBRIDE, *Director, State Division of Standards*

Mr. McBride reported the adoption of a regulation in relation to metered deliveries from vehicle tanks designed to prevent the delivery of short measure through the incorporation of air in the liquid being delivered through a meter. He summarized the results of State tests of vehicle scales and pointed out some of the more common causes of failure. The results of a special survey on weights of butter in prints were given including figures on probable losses through shrinkage.

#### MICHIGAN

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

Mr. Austin reported the very recent and sudden death of Hon. Burr Lincoln, Commissioner of Agriculture for the State, who had long been active in weights and measures administration. As a result it was not practicable to carry through plans made for the State department to be represented at the Conference.

#### MINNESOTA

By K. K. SOLBERG, *State Supervisor of Weights and Measures*

Mr. Solberg reported that through the reorganization of his department the inspection work was being conducted more efficiently than formerly, and a greater number of inspections were being made; however, the shortage of funds and equipment was acute. An effort

was now being made to procure four new large-capacity scale-testing equipments to supplant eight lighter equipments which had become obsolete, in the testing of livestock and vehicle scales.

#### MISSOURI

By LOUIS G. WALDMAN, *Commissioner of Weights and Measures, City of St. Louis*

Mr. Waldman reported that although there was, as yet, no State-wide inspection of weights and measures, increased interest was being manifested in the passage of a State law; he was officially representing the State at the Conference in order to obtain information to be used as a basis for recommendations. In the city of St. Louis an ordinance had been prepared designed to codify the many weights and measures ordinances now in force.

#### NEVADA

By JOE M. McLEOD, *State Inspector of Weights and Measures*

Mr. McLeod reported that as a result of the very large area and the small population of his State, the Department was faced with special problems of administration not ordinarily encountered elsewhere. Consideration was now being given to the procurement of equipment for testing large-capacity scales which would be competent to test such scales and yet mobile enough to cover the State.

#### NEW JERSEY

By CHARLES C. READ, *State Superintendent of Weights and Measures*

Mr. Read greeted the delegates and stated that he would ask Joseph G. Rogers to report. Mr. Rogers reported an intensive drive against the bootleg coal traffic and the introduction of additional legislation deemed necessary for proper control; large increases in reweighings of general commodities; the appearance of a tendency to degrade the quality of hanging spring scales; and plans for the more effective regulation of deliveries of fuel oil.

#### NEW YORK

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

In the absence of a representative of the State Bureau of Weights and Measures, Mr. Smith reported that no important legislation in relation to weights and measures has been enacted in the State during the year.

#### NORTH CAROLINA

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

Mr. Baucom reported that the appropriation for weights and measures work in his State had been very substantially increased. As a result the procurement of apparatus for the testing of electricity, gas, and water meters was contemplated; also plans had been formulated to provide more nearly adequate tests on large-capacity scales. The State law was amended to eliminate the sale of corn by the bushel, dry measure, on the cob, or with cob and shuck.

(At this point, at 1:00 p. m., the Conference took a recess until 2 p. m.)

## SECOND SESSION—AFTERNOON OF TUESDAY, JUNE 1, 1937

(The Conference reassembled at 2:20 p.m., Dr. Lyman J. Briggs, President of the Conference, in the chair.)

### ABSTRACTS OF STATE REPORTS—Continued

#### NORTH DAKOTA

By A. J. JENSEN, *State Superintendent of Weights and Measures*

Mr. Jensen reported that the specifications and tolerances for apparatus, in his State, were those adopted by the National Conference. Difficulty had been experienced through the sale of second-hand scales which had been condemned in adjoining jurisdictions; as a result a regulation had been promulgated prohibiting the sale of such a scale until it had been approved. He gave figures as to the number of pieces of apparatus tested.

#### OHIO

By O. E. BRENNEMAN, *Chief Deputy State Sealer of Weights and Measures*

Mr. Brenneman reported the passage of legislation which required that all scales used in the purchase and sale of live stock must be tested by the State four times a year, and that the weighers must be bonded. This act was to be enforced jointly by the Bureaus of Weights and Measures, and of Animal Industry. It was contemplated that it would be necessary to procure new equipment to carry out these provisions.

#### PENNSYLVANIA

By C. J. P. CULLEN, *Director of Standard Weights and Measures*

Mr. Cullen described two large-capacity scale testing trucks recently put into service and reported the success that had attended this testing work. Eighty-four percent of the scales tested, over which material purchased by the State was weighed, had been condemned; 59 percent of the tippie scales tested at mines were found weighing short, and many heavy-duty commercial scales had also been tested. He said that it was impossible to meet the requests for tests being made.

(At this point, Mr. C. D. Baucom, Vice President of the Conference, assumed the chair.)

#### RHODE ISLAND

By EDWARD R. FISHER, *Chief, State Bureau of Weights and Measures*

Mr. Fisher reported that there had been no changes in the weights and measures law, the legislature having acted unfavorably on the bills which had been presented at the session. He mentioned the work of his Bureau in gathering evidence of short measure deliveries in the case of an oil concern which had a contract with a State agency; as a result six prosecutions were pending for violations of weights and measures laws.

## SOUTH CAROLINA

By A. H. GIBERT, *Chief State Inspector of Weights and Measures*

Mr. Gibert read a report submitted by Hon. J. Roy Jones, Commissioner of Agriculture. It was said that the work done in the State by the vehicle-scale testing equipment of the National Bureau of Standards had been greatly appreciated by the owners of the scales, and had shown the importance of proper equipment. The provisions of contemplated Federal legislation for financial assistance to the States for enforcement of weights and measures laws were endorsed.

## TENNESSEE

By TOM WEBB, *Sealer of Weights and Measures, City of Nashville*

Mr. Webb reported that there was no State-wide inspection of weights and measures in his State. However, a State law had been enacted under which the rules and regulations of the National Conference might be adopted. In Nashville the principal difficulty encountered had been with truckers of coal from mines. However, the enforcement of a new city ordinance had bettered conditions in this respect to some extent.

## TEXAS

By W. S. BUSSEY, *Chief, State Division of Weights and Measures*

Mr. Bussey reported that 3,000 vehicle tanks had been tested at the six testing stations operated, that a greater amount of work had been done in relation to cotton weights, and that the Division had been very active in the enforcement of the law in relation to butterfat tests. Appropriations for the Division had been greatly increased; also a special appropriation had been secured to purchase two vehicle-scale testing trucks and these would be delivered shortly.

## VERMONT

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

Mr. Davis reported three amendments to the State law: The Division of Weights and Measures was transferred from the Department of Industries to the Department of Agriculture, the change being made to eliminate overlapping functions especially in creamery inspection work; the mandatory licensing of scale repair men was provided for; and the Vermont log rule was adopted as the basis of determining the number of board feet in the log for purposes of purchase and sale.

## VIRGINIA

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

Mr. Meek reported that while weights and measures inspection work had advanced materially in Virginia, there was still need for increased activity, especially in connection with the testing of scales. He mentioned the helpful work being done by the training school for weights and measures officials, conducted by the League of Virginia Municipalities in cooperation with the Division of Markets and the State Division of Trade and Industrial Education.



WASHINGTON

By R. E. WHITE, *Supervisor, State Division of Weights and Measures*

Mr. White discussed the organization of weights and measures inspection work in his State; three cities had weights and measures departments, while in the remainder of the State the work was done by State inspectors. It was planned to procure a portable trailer equipment for the testing of vehicle-tank compartments and large meters. The truck used in the testing of large-capacity scales worked out well, although the load of test weights was not large.

WEST VIRGINIA

(While the State of West Virginia was represented by official delegates no report was presented at the meeting.)

WISCONSIN

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

Mr. Warner discussed pending legislation: One bill would require that in the case of second convictions for weights and measures offenses the facts should be prominently published in a newspaper; another had to do with the feeding and watering of livestock before sale and would require the testing of livestock scales once in 30 days. He mentioned a unique law of his State forbidding the advertising of the retail price of food in package form unless actual contents was set forth.

REPORTS OF REPRESENTATIVES OF STATE ASSOCIATIONS OF WEIGHTS AND MEASURES OFFICIALS

At this point brief reports of the activities of State associations were presented as follows:

California Sealers' Association, Charles M. Fuller.

Illinois Weights and Measures Association, James O'Keefe.

Indiana Association of Inspectors of Weights and Measures, C. B. Tolan.

Massachusetts Association of Sealers of Weights and Measures, Lorenzo D. F. Marston.

Michigan Association of Weights and Measures Officials, George E. Rutledge.

New York State Association of Sealers of Weights and Measures, Robert Williams.

Ohio Sealers' Association, J. C. Tinkey.

Pennsylvania Association of Inspectors of Weights and Measures, C. J. P. Cullen.

Texas Weights and Measures Association, W. S. Bussey.

Virginia Weights and Measures Association, B. W. Ragland.

Wisconsin Training Course for Sealers of Weights and Measures, George Warner.

RECENT DECISIONS INVOLVING THE CHICAGO WEIGHMASTER ORDINANCE

By JAMES O'KEEFE, *Sealer of Weights and Measures, City of Chicago*

Chicago has been maintaining her aggressive spirit and active carry-on in the interest of securing honest weights for the public.

Back in the year 1922 the city conducted a weights and measures crusade of wide importance by putting into her municipal code regulations providing that all bulky commodities sold in load lots by weight and delivered by wagon, truck, or other vehicle should be weighed on public weighmasters' scales, that public weighmasters' certificates of weight should be delivered to the purchaser at the time of delivery and before unloading, and that no public weighmaster should state in his certificate the tare weight of the vehicle until after weighing the vehicle. These enactments, together with their vigorous enforcement by the Weights and Measures Department, produced a salutary effect and did much to clean up conditions then prevailing in regard to short weighing, the use of padded weight tickets, the substitution of a different kind of coal for the coal billed and the mixing of an inferior grade with coal of a superior grade and quality. Conditions had become so bad that many reputable dealers were confronted with the situation of securing protection against such unfair trade practices or going out of business.

To thwart the enforcement of the provisions, certain recalcitrants instituted injunction proceedings in the courts. The Supreme Court of Illinois, however, upheld the validity of the ordinance and in its opinion commended it. Comment was made upon the lack of available means, without the ordinance, of detecting the short weigher and preventing him from continuing his nefarious practices when relying merely upon the State statute making sale by false weights a criminal offense. The court said:

Purchasers of a commodity by weight already had that protection but no way to enforce it. In buying ordinary articles the buyer generally may see the article weighed or have the means at hand to ascertain whether it is short weight, but when applied to load lots it was and is impossible for the purchaser to determine the weight of the load. The purpose of the ordinance was most commendable and essential to secure to the purchaser the weight of the commodity purchased and paid for. (*City of Chicago v. Wisconsin Lime & Cement Co.* (1924), 312 Ill. 520, 144 N. E. 3.)

The defeated party made an unsuccessful attempt to induce the Supreme Court of the United States to disturb the decision of the State Supreme Court upholding the ordinance. (*Wisconsin Lime & Cement Co. v. Chicago* (1926), 270 U. S. 626.) Thus from 1924 on, consumers of coal and law-abiding coal dealers enjoyed the protection of these code provisions.

During the recent depression coal buyers very naturally sought to save money on their coal bills. To satisfy the demand of persons looking for cheap coal, numbers of unemployed men, mostly nonresidents of Chicago, who owned or had the use of trucks, began hauling coal into Chicago from the northern part of Illinois, 60 to 100 miles away. This free-lance, nondescript group received encouragement from mine owners who sought the opportunity of profiting by opening up strip or surface mines and running cheap grades of coal into Chicago. A business approximating in volume 1,200 tons per day developed.

By January 1935, hundreds of truckers were engaged in this business of trucking coal from mines to Chicago consumers. Each trucker marketed the coal in any way he saw fit, without regard to ordinances or to honesty. The mines engaged agents in Chicago who advertised in the daily papers "mine to consumer" cheap coal. The coal user was at the mercy of the truckers in the matter of correct weights and representations as to grade of coal. He had no adequate way to pro-

tect himself and no responsible coal dealer to look to. To regulate this miscellaneous group of nonresident truckers was difficult, since there was no central control. When short weights were discovered the usual procedure of instituting municipal court prosecutions was futile because service of process outside of Chicago could not be obtained and many of the truckers, as said before, lived outside the city's limits and were irresponsible.

The owners of the mines interested in this business were then consulted and were requested to refuse to sell coal to truckers who were convicted of short-weight practices. The mine owners replied that they were in the business of selling coal and would sell to anyone, regardless of who he was; they said, furthermore, that they, the mine owners, were not responsible for what happened to the coal or to the Chicago consumer after the coal was loaded on the trucks at the mines. To increase their sales the mine owners not only abetted the free-lance truckers but battled to secure for the truckers their claimed right to continue their libertine practices. At the same time the mine owners disclaimed that the truckers were their agents and advanced the theory, later refuted by the courts, that the truckers were the agents of the coal users.

This situation was a direct challenge to the city's ordinance and demanded vigorous action on the part of the city sealer, who again renewed his prosecutions to compel compliance with the municipal law. Section 2947 of the city's code again became the subject of controversy. This section provides as follows:

2947. Commodities sold in load lots. Every load of any commodity, produce, or other article or articles of merchandise sold in load lots by weight, delivered by wagon, truck, or other vehicle within the city, shall be weighed by a public weighmaster; a certificate of weight for each such load, issued by such public weighmaster, shall be delivered by the driver or person in charge of the wagon, truck, or other vehicle used in the delivery, to the purchaser or consignee of such load, or to his or their agent at the time of the delivery and before any of the commodity, produce, or other article or articles of merchandise is removed from the vehicle, or such certificates shall be delivered to the inspector of weights and measures, or any of his deputies upon his or their demand. When delivery is made, in case no person is present to receive such commodity, produce, or other article or articles of merchandise, and if the purchaser or consignee, or his or their agent, cannot be located, then the memorandum or certificate of weight hereinbefore provided for shall be posted conspicuously at the place of delivery before any of the commodity, produce, or other article or articles of merchandise is removed from the vehicle.

The "punch" in this section is found in the requirement that the public weighmaster's certificate of weight was required to be delivered to the customer *before* the coal was unloaded.

Of course, before a weighmaster could properly certify the gross, tare, and net weights, he was obliged to weigh the empty truck.

The truckers then found that they could not obtain certified weight tickets until they appeared at the weighmasters' scales, unloaded their coal so as to give the weighmasters opportunity to ascertain the correct tare weight, and then reloaded it so that the gross could be obtained and the weighmasters could then certify to the correct net weight. Determined attempts to evade or defeat the ordinance followed. The city's Department of Weights and Measures decided it would be necessary to arrest immediately all truckers who did not comply with the ordinance. When arrests were made the mine owners, who had previously taken the position that they were not concerned with the method of delivery, paid high-priced lawyers to defend

the truckers and to obtain injunctions restraining the city and its officials from enforcing the ordinance. A suit for injunction was instituted in the Superior Court of Cook County by the most prominent of the mine owners. The city Law Department was successful in resisting the motion for temporary injunction and the plaintiff corporation then dissolved its Illinois corporation, reincorporated under the laws of the State of Delaware, and filed a new injunction suit in the United States District Court of Chicago upon the ground of diversity of citizenship. After a hearing in this case before United States District Judge Woodward, plaintiff's motion for injunction was denied, and later on the case was dismissed for want of equity. Concurrently with the State and Federal court injunction litigation, appeals were taken to the Supreme Court of the State of Illinois from judgments convicting and fining truckers for violating the ordinance. These cases were decided February 14, 1936, by an exhaustive opinion of the State Supreme Court, which fully sustained the city's ordinance. The court's opinion held that the truckers were the agents of the coal mines and that the contracts of sale were made in Chicago, the place of delivery of the coal, and not at the mines; that the ordinance was strictly within the police power of the city, as the delivery of true weights to the consumer is a matter clearly related to the public welfare. After commenting upon the fact that the opportunity to defraud the consumer in the sale of coal in load lots is great and that the consumer has no adequate way to protect himself against being cheated, and that the city had the right to adopt the ordinance as a police power measure in order to insure true weights to the consumer, the court said:

The defendants, nonresidents of the city of Chicago, are asking for a practice of weighing, as applied to the business done by them in the city, which under the ordinance here would not apply to those truckers living in the city and delivering coal from the local yards or local dealers in the city to the consumer. To recognize the demand of the defendants would be to discriminate between the local truckmen and dealers in Chicago in favor of nonresidents. \* \* \* If the defendant nonresidents desire to compete in the trucking business in the Chicago market they must submit to the requirements of the ordinance regulating the business. The facts, if there be such, that it may be necessary to establish coal yards in Chicago, ship by rail in car-load lots, unload from the car and deliver to the purchaser, or submit to an unloading and reweighing of the coal in the event that coal moves into Chicago by trucks, are incidental problems, to be solved by the coal company in the event it desires to sell in the Chicago market. There is no discrimination made by the ordinance against the defendants. (*City of Chicago v. Waters*, 363 Ill. 125, 1 N. E. (2d) 396.)

Even after this body blow the mines and nonresident truckers did not stop fighting. Taking encouragement from a dissenting opinion which had been filed in the Illinois case, they then appealed to the Supreme Court of the United States, where they contended that the city's ordinance deprived them of property without due process of law in violation of the Fourteenth Amendment to the Federal Constitution. The case was presented to the high court at Washington upon extensive printed briefs and the oral arguments of the company's attorneys who appeared for one of the truckers whose conviction had been sustained by the State Supreme Court, and of Assistant Corporation Counsel Col. Martin H. Foss representing the city of Chicago. On January 4, 1937, the court delivered its unanimous opinion affirming the decision of the Supreme Court of Illinois and upholding the

constitutionality of the city's ordinance. In concluding its opinion the United States Supreme Court said:

For many years, \* \* \*, Chicago has rightly required local truckmen to comply with the ordinance. Since the evil to be prevented is no less imminent when coal comes by truck from without the city, a like requirement as to this seems equally important. The ordinance makes no discrimination of which appellant can complain; and no adequate reason has been suggested for concluding that although valid as to local truckers it violates rights guaranteed to him by the Fourteenth Amendment.

That the coal delivered by appellant was weighed at the mine on tested scales is stressed; but this is not really material. Chicago had no control there and such weighing afforded no adequate protection against fraud. The opportunities for manipulation thereafter are obvious. Invalidity of the ordinance cannot be established by suggesting some other less burdensome procedure, which possibly might accomplish the end in view—honest delivery weights. The city may act with proper legislative discretion. Here there is nothing to show action so arbitrary, unreasonable, or discriminatory as to require us to overthrow its deliberate effort to meet a plain evil. (*Hauge v. Chicago*, 299 U. S. 387.)

The result of these court decisions has been to clarify the law and set a precedent in its enforcement which is a guide to city sealers throughout the Nation in defining their duties.

Of course, the contest waged by the city of Chicago had many complications, was protracted and hard fought. During the progress of litigation 119 cases were instituted by the city sealer and tried in the Municipal Court of Chicago and fines were assessed against all defendants. The mine owners attempted to sway public opinion and, being a closely knit group, affiliated with their local Chamber of Commerce, they succeeded in having it hold meetings and declare that Chicago had erected barriers to the free flow of goods to a competitive market; whereupon that Chamber of Commerce petitioned the Illinois Chamber of Commerce and the Chicago Association of Commerce to investigate what they called a "trade barrier." After a full hearing by both associations, each gave a vote of confidence to Chicago's Weights and Measures Department and declared the charge of the downstate Chamber of Commerce to be without foundation.

The mine owners also succeeded in releasing considerable publicity in the Chicago papers, as well as in the papers in the towns in the mining districts, much of which was adverse to the city sealer's office. This adverse publicity, it is hoped, has been dispelled by the pronouncements of the highest court of the State and the Supreme Court of the United States.

After the final decision of the Supreme Court of the United States had been handed down and its importance had traveled throughout the different States and cities, the city sealer's office was deluged with requests for copies of the ordinance, and many cities, facing problems in the trucking of merchandise, have adopted Chicago's ordinance.

The latest decision is from the Court of Appeals in Maryland, which upholds the validity of an ordinance of Baltimore, which adopted in part Chicago's ordinance.

In closing, may I emphasize again one of the most important points in connection with Chicago's ordinance, which is the requirement that the delivery ticket shall be delivered *before* any of the commodity is unloaded. This provision forces the seller to commit himself in advance as to his weights, and eliminates the possibility of excuses after he is caught, for the manifest reason that the weight must correspond with the weight on the ticket. Most States and cities have laws requiring only the delivery of the ticket, but not mentioning the

time at which it must be delivered. If the ticket is delivered after the coal is delivered, it is impractical to determine the weights. Again, the driver may have two tickets, one being correct for the load and the other calling for a ton more than is on the load. He can safely present the latter ticket if he is allowed to delay its delivery until after the coal is unloaded.

The ACTING CHAIRMAN. We are very thankful to Mr. O'Keefe for this paper. We can sympathize with him in the hard work that was necessary in the preparing of the cases and the hours of study that he must have devoted to the subject.

#### CONSUMERS' INTEREST IN ADEQUATE WEIGHTS AND MEASURES SUPERVISION

By D. E. MONTGOMERY, *Consumers' Counsel, Agricultural Adjustment Administration*

Mr. Chairman and members of the Conference, probably no people in America realize so fully the importance of adequate weights and measures supervision as do you who are gathered in this room. Probably no group *needs* to realize the importance of weights and measures supervision more thoroughly than does the group for which I appear as spokesman, the consumers of America. I suspect, however, that the group for which I speak knows far too little about weights and measures supervision and pays far too little attention to that subject. I suspect that if we could take a cross section of average American consumer opinion on this question we would find that consumers take it for granted that they should be protected in the weights and measures of things they buy, and because they take it for granted that this *should* be done they also take for granted that it is being done. We would probably find that in many districts consumers do not enjoy adequate safeguards and because of their indifference do not even appreciate their need for protection. In other districts we would find that consumers do have the benefit of good enforcement of a good law, but take that protection for granted like other governmental services and are not on the alert to see that it is kept up to the standards which people in your position know to be necessary and desirable.

The indifference with which too many consumers probably look upon weights and measures supervision is not surprising. For many years most of us have been rather indifferent about most of our consumer problems. Our tradition has been to make a lot of money and to spend it easily. Even millions of families who never made a lot of money and never found the spending of it easy, were subject to the influence of this general point of view and were discouraged from tackling their consumer problem sensibly. But if this is true of the past, it very positively is much less true today and it most certainly will not be true tomorrow. The American people are becoming consumers with amazing rapidity. That is to say they are becoming aware of their consumer problems and they are taking steps to do something about those problems.

As consumers we are interested in the kind of goods we buy, in the price we pay for them, and in the quantity of things we consume. At first this new consumer movement that is getting under way all over the country seems to be giving its major attention to quality. It wants facts which accurately describe the things consumers pay for, it wants to be sure they are getting their money's worth in terms of

real utility. The consumer movement is also interested in price. It is showing some disposition to do something collectively on the subject of price. If it is not equally aware of the necessity of being sure that when consumers purchase goods they get the quantity which they are paying for, then that indifference to the extent that it exists can only be due to the fact that consumers are taking something for granted. If the consumer movement is not getting behind you in demanding adequate weights and measures supervision, it is only because the need of doing so has not been sufficiently brought home to consumers. Perhaps the fault is yours and perhaps the fault belongs to people who like myself are trying to promote the cause of consumer education. We need not waste any time, you and I, dividing the blame. It is perfectly clear that consumers can be interested in weights and measures supervision and I think it is equally clear that once they are interested in it they will get it.

Consumers have an enormous stake in your profession and in your service. Latest available figures indicate an annual consumption in this Nation of 19 billion pounds of potatoes; of more than 21 billion pounds of meat, poultry, and eggs; of more than 27 billion pounds of fresh fruits and vegetables; of  $15\frac{1}{2}$  billion gallons of gasoline, of 445 million gallons of lubricating oil. All but a very small part of these enormous totals is measured out to the consumer in millions of small retail transactions across the counter. For at least two-thirds of the families who make those millions of purchases it is a question of vital importance that they get the quantity they pay for. A very minor average error against them in weight or measure could mount up to a national total of very real significance.

Only an insignificant fraction of the total amount of money involved in the transfer of this huge store of commodities to consumers would be required to adequately police the weights and measures aspect of these transactions. Mr. Ralph Smith, of the National Bureau of Standards, in an address which he gave before the League of Virginia Municipalities last September estimated that the average annual assessment for adequate weights and measures enforcement in Virginia would amount only to 30 cents per family. This, he shows, is the cost of 15 pounds of potatoes compared with the 770 pounds the family uses in a year,  $1\frac{1}{4}$  pounds of meat compared with its 650 pounds total consumption, 2 gallons of gasoline out of 500,  $1\frac{1}{2}$  quarts of lubricating oil out of 14 gallons. And, remember, any one of these items would meet the whole cost. Certainly if shown these facts, consumers will not object to the expenditure of 15 pounds of potatoes to assure themselves fair weight on all the potatoes they buy in a year and on all the other things they buy by weight or measure during the year. If they average short weight by as little as  $\frac{1}{2}$  ounce on each pound of potatoes they buy, this item alone would cost them as much as the annual assessment for adequate weights and measures supervision on all the things they buy.

The reports of the recent National Conferences on Weights and Measures give ample testimony that alert weights and measures officials are giving more than an adequate return on the money invested in their departments. Going back to your 1929 meeting I find this rather startling statement made by Ernest N. Smith, General Manager of the American Automobile Association: "From a survey recently made by the American Automobile Association it was found

that the motoring public in the United States is being robbed by dishonest operators of retail gasoline pumps of a sum conservatively estimated at \$20,000,000 annually."

This situation may have changed since then, but the chances are that there is still need for improvement. For example, I find in your 1936 Conference proceedings references to a check-up here in Washington on one chain of gasoline stations, which revealed that out of 36 purchases of 5 gallons each, short measure was given 23 times in amounts ranging from 6 ounces to 2 gallons. George M. Roberts, the Superintendent of Weights and Measures for the District of Columbia, estimated that this firm was defrauding Washington consumers approximately \$100,000 per year. Items such as these should certainly arouse the interest of consumers in weights and measures supervision.

Another interesting story of short weighing comes to me from New York and involves the sale of dressed poultry. Consumers complained that they were being given short weight on dressed poultry at one particular store. A check of the scales used in this store indicated that they were satisfactory. After some careful sleuthing a weights and measures official found the source of the cheating. If a customer asked for a dressed chicken the clerk inserted a lead plug covered with fat into the chicken as he secured it from the cooler. After he had cleaned the chicken for the customer he recovered his lead plug and was ready to serve the next person. The bad situation which existed in poultry buying here in Washington was mentioned by Mr. Roberts at your Conference last year when he reported that 68 out of 81 purchases of poultry at one group of stores were short weight.

There is one paragraph of Mr. Roberts' address of last year in which I take particular interest as a spokesman for consumers. Said Mr. Roberts, "Credit for presenting to Congress the facts regarding the desperate need for an increased inspection force is due largely to the active chairman of our local consumers' council, who did very fine work." I am wondering if this comment does not suggest a line of endeavor in which the National Conference of Weights and Measures and the Consumers' Counsel Division might cooperate. The nature of these consumer organizations, it seems to me, makes them the logical spokesmen to demand stronger laws and more adequate appropriations for weights and measures departments.

I should like to call your attention to two developments along this line which I think hold great possibilities for bringing to the attention of consumers the importance of good weights and measures administration. The first of these is the rapid increase in consumer organization, and the second, the great strides that are taking place in the development of programs of consumer education.

At the present time consumers are financing three independent, nonprofit organizations to test and rate consumer goods. These organizations have a combined membership of approximately 100,000 individuals. Surely groups of people who see the importance of supporting agencies to give them the facts about commodities ought to be equally interested in seeing that they get the amount of goods for which they pay.

Last month the organizational work was completed for the Consumers' National Federation to act as a central clearing house for



organizations having an interest in consumer affairs. The program of this organization will, among other things, include educational work and an informational service.

Such groups are for the most part of very recent origin. I should like to call your attention to certain long-established organizations which have been giving special emphasis to consumer programs in their programs. The American Association of University Women distributes a large consumer study kit, and over three thousand of these have gone out to study groups. Some of the branches of this organization have held special consumer exhibits. The League of Women Voters has taken an active interest in consumer affairs. This organization has supported food and drug legislation and has issued for its membership such publications as "The Government and the Consumer", and "Research in the Consumers' Interest." The National Congress of Parents and Teachers has a committee which has been working on a 3-year program giving emphasis to consumer interests. One of the handbooks of this organization contains a chapter on the "Education of the Consumer." Thousands of other women are becoming consumer conscious through the program of the National Coat and Suit Recovery Board to promote their consumer-protection label, a label which assures the retail buyer that satisfactory labor standards have been met in the production of the article.

The American Home Economics Association with a membership of 12,000 teachers has always taken a deep interest in consumer welfare. The journal of this association has carried many articles on subjects of importance to the consumer. "The Consumer Education Newsletter" which the association issues monthly is an outstanding service to teachers in the field.

As a guide to the consumer education movement the Home Economics Education Service of the United States Office of Education has issued a 205-page bulletin entitled "Consumer Buying in the Educational Program for Homemaking." Over 9,000 copies of this bulletin have been distributed to educational leaders. The interest of the States in this program is indicated by such publications as "Suggestive Materials for Teaching Consumer Buying in the Secondary Schools" issued by the Home Economics Division of the University of Iowa; "Consumer Buyer Education—A Memorandum for Home Economics Teachers" by the Department of Education of the State of New Jersey; "Education for Consumption" by a committee of the Colorado Education Association and the "Report of Committee on Consumer Education" by the Home Economics Extension Service of Ohio State University.

In the field of business education interest in consumer problems is no less marked. In June 1934, the University of Chicago Conference on Business Education was devoted solely to the subject "Business Education and the Consumer." The National Education Association is holding its annual convention in Detroit the latter part of June and three-fourths of the program of the Social Business Section is given over to speakers on consumer education. In California the Home Economics and Business Education Divisions of the State Department of Education are cooperating to publish materials for a State-wide program of consumer education.

In Idaho and Wisconsin material is being distributed for adult consumer education on a State-wide basis. In Idaho the State De-

partment of Education, the Civilian Conservation Corps, and the Works Progress Administration, have set up a correspondence consumer course. In Wisconsin the Rural Sociology Division of the State Department of Agriculture has issued a guide for adult study entitled, "How Can the Buyer Get His Money's Worth?"

We get word of courses in consumer education being set up in many schools throughout the country. We know of nine colleges or universities which are teaching the economics of consumption, seven which are adding consumer buying courses, and four which give courses in the methods of consumer education. This does not include the large number of schools in which there are regular courses in home economics, and the subject of home economics, I understand, has very definitely stepped out of the kitchen and is going into the market place where consumer values are made. The Cooperative League recently reported that 18 American colleges are adding special courses in consumers' cooperation, and the subject is discussed in 131 other colleges. Here is a phase of the consumer movement which will do yeoman service for better weights and measures supervision.

I hope I have discussed consumer education at sufficient length to convince you that this development is not just a passing fad. Consumer education has become a solid part of our educational structure because it meets a fundamental need, and I am sure that it offers a splendid channel for spreading the gospel of better weights and measures supervision.

I think that the time has come to turn the full spotlight of attention on weights and measures departments as consumer-protection agencies. Teachers of consumer education need to have their attention called to the work of weights and measures departments. Consumer organizations that are on the lookout for practical projects need to be shown that weights and measures supervision represents a close-at-hand problem that will give good returns for the attention they give it. Consumer groups not only need to work to secure weights and measures supervision in States and communities which do not have it, they need to work for adequate appropriations in all jurisdictions so that officials can have sufficient equipment and a staff of such size and training that they can do a thorough-going job.

The Consumers' Counsel Division for which I speak has made a small beginning in trying to arouse the interest of consumers in weights and measures supervision. The "Consumers' Guide," which now goes to 100,000 consumers, has carried several articles on this subject. Fairly recent ones are: "Checking Your Weights and Measures", and "Grocery Clerks Test Their Knowledge." The first of these is a general story on weights and measures administration and the second tells of a project carried on in Richmond, Va., to educate grocery clerks about weights and measures. I brought along a number of these issues of the "Consumers' Guide" so that you may have copies as you leave today's meeting.

Our division receives a continuing demand from consumer groups and teachers of consumer education for study outlines on consumer problems, and we have undertaken the production of such a series. I have in my hand a copy of the first one to come from the press. It is an attractively printed, well illustrated guide to study for school or adult groups. It lays out an entire program of reading, investigation, reporting, and tabulation of results on its particular subject, which

happens to be eggs. Our first principle in preparing these is to make them interesting, believing that if we succeed in that we will also make them instructive.

The proposition I should like to put to the members of the Conference is this: If, as Mr. Smith says, our chief difficulty is getting consumers and governmental officials to "fully appreciate conditions which actually exist, the consequent need of adequate weights and measures supervision, and the tremendous savings to the people which follow the establishment of such supervision", then we should include a consumer study guide titled "Consumers Look at Weights and Measures" in this series. It will help do just what Mr. Smith suggests.

If we are to tackle the job of preparing such a study guide the first thing to do is to find out as exactly as possible just what the weights and measures situation is in all parts of the country. We propose to do this by sending out a questionnaire on various phases of weights and measures administration, covering such items as the nature of your weights and measures law, the cost of your department, some examples of savings made for consumers, and general results of your enforcement activities. We will especially want to know of the methods you have found successful in publicizing your department, and the projects you have worked out for educational work in the public schools.

We would use the material gathered in this study in three ways. First, we would carry special articles in the "Consumers' Guide" telling what we find; second, we would use this information in the weekly radio broadcast which we give in cooperation with the National Federation of Women's Clubs over the red network of the National Broadcasting Co.; and third, we would prepare on the basis of what we find an attractive illustrated study guide for use by adult consumer groups and by classes in consumer education in the public schools.

I realize that the filling out of "another" questionnaire on your part is not an easy task. But if this plan will promote weights and measures supervision in places not now having it and will strengthen departments already in operation, it should be worth the trouble. If it is within your policy to take official action endorsing such a program, that will strengthen our position in asking weights and measures officials for the information, and, I am sure, will give us much better results.

I appreciate the opportunity to present this matter to the National Conference on Weights and Measures, and I want to invite you, without further invitation, to send stories of your enforcement activities and experiences to the "Consumers' Guide" and to make of that publication a clearing house for news on the consumer protection aspects of weights and measures administration.

#### MOTION ENDORSING PROGRAM OUTLINED ABOVE

The ACTING CHAIRMAN. We thank Mr. Montgomery for his splendid paper.

Mr. FULLER. Mr. Chairman, at the conclusion of Mr. Montgomery's address I feel that the members of the Conference should not only be willing but most anxious to endorse his suggestions, and if it is in order I would like to make the motion that we heartily agree

in favor of his suggestions and are very glad to have the opportunity to cooperate with his program.

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

The ACTING CHAIRMAN. We now come to a subject that is of vital interest to all of us; whether we agree or disagree with the speaker I am sure we will listen with a great deal of interest to what he proposes as a result of a year's study. We will hear J. H. Meek, of Virginia, speak on the "Proposed Federal Legislation in Relation to the Financing of Weights and Measures Inspections."

Mr. ROGERS. There are a number who have left for the day. I feel that this should be taken up at some meeting when all of the representatives of the States will be here to voice their opinions on it, or hear what it is all about. I would therefore like to move adjournment for the day.

Mr. CULLEN. I think that is a very good idea. There are a number of our people still to come from Pennsylvania and other States, I think, and for the benefit of all it will be better for Mr. Meek to postpone this until tomorrow or the next day. I second the motion put by Mr. Rogers.

The ACTING CHAIRMAN. The question of adjournment is never in order for discussion.

(At this point, at 4:30 p.m., the Conference adjourned to meet at 9:00 a. m., Wednesday, June 2, 1937.)

### THIRD SESSION—MORNING OF WEDNESDAY, JUNE 2, 1937

(The Conference reassembled at 9:10 a. m., at the Raleigh Hotel, John P. McBride, Vice President of the Conference, in the chair.)

The ACTING CHAIRMAN. Gentlemen, we are ready to open the morning session, and the first business of the morning will be announcements by the Secretary, Mr. Holbrook.

Mr. HOLBROOK. I have to advise the delegates that the report of the Committee on Specifications and Tolerances is now ready for distribution. A supply of copies of this report is on my table. Each delegate will doubtless desire to take away a copy so that he may familiarize himself with the proposals and be prepared to dispose of them when they come up for consideration on Friday morning.

#### GENERAL CONSIDERATION OF SUBJECTS OF INTEREST AND QUESTIONS BROUGHT UP FOR DISCUSSION BY OFFICIALS

Mr. SWEENEY. I would like to open up as a matter of discussion the question as to having pump manufacturers make some provision for the proper sealing of pumps.

The ACTING CHAIRMAN. Mr. Sweeney invites discussion on the question of the pump manufacturers providing some uniform place on the device for sealing.

Mr. DAVIS. I would like to have this suggestion included also. We have no place to attach a "Condemned" tag to a person weigher or to some of these new measuring pumps, and if it could be arranged so that there could be a hole drilled for this purpose, it would help. On some it can be done, but on others there is no way, and in our State the person weighers are more of a joke than anything else. They are fortune telling machines, but at the same time we are supposed to check them like any other scales. They take the people's money. When we condemn one of those scales we have to hand the tag to the person who operates the person weigher and very often we never get the tag back, because it is destroyed or lost. If the manufacturers would design equipment so that we might attach either a seal or a condemned tag to the person weigher or pump, that is what we need. The gummed seal will come off under some weather conditions.

The ACTING CHAIRMAN. I think, Mr. Davis, that the last Conference provided for holes in the slot on person weighers so that the "Condemned" tag could be attached there and thus prevent the insertion of a coin. There is no special provision in regard to means for attaching a seal.

Mr. TINKEY. Ohio goes a little further and provides for the attachment of a lead and wire seal. I think that could be included. Perhaps if that were made general they would all comply with it.

The ACTING CHAIRMAN. I think that is in the mind of at least one of the manufacturers—a uniform position for seals.

Mr. ISING. When you seal them the seal doesn't prevent changes in adjustment. Do most States have a ruling that the weights

and measures inspectors will seal such apparatus at the adjustment point?

The ACTING CHAIRMAN. There is always means for effectively sealing at points of adjustment, but I think this matter had to do with the seal that appears to the public.

Mr. JENSEN. We have just received 6,000 metal seals, 4 by 5 inches in size, on which is the word "Approved," and the part of the law applicable, stamped into the metal. The plate is finished in three different colors, and is fastened on the pump with four metal screws. Whenever a pump is condemned we remove that tag and attach the red "Condemned" tag until the pump has been repaired and we have retested it. If we approve it then we remove the "Condemned" card and put the seal back on.

Mr. TOLAN. I happen to be from Fort Wayne, the pump city. One company is coming into line with a provision for the wire seal and others will probably do likewise. That is being taken care of now.

Mr. WARNER. On scales of the large capacity type the beam rod in a great many cases is not covered and we have found in a number of cases that an unscrupulous party can easily put a foot against this rod and cheat in very fine shape. In other cases, stuff is piled inadvertently against that rod and this causes great discrepancies. My suggestion would be that we have something in the regulations to the effect that this beam rod has to be boxed up or closed in.

Mr. PELLEGRINI. I have had a similar experience in Parkersburg, W. Va., on that particular type of scale. We have noticed the weighmaster with his foot touching the beam rod, and of course we ordered it to be boxed. Since this condition has been corrected farmers or merchants who had previously complained of short weights on cattle have no longer made the same complaints.

Mr. DAVIS. I would like to ask the delegates if they have experienced cases in which the nozzle on a gasoline pump designed to prevent the drainage of the hose, has been changed. It was brought to my attention in several instances that the inspector would pass a pump, the nozzle being correct in every respect; after the inspector had left the operator of that pump would change the nozzle so that the hose could be drained. They were then draining those hoses and helping themselves to as much gasoline as the hose would hold.

Mr. BULSON. I have had the same experience. Recently we inspected a pump; on a return trip a few days ago we found that condition and I promptly condemned it. The penalty is \$25 or 25 days. I told the man, "If I come back here again and find this condition, you are going to court." I haven't had any more trouble. A pump that won't stay right while you aren't looking isn't any good.

Mr. BOYLE. At this time I would like some discussion on the so-called household gravity-flow fuel meter. As I understand it, there are a number of those meters in use. Some States have tolerated them but have not approved them or sealed them. There has been no legal tolerance established in a number of places where they are being used, but where a tolerance has been established it ranges all the way from 3 to 7 cubic inches on 5 gallons.

In Maine the State Department has not yet established a tolerance. They have permitted me to seal the meters if the error does not exceed 1 cubic inch per gallon. The problem of testing is not as complicated as it might appear for the reason that in Portland we require the

distributor to provide a supply tank with proper piping, also burner tips of 3-, 6-, and 9-gallon per hour capacity, and the meters are tested in the condition under which they are used. After they are tested they are taken to the various homes and the fuel that is used by the purchaser is sold on the basis of the meter reading, disregarding the meter reading on the tank truck.

The point that I want to bring out is that before another year comes around I am led to believe they will be used in much larger numbers than they are now. It is something that is coming and something I think the Conference should recognize, and on which it should establish some uniform tolerances.

If any of the delegates here have had any experience in testing these meters I would like to know what that experience has been.

The ACTING CHAIRMAN. Mr. Boyle, of Portland, brings up for discussion the so-called household fuel meter. I think a year ago or 2 years ago there was a gentleman here with such a meter; it is one that is installed between the tank in the cellar and the oil burner, and is of the gravity-flow type.

I think I will leave that subject in your minds so that when we again come back to this open forum we can open up with that subject, but at this time, gentlemen, I think we will proceed to the item at which we adjourned yesterday afternoon, as most of the delegates are now here.

#### PROPOSED FEDERAL LEGISLATION IN RELATION TO THE FINANCING OF WEIGHTS AND MEASURES INSPECTIONS

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

I will make a brief statement relating to the bill "To provide assistance for the several States, Territories, and possessions in the inspection and regulation of, and the administration of laws concerning weights and measures and weighing and measuring devices and mechanisms."

Weights and measures activity is one of the most vital public needs. It is not a new activity. Throughout many years it has received only meager support in most sections of this country. Since there has been but little Federal legislation relating to weights and measures, numerous inconsistencies and irregularities in laws and specifications, tolerances, and regulations exist between the States. These can easily be made more uniform and more workable, and they can be more economically and efficiently administered through Federal legislation coordinating and supporting them.

Weights and measures activity in this country may be described in general terms as follows: One-fourth of the States in the Union have considerable activity relating to weights and measures, one-fourth of them have about 50 percent of the activity that is urgently needed, while one-fourth have only a little activity, and the other one-fourth have practically no activity. This is a serious situation and a strong indictment against public officials responsible for this negligence.

Experience shows that where there is no activity on weights and measures, approximately 50 percent of the weighing and measuring devices used by dealers in selling to the public fail to meet reasonable standard requirements. The larger portion of these are short weighing and short measuring the public, while the remaining portion of the

50 percent that do not meet reasonable standard requirements have defects leading to inaccuracies which in most cases will defraud or take advantage of the public.

When Congress is spending gigantic sums to help the under-privileged, it certainly seems that there should be some interest in encouraging and helping the States and local municipalities in their efforts to protect the public in this important service, which can only be satisfactorily financed from public funds. Congress has been almost totally inactive for many years on weights and measures matters, therefore, it seems that it is time for some review of the existing needs, and action to help the States and municipalities in the correction and improvement of undesirable and deplorable conditions that now exist throughout the greater part of this country.

The purpose of this bill may be summed up in four words—"Larger and improved service." This can and will be secured, first by bringing about greater uniformity throughout the country, and second by giving support and encouragement to the States in developing and maintaining uniform and efficient service.

I have prepared only this short statement with the hope that plenty of time might be given for representatives from each State to make a statement at this time as to what they think of the matter as a whole. The bill has been revised twice, the last copy having been mailed a few days ago to each person in charge of weights and measures within the different States. Some did not receive them before leaving home for this Conference, and some have had them forwarded here.

If it is the desire of the Conference I will read this bill, which is now being distributed. May I ask all who would like the bill to be read to hold up their hands, please? [A number of delegates raised their hands.] Then, Mr. Chairman, I will take time to read the bill.

#### A BILL

To provide assistance for the several States, Territories, and possessions in the inspection and regulation of, and the administration of laws concerning, weights and measures and weighing and measuring devices and mechanisms.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

SECTION 1. As used in this act, unless the context clearly requires otherwise:

(a) "State" includes, in addition to the States of the United States, Alaska, Hawaii, Puerto Rico, and the District of Columbia;

(b) "Weights and measures" shall include all weights and measures and weighing and measuring devices and mechanisms, and all devices or mechanisms designed or intended to be attached thereto and used in connection therewith;

(c) The term "use in trade or commerce" shall be construed to include use in buying or selling goods, wares, or merchandise, or in barter or exchange; in determining charges for the carriage or transportation of freight, baggage, or express shipments; in determining wages, compensation, or charges according to the amount of goods or things made or produced, or amount of work or labor done or services performed; in compounding medicinal and other formulas individually submitted for this purpose; in determining weight or measure when a charge is made for the determination; and in all other similar cases;

(d) "The National Conference on Weights and Measures" refers to the organization of this name which is held under the auspices of the National Bureau of Standards and which is composed of officials of the National Bureau of Standards, of officials of State and local jurisdictions charged with the duty of enforcement of weights and measures laws and ordinances, and of such other persons as may be designated as delegates by the Governor of a State.

SEC. 2. (a) For the purpose of assisting the States in the administration of their laws concerning weights and measures there is hereby authorized to be appropriated for the fiscal year ending June 30, 1938, the sum of \$800,000, and for each fiscal year thereafter such sums as may be necessary, to be used as hereinafter provided in this act.



(b) For the purpose of administering the provisions of this act there is hereby authorized to be appropriated to the National Bureau of Standards for the fiscal year ending June 30, 1938, and for each fiscal year thereafter, such sums as may be necessary.

SEC. 3. (a) The administration of this act by the Secretary of Commerce shall be through the National Bureau of Standards.

(b) The Secretary of Commerce shall certify to the Secretary of the Treasury quarterly for payment to each State amounts to be expended for the administration of the weights and measures law during the fiscal year for which such payment is to be made. These amounts shall be apportioned on the basis of the populations of the States qualifying under this act; but in no case shall the amount certified and paid to any State in any year be in excess of the amount appropriated and expended by the State, including its subdivisions, for the same purpose during that year, and the total amount certified and paid under this section to the several States in any fiscal year shall not exceed the amount appropriated by Congress therefor for such fiscal year.

(c) Out of the sums appropriated therefor, the Secretary of the Treasury shall upon receiving a certification under subsection (b) of this section pay, through the Division of Disbursement of the Treasury Department, to the State agency charged with the administration of such law the amount so certified.

(d) The Secretary of Commerce shall make no certification for payment to any State under the provisions of this act, unless he finds that such State is effectively enforcing or prepared to enforce:

(1) A law for inspection of weights and measures in the State.

(2) Rules and regulations, to require the sale of commodities by weight or measure or to govern the manner of sale of commodities by weight or measure, and to include specifications, tolerances, and regulations to govern the design and construction, accuracy, and use of weights and measures for use in trade or commerce.

SEC. 4. (a) The rules and regulations including specifications and tolerances relating to weights and measures for use in trade or commerce, mentioned in section 3 (d) (2), shall be those which are adopted by the National Conference on Weights and Measures when voted upon in the manner set out hereinafter and which are thereafter published and recommended by the National Bureau of Standards for adoption by the several States.

(b) The conference shall meet at least once each year for the purpose of discussing weights and measures and the adoption of rules and regulations, including specifications and tolerances, relating to weights and measures. Voting in the conference shall be by States, each State being entitled to a minimum of three votes, and to one additional vote for each one million inhabitants by which its population exceeds three million. The population of each State shall, for the purposes of this subsection, be deemed to be that million nearest its actual population. The officials of the Weights and Measures Division of the National Bureau of Standards shall be entitled to three votes.

SEC. 5. Each State receiving aid under the provisions of this act shall make an annual report to the Secretary of Commerce on such forms as may be provided, relating to activities carried on by and with the aid of funds received pursuant to the provisions of this act.

SEC. 6. If any provision of this act, or the application thereof to any person or circumstance, is held invalid, the remainder of this act and the application of such provision to other persons or circumstances shall not be affected thereby.

I am deeply indebted and very grateful for the suggestions that have come to me through the mail from you and others, particularly W. R. Shands, who is the Director of the Legislative Reference Bureau of my State, without whose help it would have been impossible to have drawn this bill up in the form in which it has been proposed.

As mentioned, two revisions have been made and there are no doubt technical problems that can be taken care of better than in the bill as written. I think it is the duty of everyone to make suggestions for such changes as they think will help the country as a whole, and those of us who have been interested, myself particularly, welcome such suggestions.

Some suggestions were given to me last night. One is, that in section 3 (d) the word "effectively" be stricken out and that the

word "prepared", be changed to "preparing"; also that in section 3 (d) (2) the words "design and construction" be stricken out and that the following words be added: "*Provided, however,* That each State shall have the right to make additional rules and regulations not in conflict with said rules and regulations." This provision was in one of the former drafts but was left out without any intention so to do.

DISCUSSION OF ABOVE SUBJECT

Mr. J. H. MEEK. Mr. Chairman, I have tried to be short in discussing this and I would like to have further time if the discussion indicates it is necessary to say more, but at this time I am going to ask if it be your pleasure to let each State have a 1-minute statement, at least, as to what their attitude is on this matter.

The ACTING CHAIRMAN. That would be for the body to determine. The query that Mr. Meek makes is whether or not the States should be polled as to their attitude in relation to this proposed legislation. The Chair doesn't wish to do that unless somebody from the floor makes a motion to do so.

Mr. GRIFFITH. In order to get this matter before the body properly and find out the consensus of opinion before we go into any lengthy discussion, I would suggest that the States be polled as to whether or not they are favorable to a bill; if they are, we can take up this one. If there is no response favorable to the enactment of such legislation there is no need of going into discussion of any bill.

Mr. O'KEEFE. I don't think we should just poll the States. I think each individual should be given a few minutes to say why he is for or against a bill. I don't feel like just sitting here and saying "yes" or "no" without giving certain reasons.

Mr. RAGLAND. I move that the bill be approved by the Conference, with the understanding that this is the proper way to handle it. I am not in full sympathy with the bill and will suggest, at the proper time, an amendment, in case the Conference discusses the bill.

Mr. BAUCOM. I don't naturally go against my friend Mr. Ragland, but I going to make a substitute motion that a committee of, say, five men be appointed to study this thing over and to report back their recommendations on Friday morning or at such future time as the Chair may set. Let's hear from them at that time and then give the delegates time to express themselves. This proposal does have some merit. There are some phases of which I am not in favor, but I would not want to hamper or prevent some of the States from getting aid if it can be done in a good way.

Mr. RAGLAND. I second the motion.

You didn't state when this should be reported back. I call attention to the fact that if it is not reported back at the proper time, it is a dead bill. If you are going to refer it to the next Conference you are killing it.

Mr. ROLLIN E. MEEK. It appears to me that this proposed committee could operate more effectively if they had some consensus of opinion from the various States as to the changes which should be made in the bill. They will have to work in the dark otherwise. Why not have a roll call, or continue as you started and get suggestions, and then permit the committee to act?

The ACTING CHAIRMAN. At the present time we have a motion duly made and seconded that a committee of five be appointed to sit on

this matter and report back on Friday morning. Mr. Meek offers the suggestion that some discussion occur in relation to the question so that in the event the motion of Mr. Baucom prevails the committee will have something on which to work besides their own thoughts. The floor is open for a discussion by the delegates. In relation to the idea of polling the States, I would not take upon myself the responsibility of asking the delegates of the various States to give a "yes" or "no" on the thing.

Mr. LEVITT. Mr. McBride, in discussing this bill there are several things to be taken into consideration. Primarily the purpose of the bill seems very good, but I doubt very seriously that any weight and measure official of any State would have the authority to usurp the powers of the Governor or other officials in saying that his State would tie into a proposition of this kind. This is a proposition that I, personally, would have to take up with the Governor, and have his sanction and approval before I would say that our State was in favor of this.

Another thing: We are operating under a fee system and we do not intend to change that fee system. If we accept Federal aid in the enforcement of weights and measures work in our State they probably would have a definite standard that they would wish to follow and that might not work out.

Personally, I would like to have a little time to study this thing over.

The ACTING CHAIRMAN. Gentlemen, as I understand it, this is not yet in Congress, but is contemplated for immediate introduction. Is that correct, Mr. Meek?

Mr. J. H. MEEK. Mr. Chairman, the matter is rather left in the hands of this Conference. If the Conference sees fit, I see no reason why it cannot be introduced without delay.

The ACTING CHAIRMAN. Have in mind, then, gentlemen, that this is not legislation already petitioned for, but contemplated as this Conference may determine, which makes the matter of your authority to act for your various States, of some importance.

Mr. ROGERS. This is a very serious proposition; there isn't any doubt about that. I think Mr. Meek is to be commended for his fundamental thought of advancing weights and measures uniformity and efficiency throughout the country. However, in reading over this bill I find there are things that must be taken into consideration in connection with it.

First of all, the bill doesn't seem to grant any discretionary powers to the States as to whether or not they will adopt this. It merely flatly says that if they qualify they get this money and may use it by reporting to the Federal Government. There may be some States now financing their own propositions that may not care to go into it, possibly with a fear or thought that they may be subject to Federal control. You are reaching into a question of State sovereignty and State's rights, which is a very moot question.

Voting power is brought into this proposed Act, where you tie up the National Conference on Weights and Measures directly as an agency or as a branch of the Federal Government. I don't know whether you can do that or not. This is an educational body, we have always understood, in cooperation with the National Bureau of Standards. It is suggested that the States be allotted so many votes. I don't

know how that is going to be taken by the members of the Conference. I think some years ago, possibly at the beginning of the Conference, there was one vote to a State. If you are going to do that, it might be well and good but you still must consider that there are county and municipal officials who come here at the expense of their local governments, who take a very deep interest in what is going on, who come here to learn; they feel they are entitled to a voice in the Conference, and their voice is important. This voice has been accorded them by custom. I don't think the framers of the bill had any purpose in mind of taking that power away from the States. It may bring certain delegations down here because of their interest in the work.

There is another feature of this thing—its economic side. This apportionment of this money is important. Take New Jersey, for instance. We operate on between \$40,000 and \$50,000 up there. Under this bill we would be entitled, I suppose, to \$40,000 or \$50,000 from the Federal Government. Now here is what is going to happen: The minute the State appropriations committee finds out that the Federal Government is going to match the appropriation of the State of New Jersey they are going to say, "Well, you can operate on about \$40,000, so we will give you \$20,000 and let the Federal Government give you \$20,000." This bill predicates that you will get dollar for dollar; the State will put up a dollar and the Federal Government will put up a dollar. That means that the governments of the States, for economic reasons, are going to cut their appropriations in half and the State departments will be no better off than they were in the beginning.

I haven't much more to say on the bill but I do believe it would be a good idea to dispose of it here, one way or the other. As Mr. Levitt aptly says, we certainly would not want to commit our State to a proposition of this kind without finding what the Governor and the legislative body think about it, because after all we are not empowered to talk for the government in that capacity.

We have with us here our Mr. Walsh, Assistant Attorney General, assigned to the enforcement of weights and measures laws in New Jersey. We thought this bill was of sufficient importance for him to be here just in the case we needed legal advice on it. A question of constitutionality may be involved. I would like to hear him say a few words on this, if he may have the privilege of the floor.

The ACTING CHAIRMAN. If there is no objection we will accord the floor to the Assistant Attorney General of New Jersey.

Mr. WALSH. Mr. Chairman: When I came down here yesterday I saw this bill for the first time. Joe Rogers has been talking about constitutional features and he has me on the defensive, so I was glad to hear the suggestion that each State would only talk approximately a minute.

I don't know whether I speak only my own personal objections, but I think I speak the objections of the various States which have weights and measures enforcement agencies. The Constitution, of course, provides for the setting up of a uniform standard and that is all. There are no decisions on how far the Federal Government can go under that provision, and I suppose there would be some conflict with the clause in the Constitution that reserves to the States their police powers. That is what weights and measures enforcement really is; it is one of the State's police powers, and that applies

even to legislation in the way of grants. This type of legislation by the Federal Government is cooperation, the Federal Government acting as a cooperative agency.

Grants have always been opposed, and legislation of that kind has always been defeated. It was defeated when they attempted to set up a department of education. The States stepped in and said the Federal Government should not have a thing to do with it. If they want to cooperate with the States in education, that is all right.

The appropriation made is very small, insignificant, but the argument has always been that that is an opening wedge. I think the purpose of the bill is defeated because the obvious intention of the draftsman is to provide better enforcement in backward sections, yet those sections have been unable to set up any departments or any offices to cope with the situations and they have no statutes on their books. Perhaps they have no interest in it whatever or perhaps they can't afford it, but if they can't set that up now I don't see how they can set it up later, because they will have to have money; the Federal Government won't grant money until the jurisdiction appropriates sufficient money to set up its enforcement agency.

There may be a very good intention back of the bill but it tends to put into the Federal Government's hands powers which essentially belong to the States. It always starts off this way, in a very small way, and gradually you have such interference with your State officials that there is a situation that is intolerable.

As Mr. Rogers said, you always have your men back home; especially during these times, when some of the men are looking for sources of revenue, they will say, "Here is where we can save \$20,000", and the first thing you know they have cut your appropriation. Then, too, if the Federal Government is going to spend the money, they are going to have something to say about the way it is spent. I think there is one provision in the bill that is very broad in that respect and it means that the Federal Government is going into a sphere of activity which was never intended for it.

If there is anything to be done I think it is in the matter of education. That is what I think has always been done at this Conference, from what Mr. Rogers tells me, and I think that that should be adhered to in the future.

That is all I have to say. I don't like to interfere with the activities of your body, but Mr. Rogers and the State Department of Weights and Measures have been very interested in this. He asked me to come down, not only on this matter but on several other matters. I hope I haven't trod on anyone's toes in expressing my views.

Mr. ENGLEHARDT. I want to make an amendment to the motion that if a committee is appointed, it hold open sessions and any delegate who sees fit may appear before it; then let the committee bring in a bill to please the States, and we will approve or disapprove it on Friday morning.

Mr. BAUCOM. I am glad to accept that amendment to my motion.

Mr. GRIFFITH. I listened to Mr. Walsh's remarks with a great deal of interest. The power to control weights and measures supervision, or any activity pertaining to weights and measures, is already reposed in the Federal Government by the Constitution of the United States. They can do that tomorrow—tell every State what the standard should be in regard to weights and measures. I think

probably he failed to remember that, because that provision has never been exercised to a finality. There have been several feeble attempts, and just about 6 or 8 years ago Representative Perkins, who was then chairman of the House Committee on Coinage, Weights, and Measures, spoke before this Conference, and discussed one of them.

The idea behind this bill is to promote a wider and a more comprehensive administration of weights and measures supervision, so that many States that now do not have departments may avail themselves of Federal assistance in the form of funds which may be appropriated under this bill.

No State would be obligated to avail itself of this opportunity if it did not so desire. You will remember that in very recent Federal legislation—Grants to States for old-age assistance—States may participate if they want to by passing an enabling act. In that event they can then retain 90 percent of the amount collected in the State and pay to the Federal Government only 10 percent. The provisions of that act are similar to those of this bill. The fact that we are offered dollar for dollar would not diminish the amount available for our work. Suppose we are getting \$40,000 now and the Government gives us \$20,000; even if our State says, "If you are going to get \$20,000 from the Government we will give you only \$20,000", we still have the same amount and we won't hurt our present operations. Certainly there would be an opportunity to increase your appropriation, and you won't diminish it in any event.

Those States that don't have anything at all would certainly then have an entering wedge. The people would say to their own administrations, "Here, give us something. Let us get organized in the State and create supervision that is most needed. The Federal Government will help to the amount that the State appropriates." I know from my own personal experience that some 8 or 10 years ago Governor Ritchie said, "There isn't any demand for it and while I am in favor of it, I would hate to appropriate \$60,000 to start." That included the buying of new equipment, which would not have to be done afterwards, but he said, "To saddle \$60,000 more on Maryland yearly, would be objectionable when there isn't any great demand for it yet." If I had been able then to say, "If you will give us \$30,000, the Federal Government will give us \$30,000", we probably would have had a State department.

The bill offers an opportunity to get some of the Federal funds which are being spread about; the bill is certainly sound. As to the details, they are a matter of discussion and opinion. I read the bill over thoroughly for the first time the day before I came over here, and there are a number of objections that I can see. I hope the committee will take into consideration all the phases that have been put forth by Mr. Walsh, especially. His legal knowledge is very valuable, but I am quite sure that the delegates here from the several jurisdictions would not be binding their States if they voted favorably or unfavorably. After all, we are sent here because of our knowledge of weights and measures, to represent the various States and communities and to decide what we think is best for ourselves in the administration of weights and measures.

Mr. KLOCKER. I wonder if the committee could look up and determine whether or not this bill can be passed. I will tell you why. About 4 years ago they had a piece of legislation in the Congress to

double the State police departments of the country. I believe the States were to pay \$1 of the salary and the Federal Government would pay the rest of the salary, in order to get more law enforcement. That bill was killed, or something happened to it, because the outcome of it was the "G-Man" school that the Federal Government is now running. I wonder if the difficulties that were run into on that bill would be run into on this one. I think it would be a good idea if the committee would check and see what happened to the other bill.

Mr. O'KEEFE. Before this motion is put I would like to have a ruling from the chair as to who is going to vote. I have been coming down here for 3 years as a member of this Conference. I am representing 3,500,000 people in the city of Chicago—as many people as some of the States. I think I am entitled to a vote here just as well as a representative of any of the States.

The ACTING CHAIRMAN. The chair will rule that the persons entitled to vote are the duly accredited delegates, whether they be from city or State. The provision in the proposed legislation would make a change but so far as the Conference as at present constituted is concerned, any accredited delegate may vote.

Mr. WARNER. I wish to offer a substitute motion number two, that the Conference resolve itself into a committee of the whole on Friday morning to further consider this matter.

Mr. GRIFFITH. I second that motion, Mr. Chairman.

Mr. BAUCOM. I will withdraw my motion in favor of that motion.

The ACTING CHAIRMAN. Mr. Warner, of Wisconsin, moves that the body constitute itself a committee of the whole to further consider this matter on Friday morning.

Mr. CRAWFORD. I want to urge you to vote against this for one reason. This Conference has a great deal of work to take care of. We are not on schedule at the present time; we are late. The committee in session can be visited by every one of us, and I believe that if that matter is taken on the floor and this Conference handles it as a committee of the whole, we will find our program too badly delayed.

Mr. J. H. MEEK. Mr. Chairman, as I stated, I would like to have a few moments for further remarks, and if I am given that time after this vote I will wait until after the vote. If not, I would like to say a few words in answer to some of the remarks that have been made here.

The ACTING CHAIRMAN. If this vote determines that the matter is postponed until Friday, your remarks would be in order on Friday.

Mr. J. H. MEEK. May I say a word at this time on the matter?

(The question was called for.)

The ACTING CHAIRMAN. The question is called and we are ready for the vote, Mr. Meek.

The motion now for action is Mr. Warner's substitute motion that the Conference constitute itself a committee of the whole to consider this subject further on Friday morning.

Mr. ROLLIN MEEK. May I ask Mr. Warner if he will consider having this meeting one night this week, either tonight or tomorrow night? Otherwise it will entirely break up the meeting. [Cries of "no."]

Mr. ROGERS. I think we have everyone here, and a committee of the whole on Friday would be the same group, with possibly fewer men. Much of what has been said this morning may be lost sight of by that time and we will have to go over the ground again. I think we should dispose of this question one way or the other right here.

Mr. CULLEN. I quite agree with my friend Joe Rogers. It should be disposed of now. Friday is the last day we have and each of us wants to get out of here, and get out early.

The ACTING CHAIRMAN. The question is on Mr. Warner's substitute motion. Mr. Baucom withdrew his original motion, as I understand it.

Mr. BAUCOM. I am not withdrawing it if they want it that way.

The ACTING CHAIRMAN. Very well; then we have two amendments to your motion.

Mr. O'KEEFE. We came here, most of us, not knowing a thing about this bill or having read it or seen it. I move you as a substitute for the whole that this bill be made a part of the record and be printed in the proceedings of the Conference.

(The substitute was not seconded.)

The ACTING CHAIRMAN. Since Mr. O'Keefe's substitute motion has not been seconded, we will vote on Mr. Warner's amendment that we consider the matter on Friday.

(The question was taken and the amendment to the motion was lost.)

The ACTING CHAIRMAN. Now we have Mr. Engelhardt's amendment that the committee hold open hearings and report back this bill or some other bill at a date set before the termination of the Conference.

(The question was taken and the amendment to the motion was lost.)

The ACTING CHAIRMAN. Now we have Mr. Baucom's original motion, that the chair appoint a committee of five, the committee to sit on the matter and report back at a date set.

(The question was taken and the motion was lost.)

Mr. ENGELHARDT. To bring the matter to a head and dispose of it at this session rather than to prolong it and disrupt the workings of the Conference, even though I am not in favor of it, I move that the bill as read be adopted.

Mr. CULLEN. I second the motion.

Mr. GRIFFITH. If the idea is good we should take some action on it. It would be very detrimental to the esprit de corps if this thing is not discussed thoroughly. I don't want it ignored by a body of men vitally concerned with this question.

The ACTING CHAIRMAN. The motion is that the Conference adopt the proposed legislation as read by Mr. Meek this morning.

(The question was taken and the motion was lost.)

The ACTING CHAIRMAN. Gentlemen, we have with us a guest, the Hon. Harry Sauthoff, Member of Congress from the State of Wisconsin. Congressman Sauthoff requests the privilege of the floor for a short time to discuss H. R. 6964, which is a bill introduced by the Congressman in relation to fixing the standards of dimension and capacity for metal containers for canned fruits and vegetables and canned milk for the prevention of fraud. Congressman Sauthoff.



REMARKS OF HON. HARRY SAUTHOFF, MEMBER OF CONGRESS,  
SECOND DISTRICT, WISCONSIN

Mr. Chairman, ladies, and gentlemen of the Conference: I introduced H. R. 6964 for the specific purpose of securing some simplification in our standard sizes for metal containers for fruits, vegetables, and milk. This exhibit here of my fellow townsman, George Warner, is a silent but potent argument in favor of that bill. That bill does not seek in any way to hamstring or obstruct legitimate business, but I am strongly in favor of passing some legislation to outlaw the business of that particular public nuisance, the business pirate who seeks to defraud the consumer. Unfair trade practices are a menace to legitimate business and in no way can they be considered helpful, either to the consumer or to business.

When you introduce a bill of this character you meet with certain difficulties. One is to get a hearing on the bill, which is always extremely doubtful. Congress introduces about 22,000 bills during the course of a session and only about one-tenth of them get a hearing. Naturally the bill will be referred to the economists of the Department of Agriculture for their opinion first, before the chairman of the committee does anything about it. I have met that little difficulty by having the economists sit in and help draft this bill. So much for that end of it.

The second obstacle is to get by the Director of the Budget, for his first question is, "Does it cost anything and, if so, how much?" When you say it does, he puts thumbs down on it. This bill doesn't cost anything.

George Warner tells me there are probably 75 different sized cans now in the field. The housewife can't possibly keep track of all those cans. The result is that the chiseler and the grafter and the gouger have an advantage. We want to take that advantage away from them and put them on a par with legitimate business.

You men who are in this field know a lot more about it than I do and must recognize the difficulties that the housewife must have, because even you inspectors don't know the sizes of all the cans and what they hold. I realize that I don't know very much about it, but I find that even manufacturers don't know a whole lot about it, except that portion that pertains to their particular industry.

I sat in at a dinner the other day with a group of gentlemen who are interested in this bill—fine fellows, legitimate business men. They are in favor of simplifying the metal containers. We talked about the manufacturers' angle, we talked about the wholesalers' angle; then I said, "Well, now, gentlemen, you have discussed the manufacturer and the wholesaler. This bill isn't drawn for their benefit. It is drawn for the benefit of the consumer. What have you got to say about him?" He pays the freight. He pays your salary and he pays my salary, and he pays us to take care of him. I conceive that to be our duty. I would appreciate it greatly if you would send me any suggestions you have in regard to the measure, because after all, it is only by cooperation that we can possibly accomplish something in this field.

Thank you very much, Mr. Chairman.

## STANDARDIZATION OF PACKAGES OF CANNED FOODS

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

I really enjoy presenting this particular subject because the exhibit speaks for itself, and in more forceful terms than anything that I can say. I do wish, however, to point out a number of inconsistencies that I believe you will agree with me are nothing short of ingenuity to deceive the purchaser.

The National Canners' Association is about the only agency that attempts to standardize packages for canned foods, and I wish to state that the Division of Simplified Practice of National Bureau of Standards has done some wonderful work in cooperation with the Canners' Association in attempting to standardize cans, but going at it by merely suggesting certain sizes to be used without having any law back of them has been an extremely difficult task.

I believe that in 1934 the National Canners' Association selected a simplified list of 27 sizes for approval by the industries and these were recommended as standards. I believe that this year the committee recommends a revised list of 21 sizes. However, there is nothing to prevent anyone from using any number of sizes that he sees fit, and the result is that instead of the number of sizes in actual use being decreased, it is apparently increasing. I have positive proof that there are at least 52 sizes in use, as I have that number of cans in my exhibit, and with the exception of one or two, these cans are being used at the present time, and I know that I have missed quite a number, so that my estimate would be that there are close to 75 different sized cans now being used in the sale of canned foods.

As far as the National Canners' catalog of specifications is concerned, the trade names are not of any value at all to the purchasing public. In my exhibit there are 22 cans that are in conformity to the National Canners' specifications, and 30 that are not.

*Trade names for cans.*—At the present time the trade designations for cans that are recognized by the National Canners' Association are something like this:

5-Z; 6-Z; 8Z short; 8Z tall; no. 1 picnic; 211 cylinder; 300; no. 1 short; no. 1 tall; no. 303; no. 303 cylinder; no. 1 flat; no. 2 special; no. 2; no. 2 cylinder; no. 1¼; no. 2½; no. 3; no. 10; no. 1 square; and no. 2½ square.

There is no argument about the fact that the particular designations that I have just read do not mean anything to the purchaser. In a recent weights and measures school where nearly all of the participants were active weights and measures officials, I asked for an answer in writing to three questions:

Question 1.—Are you familiar with the trade designations for fruit and vegetable cans?

Question 2.—Name the trade designation of three cans.

Question 3.—How much does each of the cans named hold, or what is the capacity stated on the label?

Twenty-five were unable to make any answer. Five stated that they were familiar with the trade names of the cans, but out of those five only two were able to name three sizes and state what they held. If people who are trained in weights and measures work and who are constantly checking on packages that are sold in grocery stores do not know the trade designations, it certainly is apparent that it cannot be expected that the housewife is going to know them. The argument

in favor of our present system is sometimes to the effect that the cans are labeled with their contents. This is true, but I will later show that this labeling does not mean very much to the purchaser; further, the purchaser cannot very well read the label until after the purchase is taken home, and then it is too late to do anything about it.

There is a nice bit of history that is connected with most of the cans in this exhibit, but to relate that history would occupy too much time, and for that reason I am merely selecting a few.

There are industries located in many States represented by certain cans in this exhibit, and these particular products could well be the subject of particular study by the sealers having jurisdiction in that particular State. To better illustrate what I mean, I will take a product of my own State first.

*Wisconsin a great dairy State.*—Wisconsin is known and recognized throughout the Nation as a great dairy State, the foundation of which is 180,000 dairy farms. Wisconsin produces approximately 38 percent of the evaporated milk of the United States, or about 700 million pounds. About 75 percent of the common evaporated milk that we are all familiar with goes into the favorite can now used for that commodity, the one that I have numbered 31 in the exhibit, this particular can holding  $13\frac{3}{4}$  fluid ounces ( $14\frac{1}{2}$  ounces avoirdupois).

I wonder if anyone noticed any decided change in the price of canned milk in the year 1931. I do not think that they did, but what happened to this favorite can about that time? Previous to 1931 the favorite can for milk was the one that I have numbered 22 in the exhibit. This can holds 16 fluid ounces; however, it was labeled 1 pound avoirdupois, but in reality held a little more than this amount. Perhaps a person looking at this can by itself would not recognize any particular difference in size between it and the present can used for milk, which is no. 31 in the exhibit, but place them side by side and there is a large apparent difference; as a matter of fact, there is more than  $1\frac{1}{2}$  ounces difference. In other words, in 1931 the people canning milk reduced the size of the favorite can  $1\frac{1}{2}$  ounces. Now let us see what this difference of  $1\frac{1}{2}$  ounces amounted to. Canned milk is selling for about 8 cents per pound, and as I mentioned a few moments ago, there is at least 75 percent of the evaporated milk in Wisconsin put into the new sized cans. This  $1\frac{1}{2}$  ounces figured at 8 cents per pound equals more than  $3\frac{1}{2}$  million dollars annually for the State of Wisconsin alone; for the Nation it would be about 10 million dollars.

Now I wish to call your attention to another amazing fact; under our present laws, both Federal and State, cans of the different products may be labeled with their contents in many ways; they may be labeled in terms of avoirdupois weight, or they may be labeled in terms of liquid measure; they could also be labeled in the metric system, if any one desired to do so. Usually, however, it is avoirdupois weight, and for a reason that I will mention shortly. Usually, when the label states, for illustration, "net weight  $14\frac{1}{2}$  ounces", it means avoirdupois weight, while if it says " $14\frac{1}{2}$  ounces fluid" it means liquid measure. Very few people realize this, however, and it is important to bear this fact in mind for the illustration that I am going to give.

Water, as you all know, at testing temperature weighs 8.323 pounds per fluid gallon, therefore, the old table that we have learned by rote,

which is something to the effect that the pint is a pound, is not correct; therefore, a product labeled in terms of avoirdupois weight appears greater than if it was labeled in terms of fluid measure; that is the reason that most of our products that I have mentioned are labeled in terms of avoirdupois weight rather than in fluid ounces. This can of milk that I have just mentioned is properly labeled "net weight 14½ ounces", but it actually holds only 13¾ ounces fluid measure.

Now for the other amazing fact. Let us take the can that I have numbered 38 in the exhibit; this can is labeled "net weight 14 ounces", and is a can of sweetened, condensed milk. The favorite can of evaporated milk that I have just mentioned is labeled "14½ ounces." The customer sees these two labels and learns that there is only ½ ounce difference in the size of the cans. When you place them side by side, you will readily see that there is much more than that amount of difference in fluid measure; in fact, one can labeled 14½ ounces holds 13¾ fluid ounces; the other that is labeled 14 ounces, actually holds 10¾ ounces in fluid measure; there is 3 ounces difference while the label indicates to the purchaser that there is ½ ounce difference, and the strange part of this whole business is the fact that both of these apparent inconsistencies are correct. The difference is in the different specific gravities of the commodities, but what difference does the specific gravity make to the housewife as far as the purchase of the commodity is concerned; that is a matter that can be, and is taken care of, by State and Federal regulation in providing the standard of quality for most of the products.

*Canned peas.*—Another very mystifying effect in juggling and camouflaging cans is illustrated by two sizes of canned peas; one of the cans is numbered 15 in the exhibit, and the other is numbered 20. This can numbered 15 is what is recognized in the Cannery catalog as a no. 2; it actually holds 19¾ ounces liquid measure, and it is labeled "net weight 1 pound 4 ounces"; this is the common 20-ounce can. I believe that more people are familiar with this can than most of the other cans in the exhibit. Now let us see what has happened in the sale of this very popular commodity recently. The can that I have numbered 20 is what is known in the Cannery catalog as no. 303 and actually holds 16¾ fluid ounces, and the can itself is labeled "1 pound 1 ounce", which is in reality 17 ounces avoirdupois. Recently the company putting up this particular brand of peas changed from the labeled 20 ounce can to the labeled 17-ounce can, which is a change in the Cannery phraseology from a no. 2 to a no. 303 can. Here, again, it is difficult for the purchaser to see very much difference in the cans unless they are placed side by side, but you will observe that one can will slip nicely inside of the other one. There is a difference of 3 ounces in the size of these cans, and to prove that there was no apparent difference made in the price to the consumer when this change took place last year, I have only to cite several cases where the dealers selling this brand of peas did not even know themselves that they were getting a 17-ounce can instead of the customary 20-ounce can; in fact, we have cases on record in States where there is a law requiring that the weight of the contents of the packages as stated on the label must be put in the advertisement, where dealers had actually advertised a 20-ounce can and had delivered in answer to the advertisement the 17-ounce cans. As a matter of fact, the company packing this particular brand of peas discontinued using the so-called

no. 2 can entirely and put their entire pack into the so-called no. 303. I do not have just at the present time the sales volume for the pea canning industry, but I dare say that a reduction of 3 ounces in the size of the cans would make a large sum of money. In this particular instance, in the sale of these cans that I have before me, the advertisement stated "two 20-ounce cans for 19 cents"; when the purchase was made, it was found that they were 17-ounce cans; at even  $\frac{1}{2}$  cent an ounce it means that the consumer was cheated out of  $1\frac{1}{2}$  cents on this particular can.

*Syrup.*—Another illustration of what is happening in canned commodities may be illustrated by referring briefly to syrup. I think most of us are familiar with certain brands of syrup, and perhaps you will recall that the can that I have numbered 19 in my exhibit contained a favorite brand of syrup. This can is labeled " $1\frac{1}{2}$  pounds net weight", and actually holds 17 fluid ounces. Not very long ago this particular kind of syrup was packed in a can that held 2 pounds net weight. Here again I will leave it to your judgment as to whether or not you noticed any decided drop in price when the quantity was reduced, and to show what may happen, in fact, what is happening, it is only necessary to refer to another particular kind of syrup or molasses; can no. 24 in the exhibit is a favorite brand of so-called molasses. This particular can is labeled "net weight 1 pound 3 ounces", "net contents 13 fluid ounces", and it actually holds  $15\frac{3}{4}$  fluid ounces. This sort of labeling is about as enlightening as the report of a certain wedding where it was announced that invitations were sent to 100 people, and they expected 80 and laid covers for 50, but it illustrates in a concrete way what may happen when one company standardizes on the basis of  $1\frac{1}{2}$  pounds and another company immediately gets out a size that is 5 ounces smaller, then purports to sell for the same price. I do not have figures to show what has happened when the quantity of this commodity was reduced one-fifth, but no doubt there would be many thousands of dollars lost to the consumers in this case.

*Honey pails.*—Now I am coming to the can that heads the exhibit as far as capacity is concerned. The can that is numbered 1 in the exhibit is the pail for honey that is supposed to hold 10 pounds. In this particular case the packer got his label mixed up and the 5-pound label is on this particular pail. This pail of honey is 7 ounces short of a gallon, and I dare say that at least 95 percent of the people today believe when they are buying a 10-pound pail of honey that they are getting a gallon, but they are not. Can no. 4 in my exhibit is the 5-pound pail of honey, and this is  $3\frac{1}{2}$  ounces short of  $\frac{1}{2}$  gallon. So far as I have been able to establish, these pails for honey come the closest to being of standard size of any of the customary cans.

*No. 10 can.*—Another false impression that I am sure is abroad in the land is the fact that most people think that a 10-pound pail of syrup or a 10-pound pail of honey is the same sized pail as the so-called no. 10, but such is far from the fact. A can that is recognized as a no. 10 in the Cannery catalog I have numbered 2 in my exhibit and this particular can holds  $5\frac{1}{2}$  fluid ounces more than 3 quarts, and this particular can is frequently sold as a gallon. A short time ago a dealer was fined \$25 and costs for doing this very thing. He advertised 1-gallon cans of crushed pineapple, and when our investigator purchased a can in answer to this advertisement, he received a can

similar to this one which contained  $26\frac{1}{2}$  ounces short of a gallon. This particular can is labeled "Contents 6 pounds 10 ounces."

We have also found these particular sized cans filled with cherry juice and offered for sale as gallon cans. I think if you will carefully examine advertisements in your respective States, that you will find all kinds of fruits advertised as fruits in gallon tins, and that investigation will disclose the fact that they are not gallon tins, but tins quite close to the capacity of this can which is the regular no. 10, and probably some of them will hold only 3 quarts instead of the advertised 4 quarts.

*Canned ear corn.*—To further illustrate the fact that conditions in the canned-food industry are getting worse, we have only to examine the newer canned commodities. Can no. 3 in my exhibit is one that is used in the canning of corn on the cob. This can does not conform to any recognized measurements of any kind, either the Cannery catalog or any standard measurement. Neither does it conform to any of the other cans in the exhibit, and to show what the packer was up against, one has only to read the label. The label had stated "approximately 1 dozen whole ears", then apparently it was discovered that the tops of the ears had to be removed, and for fear of getting into trouble for misbranding, the word "ears" has been obliterated. Then to get the quantity right, the can is labeled "8 to 10", referring to the ears, and the picture on the can indicates six ears; as a matter of fact, there were eight ears in this can, and there were eight ears in nearly all cans of similar size, and the can is labeled "Contents approximately 3 pounds 4 ounces."

Now, let us examine another can for cob corn. No. 9 in the exhibit is labeled "4 whole ears of fresh corn on the cob", and the picture clearly shows four ears and in this instance there were four ears in the can. This can is labeled "net weight 13 ounces" and it actually holds 33 ounces fluid measure, only 1 ounce over a standard quart. This particular can retailed for a trifle less than 20 cents, while can no. 3 retailed for about 60 cents, or three times as much as can no. 9, but the can selling for 60 cents was about 20 ounces short of three times the capacity of the no. 9.

I am giving this illustration to show that it is impossible to buy intelligently when there is no fixed standard of quantity, and where the labeled quantity is camouflaged in such a way that it means nothing.

*Tomato juice.*—Among other new commodities, we have a conglomeration of cans for tomato juice. We have four cans that are quite close to each other in capacity; they are numbered 5, 6, 7, and 8 in my exhibit. Two of these cans are labeled 50 fluid ounces, one of them is labeled 48 fluid ounces, while one of them is labeled 46 fluid ounces, but none of them are labeled correctly; all are misbranded. In this particular instance, however, they are all labeled under capacity.

Then we have another little group in the exhibit numbered 11, 12, 13, and 14. These cans are quite close to 21 ounces in fluid capacity; however, there is a variation of 4 to 5 ounces between the cans in this little group. Apparently, in this particular commodity, competition has run wild and the original standard is being forgotten and the cans are gradually being made smaller than the original standard.

Below this particular group of cans for tomato juice are various smaller ones, no. 29 in the exhibit being a can that is labeled 14 fluid ounces and holds  $14\frac{1}{2}$  fluid ounces. This happens to be a can that is the so-called no. 300 in the Cannery's catalog. Nos. 34 and 35 are cans that are a little bit smaller in capacity than the no. 29.

*Deceptive cans.*—Now we come to still another and a different method of deception. Cans may have certain prescribed measurements and yet may not hold the correct capacity. An illustration in a small way of this are the two cans in my exhibit numbered 40 and 41. Can no. 40 is the orthodox picnic no. 1 in the Cannery's catalog, and the outside measurements conform to their specifications. Can no. 41 also has the same measurements; however, the shape of the bottoms of these cans and also the tops make nearly a quarter of an ounce difference in the capacities.

*Deception of long standing.*—In about 1911 and 1912 Dr. Fritz Reichmann, Superintendent of Weights and Measures of New York, sponsored considerable publicity in regard to the deception of packaged foods. It was my good fortune to be able to get considerable material that Dr. Reichmann used, and I have slides that were prepared under the direction of Dr. Reichmann which, I think, bear on this subject, and I will just read some of the items that he mentioned as being deceptive and indicating what he termed actual shortage in the commodity sold.

Cans for vegetables, formerly sold as gallons, now called no. 10; the actual size being about 3 quarts, shortage 1 quart.

What was formerly sold as 3 pounds, now called no. 3, actual size  $1\frac{1}{4}$  pounds; shortage,  $1\frac{1}{4}$  pounds.

What was formerly sold as 2 pounds, now called no. 2, actual size 1 pound; shortage 1 pound.

He also has listed in canned meats what was formerly sold as 2 pounds, now called no. 2, actual size  $1\frac{3}{8}$  pounds; shortage  $\frac{5}{8}$  pound.

He also listed quite a number of other items that I will not take the time to mention now, but this will serve to show that the conditions existing in 1912 exist today, and the odd-sized cans have multiplied in number many times.

*Annual saving.*—According to the latest estimate that I have seen, there are 6 billion cans of fruits and vegetables packed in the United States yearly. If we estimate that there could be just 2 ounces per can saved by standardization, at  $\frac{1}{2}$  cent an ounce, this would make 60 million dollars for the Nation, and I believe that with the various estimates of shortages that I have given, this figure is very conservative; in fact, I think it could be multiplied by two and still be conservative. This saving would be the saving on the commodity. The other saving would be accomplished by reducing manufacturing and distribution costs of this vast number of odd-sized cans. It seems to me that this saving would be several times the saving on the commodity. Again, the saving to the retail dealer would be tremendous. These 52 cans occupy a space of more than 17 feet, and we see no reason why the number of sizes might not be reduced so that the space occupied by the standardized cans would not be more than 3 feet at the most. Think of what this would mean to the retail dealer in his display space.

*Impossible to check the vast number of cans.*—There is another point that I wish to make, and that is the fact that if the people of this

country realized that they were not getting accurate measurement in the cans of food that they are buying now, they would demand that these cans be carefully checked, and I know that every one will agree that it is impossible under present conditions for the sealers of weights and measures to give the consumers or the honest packers any protection now. You can readily see that if you were to undertake to commence making try-outs on this vast number of cans, it would be a task far beyond any bureau of weights and measures in the country; by the time you had checked half of the cans there would be a new lot on the market, and you would need to start all over again.

*Standardization not new.*—Standardization of packages or containers is not new. In fact, we have any number of precedents to guide us, but it just seems as though the most important part of standardization has been forgotten.

Nearly every State in the Union has milk bottles standardized, and certainly no one would advocate returning to the old system in the bottling of milk. A great many States have laws standardizing loaves of bread, and in those States where the standards have been in effect for some time there is no call for going back to the old system. These two products are distributed over a relatively small area, and therefore the State laws have been sufficient, but in the case of canned foods the distribution is over a wide area, and therefore a State law alone would not be sufficient. Now we have precedents to go by under our Federal law.

Most of you remember the time when berry boxes were not standardized; most of you remember the time when the bottom of the berry boxes was gradually shoved towards the top until there was more space on the bottom than there was space for berries on top. The Federal law of 1916 immediately changed all this. Berry boxes were standardized on the basis of 1 quart, 1 pint, and  $\frac{1}{2}$  pint dry measure, and immediately most of our trouble relating to odd-sized boxes was eliminated. We also have Federal laws standardizing barrels, baskets, and hampers, and in all of this standardization work the standards have been on the basis of our customary dry measure. It is therefore reasonable to apply this same principle to the standardization of canned foods.

I have seven standardized cans in my exhibit, the 1 gallon,  $\frac{1}{2}$  gallon, 1 quart,  $1\frac{1}{2}$  pint, 1 pint,  $\frac{1}{2}$  pint, and  $\frac{1}{4}$  pint.

*Bill H. R. 6964.*—There is before Congress at the present time bill H. R. 6964, which provides that all fruits and vegetables and canned milk be put in standardized cans which are of capacities based on our customary fluid measure standards. The standardized cans in my exhibit are somewhat similar but are not made to the exact measurements required in the bill.

*Standard measure.*—In closing, I wish to remind this Conference that in all its deliberations extending over a period of more than 30 years, it has always been its aim to respect and perpetuate the standard weights and standard measures that are so carefully and jealously guarded and protected by this National Bureau of Standards. These standards are the ones that were established at the recommendation of men like George Washington, Thomas Jefferson, and John Adams, and I believe are the standards that we should stick by and apply to our canned foods rather than be led astray and start off with some new designations such as 1, 2, or 3, or picnic, or special, or 303, or anything of that sort.



## DISCUSSION OF ABOVE PAPER

The ACTING CHAIRMAN. Mr. Warner, we thank you very much for your instructive talk.

MR. BOYLE. I just want to mention an experience I had along this line. Shortly after the end of the NRA, prices were raised, and we found in investigating and reweighing packages that one brand of milk formerly packed in cans, weighing 16 ounces, had been reduced to 14 ounces. I would not say that the milk can was the original 16-ounce size. In the case of packaged cereal, however, an original statement of weight of "55 ounces" on the package was blanked out and "48 ounces" substituted.

We also have found that a large manufacturer of soap powder has changed the weight of the powder in his package three times in 6 months without notice to or knowledge of the purchaser. We found it necessary to prosecute one of the national chains for advertising that powder at a weight greater than the actual weight labeled on the packages. They were working on the supposition that the weight they advertised was the true weight but this was not the case. In Maine we have a law which says that if you offer for sale or expose for sale a quantity less than you represent, you may be cited. This requirement is not limited to food, so when we investigated it was found necessary to cite them to court under this section and we got a conviction. I was very much interested in Mr. Warner's paper.

MR. CULLEN. I would like to ask Mr. Warner if he has any more copies of the paper.

MR. WARNER. If anyone wants a copy of the paper and will leave his name with the Chairman, I will see that he gets one later.

The ACTING CHAIRMAN. Mr. Warner placed mimeographed copies of his talk on the table. There weren't sufficient to go around. They were all sold out before he concluded his address.

MR. WHITE. Mr. Warner, I note that in all of your references to the bill you use the term "fruits, vegetables, and milk." Isn't any attempt going to be made in this bill to standardize all canned products?

MR. WARNER. The first idea was to standardize all commodities put up in metal containers, but the different interested parties seemed to think that this might jeopardize the bill, so that is the reason it was reduced to canned vegetables and canned milk. They figured that if there was a law of this kind in effect it would prove so beneficial and be so well liked by all interested parties that it would be adopted by them immediately.

MR. WHITE. You made reference earlier in your talk to the attempt of the National Canners' Association to standardize cans. I know that has been in a great measure in reference to containers for canned salmon. There are several million cases of canned salmon put up in Alaska, Washington, and Oregon yearly, and I think, inasmuch as there has been a rather important attempt to standardize that commodity, it should be included. I don't think there would be any opposition from that group. I think canned oils are in the same category.

MR. LEAVITT. Mr. Chairman, the question of packaged commodities is causing all of the State sealers quite a little trouble, especially due to the fact of the acute competition in various lines of merchandising. I don't see why we necessarily have to confine it to canned

goods. I would like to place a motion before the house that we appoint a committee, or instruct some standing committee to work out a plan for standardizing packaged commodities of all kinds.

In our State we have a bread law which says that the net weight must be stamped on each loaf of bread. I found in the stores that there were 13 different weight statements on loaves of bread, and the housewife, when she orders a loaf of bread, doesn't know what she is going to get. Some of the stores advertise a loaf of bread at 8 cents, others at 7 cents, and it is very confusing. The same thing applies to canned goods. They advertise canned vegetables, canned corn, or canned tomato juice. A lot of housewives order their supplies by telephone and after they are delivered, as you say, it is too late to do anything. I don't know of anything this Conference can do to advance weights and measures work further than to take some step toward standardizing all packaged commodities.

If we get a standard-package commodity law that can be adopted by the various States, and if the Bureau will recommend a definite standard law on that, and let each State pass it for itself, it will save a lot of confusion. These manufacturers putting up commodities can't put up a different size for every State, and our Bureau here should take the lead in those things so we will have a definite standard for all package goods.

Mr. SWEENEY. I think, in order to expedite matters, it would be a good thing to refer this to the Committee on Resolutions.

Mr. GRIFFITH. Mr. Chairman, I am quite sure we are all in accord with the exhibit and the wonderful talk that Mr. Warner gave us, and in view of the fact that the Honorable Mr. Sauthoff has a bill in Congress, may I suggest that those present, State and city and county or community sealers, write to the Honorable Mr. Sauthoff, giving him their experiences so that he may use that information in pressing his bill for passage. It will not involve the Conference but I am sure he will be glad to have any information that will be in support of standardization of cans.

Mr. WANDLING. Is there any objection to the body going on record in favor of the bill?

The ACTING CHAIRMAN. I think a suggestion has been offered. We have a Committee on Resolutions, and something may come from the Committee.

(At this point, at 11:15 a. m., the Conference took a recess until 12:15 p. m.).

## National Bureau of Standards Vehicle-Scale Testing Unit.

Views made during test of motortruck scale at the United States Naval Academy, Annapolis, Md.

NBS Miscellaneous Publication M159

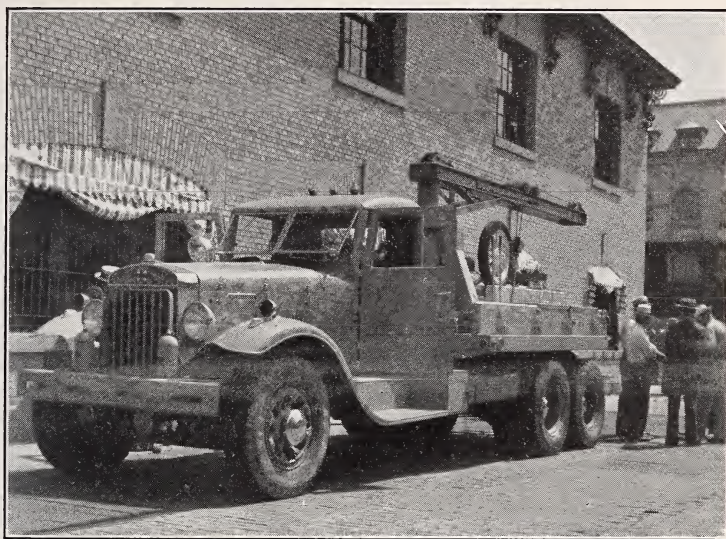


FIGURE 1.—Unit spotted at scale ready to begin test.



FIGURE 2.—1,000-lb weights being unloaded during test of right end of scale.

National Bureau of Standards Vehicle-Scale Testing Unit.  
Views made during test of motortruck scale at the United States Naval Academy,  
Annapolis, Md.

NBS Miscellaneous Publication M159

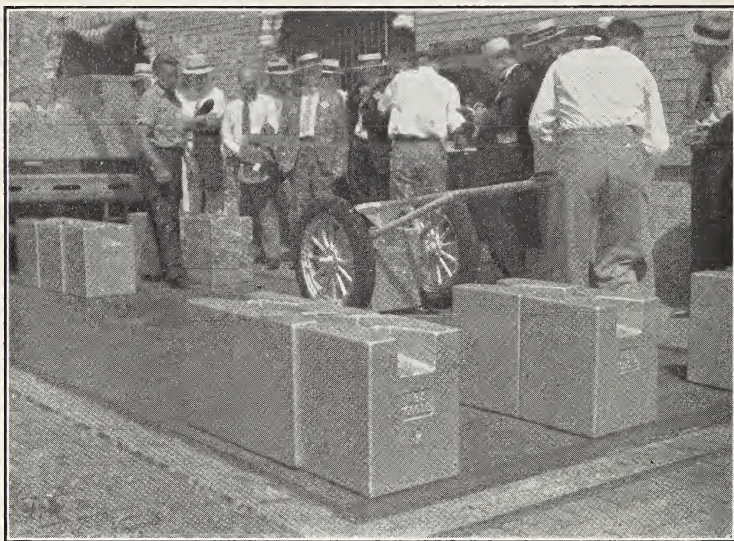


FIGURE 3.—Weights being shifted for distributed-load test.



FIGURE 4.—Weights being loaded onto truck for 15,000-lb test under strain load.

**FOURTH SESSION—AFTERNOON OF WEDNESDAY, JUNE  
2, 1937**

**DEMONSTRATION TEST OF MOTORTRUCK SCALE WITH NATIONAL  
BUREAU OF STANDARDS VEHICLE-SCALE TESTING UNIT**

(Immediately after luncheon the delegates and guests proceeded by chartered busses to the United States Naval Academy in Annapolis, Md. A complete test of the 40,000-pound motortruck scale of the Academy was made by the National Bureau of Standards vehicle-scale testing unit. After this test ample time was afforded to inspect the grounds and buildings of the Naval Academy and to witness the drill at dress parade of the regiment and the award of prizes, one of the features of the ceremonies of "June Week", before the return of the busses to Washington.)

## FIFTH SESSION—MORNING OF THURSDAY, JUNE 3, 1937

(The Conference reassembled at 10 a. m., at the National Bureau of Standards, Dr. Lyman J. Briggs, President of the Conference, in the chair.)

### APPOINTMENT OF COMMITTEES

The CHAIRMAN. The chair announces the appointment of the following committees:

#### *Committee on Resolutions:*

C. J. P. Cullen, Pennsylvania, chairman.  
C. D. Baucom, North Carolina.  
John J. Levitt, Illinois.  
Charles C. Read, New Jersey.  
L. J. Allen, Seattle, Washington.  
William H. Ising, Jr., Louisville, Ky.  
Arthur J. Wilhelm, Hamtramck, Mich.

#### *Committee on Nominations:*

J. P. McBride, Massachusetts, chairman.  
O. E. Brenneman, Ohio.  
H. N. Davis, Vermont.  
C. E. Tucker, California.  
C. H. Bulson, Jefferson County, N. Y.  
B. W. Ragland, Richmond, Va.  
C. B. Tolan, Ft. Wayne, Ind.

### DEMONSTRATION OF RECENT DEVELOPMENTS IN WEIGHING AND MEASURING APPARATUS, BY REPRESENTATIVES OF MANUFACTURERS

SECRETARY'S NOTE.—At this point several manufacturers brought before the Conference samples of apparatus 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 former cases, 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 omitted from the report.

It may be noted 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 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.

### RESULTS OF TESTS OF VEHICLE SCALES MADE WITH NATIONAL BUREAU OF STANDARDS EQUIPMENT IN PROGRAM OF COOPERATION WITH STATES

By RALPH W. SMITH, *National Bureau of Standards*

At the Twenty-sixth National Conference on Weights and Measures, held a year ago, announcement was made of the program of vehicle-scale testing which the National Bureau of Standards proposed to inaugurate in cooperation with the States. The purpose of this program was, basically, to assist the States in the procurement of

adequate testing equipment for the proper examination of wagon and motortruck scales in commercial use.

Yesterday you saw a test of a 40,000-pound motortruck scale made by the Bureau's vehicle-scale testing unit. It is the purpose of my talk today to give you some of the results of the testing work carried on by this unit during the past 6 months.

I may say in introduction that the unit in question was delivered to the Bureau in October 1936. Following some preliminary experimental operation of the unit to familiarize the personnel with this equipment, our first official test was made on November 5. For a period of some weeks thereafter we tested the various vehicle scales owned by the Federal Government in the vicinity of Washington, D. C., and did a small amount of work in the city of Baltimore in cooperation with S. T. Griffith, Chief of the Division of Weights and Measures of that city. On November 24, 1936, we began the first State schedule in Virginia. In the intervening months we have completed five State schedules: In Virginia, in cooperation with J. H. Meek, Director of the State Division of Markets; in North Carolina, in cooperation with C. D. Baucom, State Superintendent of Weights and Measures; in South Carolina, in cooperation with J. Roy Jones, Commissioner of Agriculture, Commerce, and Industries; in Georgia, in cooperation with S. H. Wilson, State Oil Chemist, and in Florida, in cooperation with Nathan Mayo, Commissioner of Agriculture. In each of these cases the original plan of procedure has been followed; that is, the State officer has arranged an itinerary for our equipment to include such territory as he wished to cover with the particular thought in mind of securing data on a representative number of typical vehicle scales throughout the State. Our testing unit has always been accompanied by the State officer or someone from his department or by a representative of the local jurisdiction in which the work was being done or, and this was frequently the case, by representatives of both jurisdictions. Reports have been issued on the individual scales examined, the originals going to the scale owners and copies going to the cooperating State and local officials. At the conclusion of the work in each State a summary report has been prepared and placed in the hands of the State officer giving him in a single document the essential facts in relation to the vehicle scales examined in this State.

In order that you may have a record in some detail of our test routine, of the character of reports issued, and of certain data relative to our vehicle-scale testing unit, we have prepared and assembled in convenient form facsimile copies of the field records of the test of a 40,000-pound motortruck scale and facsimile copies of four typical reports of vehicle-scale tests. Supplementing this material is a sheet giving dimensional and other data relative to our vehicle-scale testing unit, and an illustration of the unit made in the course of a regular test. Copies of this material have been placed on the Secretary's table and you are welcome to help yourself to these; it is believed that each weights and measures official will find it interesting and advantageous to read over all of the material I have referred to.<sup>4</sup>

In this connection I wish to say that the field records and reports in question have been reproduced just as they are in our files with the exception that we have deleted entries in the headings which might

<sup>4</sup> See appendix beginning on p. 117 of this report.

disclose information which we felt we were not at liberty to publish. Such information includes the identification of the particular scales, scale owners, and jurisdictions involved. In reproducing the field records a portion of a blank form was stapled in place over each original record.

I would call your attention particularly to the supplement appearing on the reverse of the first page of each of the test reports. This supplement outlines the test method and the requirements upon which scales are classified as accurate or inaccurate in our reports.

During the course of our operations we have found it advisable to make some changes in our test routine as compared with the methods followed during the first few weeks. These changes have been dictated by considerations of simplifying the test routine where this was practical, of establishing a procedure under which each element of the scale will be adequately checked and, in general, of making our test as effective as possible. The emphasis has been placed upon completeness of our test rather than upon speed. We realize that speed is desirable but it is felt that the most important consideration is to develop fully the performance characteristics of the scales which we examine.

In the five States which I have named, we have operated for approximately 23 full test weeks and have examined in that time 344 vehicle scales. This gives us an average of approximately 15 scales per week of testing operation. In considering this figure it should be remembered that our equipment is not, in most cases, testing all of the scales in any given town or city, and that there is a considerable loss of time in making the necessarily frequent movements from place to place.

The total mileage covered by our testing truck is approximately 6,000. The truck is now nicely broken in and is giving excellent service; there have been no truck failures, and we have never yet found ourselves in a situation in which there was any doubt as to the ability of the truck to meet every demand as to power and traction.

In presenting some of the detailed results of our tests in the five States so far covered, I wish to point out that these States all lie in one particular section of the country. Moreover, it is only fair to note that in two of the States there are no State agencies charged with the duty of inspecting scales, and only a small number of local jurisdictions have local inspection, and that the other three States, although having State organizations for the testing of weighing and measuring devices, are hampered by inadequate facilities for the testing of vehicle scales. On the other hand, conditions worse than we have found are reported by at least one State in another section of the country, where tests have been carried on for years but where tests of vehicle scales are being made for the first time with adequate equipment for this purpose.

In the data which follow, percentages are not invariably based upon the total number of scales examined; in some cases particular kinds of information have been recorded only during the past few months.

Proceeding, then, to the statistical portion of my remarks, I may say that 67 percent of the scales examined were used for the weighing of coal, either exclusively or in combination with other commodities. Based upon our best judgment in the matter, 61 percent of the vehicle



scales examined have been of the wagon type, only 39 percent being of the type which could be classed as "motortruck." Scale capacities have ranged from a minimum of 6,000 pounds to a maximum of 60,000 pounds; 47 percent of the scales had nominal capacities of 20,000 pounds, and the 30,000- and 40,000-pound scales comprise about 12 percent each. Platform sizes have ranged from a minimum of 12 feet by 8 feet to a maximum of 40 feet by 10 feet. Minimum and maximum widths of platforms were 7 feet and 13 feet, respectively. The most common platform lengths were 14 feet (15 percent); 16 feet (14 percent); 18 feet (16 percent); 20 feet (18 percent); and 22 feet (19 percent).

Nineteen percent of the scales utilized counterpoise weights. In connection with these scales, 347 counterpoise weights were separately tested by comparing them with standards of the Bureau; 35 percent were found accurate; 47 percent were found light; and 18 percent were found heavy.

Eleven percent of the scales examined were of the automatic-indicating type.

As found, 37 percent of the scales were out of balance at zero by more than 5 pounds. In the case of 66 percent of the scales examined, the approaches at one or both ends of the scale were inclined to the scale platform, the gradients ranging from what is reported as "slight" up to 15 percent; in many cases the approaches are reported as curved, the curves being so sharp in some cases as to contribute to excessive wear and derangement of scale parts as vehicles were driven on and off the scales. Overhead obstructions, either roofs over scale platforms or gateways giving access to scales, were encountered in 46 percent of the scales examined, the minimum overhead clearance encountered being 7 feet 6 inches.

Many lever systems were of the conventional "A-lever" type, and the lever systems of the motortruck scales were largely of the "Railroad pattern." However, a number of odd arrangements of levers were encountered and in one instance a scale having wooden levers was tested. Accessibility of the lever system is reported as "very good" in only 1 percent of the cases, as "good" in 42 percent, as "fair" in 39 percent, and as "poor" in 14 percent. It is reported that provision has been made for pit drainage in only 45 percent of the installations examined; in arriving at this percentage, we have considered provision to have been made for pit drainage even when this consisted only of a hand pump for pumping out the pit.

Many varieties of lever foundations have been encountered; these ranged from adequate concrete foundations down through various types of brick, masonry, and timber combinations, to timber alone.

In reporting scales as accurate or inaccurate we have adhered, of course, to the Conference tolerance requirements. A few scales are necessarily reported as inaccurate upon a single error in excess of the tolerance. In most cases, however, inaccurate scales will have errors in excess of the prescribed tolerances at several or at all test loads. In order to arrive at an average figure representing the percentage inaccuracy of all scales tested, we record as the percentage error of the scale the maximum percentage error developed by any one of the primary elements of the scale, exclusive of errors which would result from the use of inaccurate counterpoise weights. Six scales have been

found to have abnormally large percentage errors; these ranged from 14.67 to 40 percent. One scale in daily use by the owner was not tested because of derangement of the lever system; the shackle connection between two of the main levers had been broken and the short lever had dropped down into contact with the truss rod of the long lever. This particular scale has been classified as an inaccurate scale, although it is necessarily omitted in computing mean percentage errors.

#### SCALES WITH ABNORMALLY LARGE ERRORS

Error (%)	Cause
31.65	The scale appeared to have been designed to have a multiple of 750:1; it actually had a multiple ranging from 752:1 to 770:1. Moreover, it was being used with counterpoise weights designed for use on a scale with a ratio of 1000:1. The error is based upon these conditions of use.
14.67	There was a serious binding condition which could not be identified because it was impossible to make an inspection of the lever system; the platform was bolted down so securely from the under side that access from that point could only be had by removing the entire weighbridge, and there was no hole big enough for the inspector to crawl through. A small boy was prevailed upon to worm his way into the pit, and he dug some of the dirt away from the levers; this treatment, however, made almost no difference in the magnitude of the weighing error.
17.00	This scale had four main load bearings at each end—eight in all. Six of the original eight load-bearing steels were missing.
24.00	A serious bind developed under load between the weighbridge girder and a portion of the foundation.
40.00	A serious bind developed between a weighbridge girder and a fulcrum stand tie rod.
14.67	This was a pitless type scale, installed in a pit having a concrete floor. Clearance between the scale levers and the floor was very small, and under load one of the main levers settled or deflected sufficiently to rest on the floor.

Considering, then, the total of 343 scales actually tested by our equipment in the five States under consideration, we find that the numerical mean of the maximum percentage errors is 1.39 percent, approximately seven times the weighbeam tolerance of 0.20 percent. These scales include 19 municipally owned scales; 3 State-owned scales; 1 county-owned scale; and 6 federally owned scales, the balance being scales in ordinary commercial service. If we exclude from consideration the six scales having the abnormally large errors, as noted above, we find the numerical mean error reduced from 1.39 to 0.99 percent.

The percentage of scales inaccurate for all of the scales under consideration is 83 percent.

Twenty-seven percent of the scales tested are found to have shifted their zero balance by more than 5 pounds at the conclusion of a test. Upon 22 percent of the scales, the indications of weighbeam poises are found not to be in agreement or, in the case of scales utilizing counterpoise weights, one or more of the weighbeam bars is inaccurate when considered independently of the ratio error of the scale.

It was considered practicable to make nose-iron adjustments in only nine cases. It is our policy to undertake such adjustments only in cases where the mechanical condition of the scale is good and it is considered that the errors found are to be ascribed almost entirely to an incorrect lever ratio; we do not make nose-iron adjustments where these would mask errors primarily caused by faulty installation or maintenance. In eight of the nine instances where we made nose-iron adjustments we were successful in bringing within tolerance a

previously inaccurate scale; in the remaining scale, the travel of the nose iron was insufficient to permit of correction of the scale error. "Corrections" were made in the case of 17 percent of the scales tested. These "corrections" were of various kinds, ranging from the clearing away of accumulations which were causing binding conditions, to the repositioning of parts which had been incorrectly mounted; in many cases the corrections were made before the test was started. In a number of cases the corrections resulted in the reduction of errors and in 10 instances these corrections brought within tolerance scales previously found inaccurate. Efforts were made in 46 instances to reduce sensibility reciprocals to a value within the prescribed limit. In many cases the condition of the scale was such that raising the weigh-beam balance ball assembly to its maximum height had but little effect upon the SR. However, such adjustments were successful in 11 instances in reducing the SR to a value within the prescribed limit.

Considering all of the scales to which the SR requirements were applicable, it is found that only 39 percent of these met the requirements; if we limit our consideration to accurate scales, that is, those conforming to the tolerances, we find that 66 percent of this group met the SR requirements. Three scales were found to be in unstable equilibrium.

An essential part of the Bureau's test of a vehicle scale is the inspection of the scale pit and of the scale parts in the pit as well as all of the other elements of the installation. In a few instances it has been found impracticable to make the pit inspection because access could not be had to the pit. Scales have been found in which the platform planks were so securely positioned that none of them could be raised without material damage; where no other means of access to the pit is provided, such conditions preclude inspection. In numerous cases pit inspections have been prevented because of water in the scale pit; occasionally water in the pit has not been so deep as to prevent all inspection but has made a complete inspection out of the question.

The following summary of conditions found as a result of inspection as distinct from test is presented as an indication of the faults to which many weighing errors and a large part of the deterioration of scale installations may be ascribed, and particularly as indicating a fertile field for educational activity on the part of the weights and measures official so that scale owners may be given proper instruction relative to installation and maintenance conditions.

Fault	Percent
Water standing in scale pits, or stopped drains.....	22
Dirty pits, conditions ranged from a slight accumulation of foreign matter to accumulations so deep as practically to bury the lever systems.....	43
Rusting structural steel in the pit.....	27
Rusting or dirty pivots and bearings of the platform lever systems (pivots and bearings had been protected against corrosion in only 42 percent of the scales examined; this protection was given by grease in 29 percent, by oil in 5 percent, and by paint in 8 percent).....	58
Worn or broken pivots and bearings.....	25
Pivots and bearings displaced from proper relative positions.....	21
Levers out of level.....	10
Loose levers or T bearings.....	6
Out of plumb bearings and connections, including out of plumb beam rods..	32
Inadequate clearances around elements of the platform lever systems or actual interferences with such parts.....	21
Check rods missing, disengaged, broken, or improperly adjusted for freedom..	14

Fault	Percent
Improper clearances around scale platform (in the large majority of these cases the clearances were found to be inadequate, although in a few instances clearances were excessive)-----	39
Scale platforms and copings not in surface alinement-----	4
Scale platforms in need of repair or renewal-----	28
Inadequate clearances around beam rods-----	8
Dirty, rusted, or tarnished weighbeam assemblies (in numerous cases the weighbeams were in such condition as to make it difficult to read their indications)-----	35
Mechanical faults in weighbeam assemblies, such as battered poise stops, improperly mounted elements, broken poise parts, etc-----	18
Insecurely mounted weighbeam supports, such as shelves, pillars, fulcrum hooks, etc-----	13
Interferences in reading-face mechanisms-----	4

In conclusion, I wish to discuss briefly the overloading of scales. Not so many years ago all vehicle loads were wagon loads in which the loads were distributed approximately equally between the two axles of the vehicle. The scales of those days, known as wagon scales, were designed for the weighing of these wagon loads and when a scale had a capacity of, say, 12,000 pounds, it was designed on the assumption that the end loading would not exceed one-half of the nominal capacity of the scale, or 6,000 pounds. With the advent of the motortruck, weighing conditions changed; instead of the truck load being equally divided between the two vehicle axles the loading over the rear axle was much in excess of that over the front axle. Today we find that as much as 90 percent of the gross weight of a loaded motortruck may be carried by the rear axle of the vehicle.

It is generally accepted, I believe, that a wagon scale is suitable for the weighing of motortruck loads only up to 60 percent of its wagon capacity.

In the case of old wagon scales, these are not marked in any way to show their limitations when used for the weighing of motortruck loads. More recently, however, wagon scales have been marked to show both their "wagon" capacity and their "motortruck" capacity. So far as I know these marked motortruck capacities are always 60 percent of the marked wagon capacities.

It seems that it should be obvious that if a scale is overloaded, breakage or damage of parts may occur and weighing results are not to be depended upon. This seems, however, not to be well understood or at least not to be observed by the operators of scales designed as wagon scales. Not only is the motortruck limitation frequently disregarded but we have found scales used for weighing motortruck loads in excess of the nominal capacities of both motortruck and wagon scales. Based upon an analysis of our field records, it appears that 54 percent of the wagon scales encountered have been used in weighing motortruck loads in excess of the marked motortruck capacity of the scales or of 60 percent of their wagon capacity. In addition to these, 4 percent of the scales have been used in weighing motortruck loads in excess of the nominal wagon capacities of the scales, extra weights, either from other scales or home-made, having been secured in order to make it possible to weigh these excessive loads. In addition to the two groups of scales already mentioned, it is found that 7 percent of the motortruck scales encountered were being overloaded by amounts ranging up to 9,000 pounds. When we consider a wagon scale, however, carrying a motortruck load of 6,000 pounds in excess of its wagon capacity, the seriousness of the overloading should be apparent to all.

It has not been uncommon to find levers which have been broken and mended; I believe that in one case there was evidence of a particular lever having been broken and mended in three places, perhaps as a result of three separate failures.

We have no means of knowing what errors were being developed in the case of scales which were overloaded in use since in no case do we load a scale under test beyond its nominal capacity. In some cases scales are not even loaded to their full nominal capacity, if, in the judgment of our inspectors, scale parts might fail under such conditions.

The vehicle-scale testing unit of the National Bureau of Standards has demonstrated its adequacy for the purpose for which it was designed. We believe that the testing service which we have been rendering has disclosed conditions unknown both to scale owners and weights and measures officials. We know that this service has aroused widespread interest in the communities where it has been carried on and we have received from weights and measures officials of those jurisdictions and from scale owners enthusiastic and appreciative comments upon our work. It is very encouraging to learn that plans are already under way in some of the jurisdictions visited by our testing unit to provide suitable equipment for the routine testing of vehicle scales. Moreover, the results of our work are believed already to have extended even beyond States where we have carried on testing work; at least we know of activity along this line in a number of States which we have not yet visited.

It is the desire of the Bureau to further in every proper way the procurement of adequate testing means for vehicle scales and we shall be happy to cooperate with officials at any time in supplying detailed information upon our own equipment and in conferring with them, if desired, as to the most suitable type of equipment to fit their particular needs.

#### DISCUSSION OF ABOVE PAPER

The CHAIRMAN. We are very glad to see the interest that has been shown in Mr. Smith's paper and in the report that you have received. Is there discussion of Mr. Smith's paper?

Mr. BAUCOM. Mr. Smith said that he does not test any scale beyond its normal capacity. I think the manufacturers of some of the scales are guaranteeing them to carry a 25- to 50-percent overload. I am just wondering if it would be advisable or permissible to give that scale a test in excess of its rated capacity to determine whether it would go beyond its capacity and be accurate.

Mr. R. W. SMITH. The very great probability is that you will go through the platform and lever system into the pit if you start overloading scales to that extent. Another reason is that we do not believe that a scale which holds itself forth to do a certain thing should be tested beyond the point claimed for the scale. We would not want to take chances of breaking a man's scale and I don't believe weights and measures officials want to do that. That is why on certain scales having obviously weak levers or weak platforms we keep our test load down even below the nominal capacity of the scale. If you wish to conduct research of that kind I think it should be done in the laboratory or the scale shop, and not on installed equipment in the field.

Mr. HOLBROOK. I may add a word there and say that one time in testing a railroad track scale within its capacity we broke a main lever, and the amount of correspondence that was carried on over one main lever took a great deal of our time that we could better have devoted to other subjects.

I don't believe it will ever pay to test a scale over its capacity, but I do believe the State regulation should be rigidly enforced to the effect that a scale shall not be used beyond its nominal capacity.

Mr. BAUCOM. The only reason I brought that out is on account of the sales talk a salesman will put up to sell a scale to a purchaser, claiming you can overload it without any danger. The purchaser may buy a lower-rated scale believing he can overload it without damage. If the States can head that off it will help. That is more or less a policy that might be worked out in the State, but I want to throw that out for consideration.

Mr. ARCHIE T. SMITH. I would like to say a word about the conditions we found in New Jersey on the overloading of scales. Where a scale is used beyond its capacity we will so test it. Very often we find that it is inaccurate on the overload. We have gone through some scales. On one, not long ago, the platform broke right in the middle and let the truck down into the pit.

Another motortruck scale, with a concrete deck, was being used recently to its beam capacity and a sand truck went through and broke all four main levers. The scale was repaired; new main levers were installed, and our test truck was the first truck to go on that scale after it had been put back into service. During the test, while I was taking a reading on the beam, it let go again, with the result that they have to tear it out and install heavier equipment.

We have found those conditions in numerous cases. The only time we will go over the nominal capacity of the scale is when they are using it beyond that capacity.

Mr. WARNER. I think this question of advertising an overload on a scale is quite an important proposition. A great many of the State laws are upheld on the ground that violations of them are unfair practices, and certainly if a scale manufacturer advertises that his scale will carry a 25-percent overload and it does not do that, it is very unfair competition between manufacturers. I dare say that if Wisconsin had an outfit that could adequately test a scale of that kind we certainly would want to test it to the capacity advertised by the manufacturer to see whether or not they were advertising falsely. If they were and the weights went through into the pit we would have fine proof to convict those fellows when we got them into court.

Mr. ARCHIE T. SMITH. I might say that where we find wagon scales being used to more than their nominal capacity we are clamping down and not permitting them to go over that, and in numerous cases are condemning the scale entirely and requiring new, up-to-date motortruck equipment to be installed, bringing about a much healthier condition.

Mr. BOYLE. We have had a recent installation in Portland of a 24-foot-platform motortruck scale in which the concrete fabricated steel deck weighed in excess of 18,000 pounds, and I was wondering if the weight of that deck with the capacity load would create a condition which would be unusual in the scale; in other words, might not the extra-heavy deck and a maximum load overload the scale, and

create a stress that would not be present were the ordinary platform to be used?

Mr. R. W. SMITH. When a manufacturer installs a scale with a certain dead load he is supposed to put in a lever system which will safely handle the dead load in addition to the live load up to the nominal capacity of scale. That is supposed to be taken care of in the design of the levers that go into that particular installation.

Mr. BOYLE. Is there any way a local inspector can determine if that condition has been met?

Mr. R. W. SMITH. Not without an engineering computation of the entire lever system.

### FUNDAMENTALS OF SCALE DESIGN

By KENNETH C. ALLEN, *Development Engineer, Dayton Scale Division, Hobart Manufacturing Co.*

Mr. President and members of the Conference: My subject, "Fundamentals of Scale Design", is indeed a broad one and it would be easily possible to spend several days in discussing the various factors which must be considered in designing scales, not only for accurate weighing, but also for permanence of accurate operation, ability to stand abuse, ease of manufacture, speed and convenience of operation, general appearance, and of course, adherence to the specifications which you men have developed during the many sessions of these National Conferences.

Since in the time allotted for this part of the program we cannot even begin to cover the field of scale design I will confine my remarks

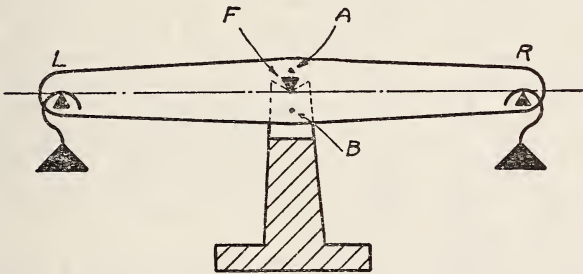


FIGURE 5.

to a simple nontechnical discussion of some of the basic principles involved in the construction of scales. To some of you these remarks may be too elementary to be of interest; however, I believe it possible that the majority of those present have, because of their executive duties, been unable to take the time necessary to delve into the theory behind these machines.

We will start this discussion with the simplest form of even-balance lever such as that shown in figure 5. In the center of this lever at point *F* we have the fulcrum knife-edge bearing on which the lever rotates. At each end of this lever are two other bearings marked *L* and *R* which are equally spaced from the center bearing and on which we may hang the weights to be compared. Since we use this type of scale by observing the effect of the weights on the normal level position of the lever, we must first make sure that the lever

will assume and maintain such a position when no weights are applied. This characteristic is controlled by the position of the center of gravity of the lever relative to its fulcrum bearing. If, in designing such a lever, we distribute its weight in such a manner as to bring its center of gravity on the axis of the fulcrum knife-edge the lever will be like a perfectly balanced wheel in that it will remain in any position in which it is placed. Such a lever will have some value for weighing operations. For example, if we applied weights to the outer knife-edges and found that the lever would remain level if we so placed it or that it would stay in any other position in which it was set, we would know that a perfect balance existed between these two weights. If, on the other hand, the lever continually tended to turn in one direction it would be obvious that the weight which was being lowered was the heavier of the two. This lever, however, would not give us any idea of how much heavier the greater weight was as it would continue to rotate to its lowest position whether the difference were a grain or an ounce.

If in the design of our lever we should so distribute the mass as to place the center of gravity above the knife edge approximately at the position *A* in figure 5, we would find it impossible to make the lever stay in position. It would be top heavy and would always tend to fall to one side or the other in the same manner as would a pencil if we tried to stand it on its point. Such a condition would render the lever practically useless for any accurate weighing operations.

In the correctly designed lever the parts would be so arranged as to place the center of gravity just below the knife edge at a position indicated by *B* in figure 5. In this case this center of gravity will always tend to hang directly below the knife edge and in so doing will hold the lever in a level position. If a very slight weight is applied to the right-hand pivot this weight will cause the lever to rotate in a clockwise direction, which action will move the center of gravity to the left of the fulcrum bearing until it travels far enough in that direction to balance the small weight which was applied. A larger weight applied at this point would result in a little greater rotation so that we find that this lever not only tends to maintain its normal position, but is also able to give us some idea of the amount of difference between two weights.

Having designed the lever so as to be stable under a no-load condition we must now consider the means of maintaining this stability when loads are applied to the end pivots. Due to the fact that the loads which are applied are free to swing on the outer knife-edge bearings their effect is the same as though they were fastened to the lever with their center of gravity on the axis of these bearings. If the load pivots are so placed on the lever that a line through them passes above the fulcrum pivot, then when we apply loads to these pivots we raise the center of gravity of the whole system and again make the lever unstable or top-heavy.

If the line between these outer pivots passes below the center knife-edge the effect is to lower the center of gravity of the lever, which condition makes the lever very much more stable and thus decreases its sensitivity. In order to avoid the two conditions just enumerated it is necessary for us to place all three pivots on the same straight line. This is known as the range line and is indicated by the broken line on figure 5. With the pivots so set, the center of gravity



of any loads which are applied to the end pivots passes through the exact center of rotation and therefore does not affect the lever action.

The effect of this range line may be more clearly explained by figures 6 and 7. In figure 6 we show the correct straight range line between the lever pivots  $L$ ,  $F$ , and  $R$ . Since the pull of the applied weights is controlled by gravity which always acts vertically downward, their effect on the lever is governed by their true horizontal distance from the fulcrum rather than by the spacing of the pivots along the line of the lever.

When the lever in figure 6 is level as indicated by the broken line  $LFR$  this effective distance between the outer pivots and the center is represented by the distances between  $O$  and  $M$ , and

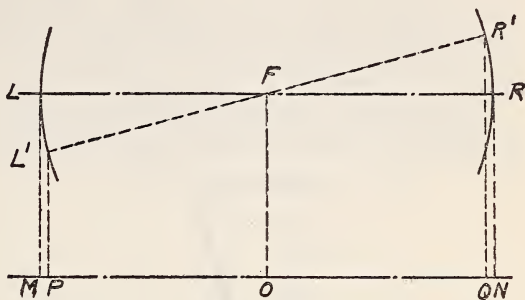


FIGURE 6.

$O$  and  $N$  on the lower horizontal line. In this case these two distances are equal to each other because the distances between  $L$  and  $F$ , and  $R$  and  $F$  are assumed to be equal and the lever is horizontal and therefore parallel to the line  $MON$ .

When the lever is used in weighing it will, of course, be rotated and will assume some off-level position such as the one shown by the dotted line  $L'FR'$ . In this position the effective horizontal spacing of the pivots has been decreased to the distance represented by  $OP$  and  $OQ$  on the lower horizontal line.

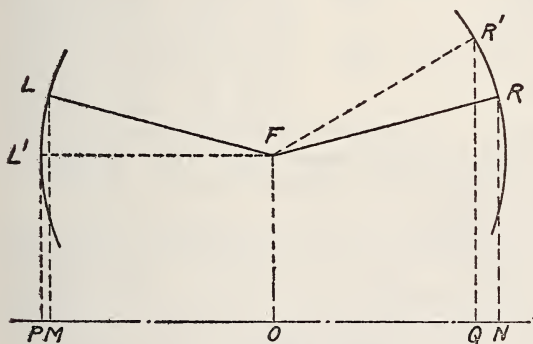


FIGURE 7.

Since this range line is straight, the two sides of the lever,  $L'F$  and  $R'F$ , make the same angle with the horizontal line below and therefore result in equal projections on that line as shown by  $OP$  and  $OQ$ . Therefore, although  $P$  and  $Q$  are not as far

from  $O$  as points  $M$  and  $N$ , they are still equally spaced from  $O$  and our lever still maintains its even-balance characteristics.

In figure 7 is illustrated the effect of a broken range line with the pivots  $L$  and  $R$  being placed above the fulcrum pivot  $F$ . Here the distances from  $L$  to  $F$  and  $R$  to  $F$  are assumed to be equal and the lines between these points, when in a position shown by the straight line, are assumed to make equal angles with the horizontal. When the lever is in this position the effective arms of its two sides will be represented by the distances from  $O$  to  $N$  and  $O$  to  $M$ , which are equal and therefore indicate an even-balance lever when in this position.

If this lever is then used in weighing and is rotated to the position shown by the dotted line  $L'FR'$  we will find that instead of the lever steadying itself it will tend to keep on going in the direction in which it started. If we examine the horizontal projection in this case we will find that the projection of the left side of the lever has been increased from  $OM$  to  $OP$  and that of the right side of the lever has been decreased from  $ON$  to  $OQ$ . The distance from  $O$  to  $P$  is now considerably greater than that from  $O$  to  $Q$  so that we no longer have an even-balance lever and it becomes obvious why the lever continues to rotate to the left.

The final step in the construction of an even-balance lever is the adjustment of the outer pivots so that they both are exactly the same

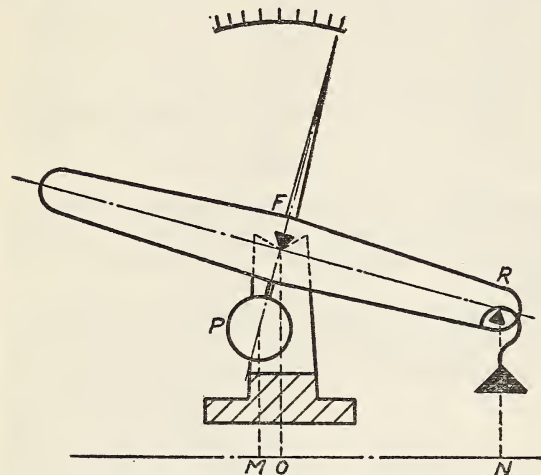


FIGURE 8.

distance from the center bearing. This is usually accomplished by setting these pivots with very accurate gages and then checking the setting by applying equal weights to the pivots and observing their effect on the lever. If the lever does not maintain its level position, further pivot adjustments are made until the desired condition exists. After this final setting is made the weights are usually interchanged on the lever in order to make sure that the weights themselves are exactly equal. If the lever still maintains its horizontal position after the weights are reversed we are then reasonably certain that the pivots are accurately set and that we will obtain satisfactory results from the lever.

All the principles just described for an even-balance lever also apply to uneven levers, with the obvious exception of the pivot spacing which is changed to suit the desired ratio of the loads to be applied. These principles also apply to the poise and beam systems commonly used on commercial scales. If a hanging poise is used the beam notches must all be placed on the range line so that the weight of the poise will not affect the sensitivity of the lever. The notches for the poise must also be as accurately spaced as the pivots would be on a simple lever if we expect to obtain results of comparable accuracy.

If the sliding poise is used its track must be on or parallel to the range line and the center of gravity of the poise must either be on the range line or must be placed in such a manner that the combined effect of its center of gravity and that of the lever are such as to meet the requirements of stability and sensitivity.

From the simple lever just described it is but a short step to the pendulum principle of automatic weighing. By taking the lever

shown in figure 5 and hanging a heavy weight just below its fulcrum we make this lever exceedingly pendulous. If we then add a pointer and a chart we have the fundamentals of a pendulum scale, as shown in figure 8. If a weight is hung on pivot  $R$  it will pull this point downward, thus rotating the whole system in a clockwise direction. This rotation will move the pendulum weight  $P$  to the left of the fulcrum  $F$  a distance equal to that between the points  $O$  and  $M$  on the horizontal line. This same action will move the pivot  $R$  in toward the fulcrum until it stops at some horizontal distance from the fulcrum such as  $ON$ . A balanced condition will exist when the weight of the pendulum times the distance  $OM$  equals the weight of the suspended load times the distance  $ON$ . If still more weight is added, the pendulum will move farther out until the balance is again reached. This same rotation will move the pointer along the chart and thus indicate a greater load. The chart, however, will not be evenly graduated because equal increments of load result in equal changes in the combined ratios of the distances  $ON$  and  $OM$  rather than in equal increments of rotation of the system.

When an evenly graduated chart is desired the necessary action can be produced by suspending the load to

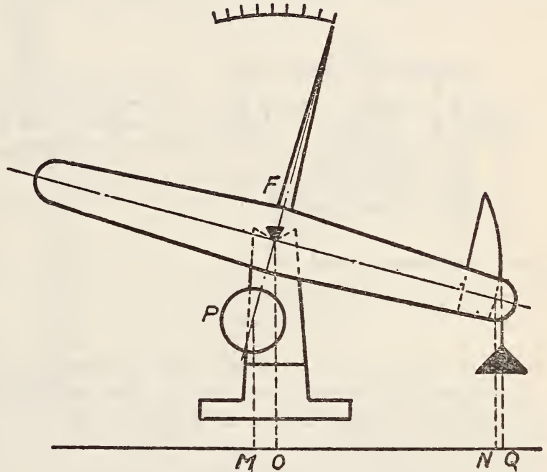


FIGURE 9.

be weighed from a steel tape passing over a cam so designed as to make equal angles of rotation result from equal changes in combined ratios of the distances  $OM$  and  $OQ$  as shown in figure 9. It will be noticed in this diagram that the distance from  $O$  to  $Q$ , which now represents the moment arm of the applied load, is greater than the distance from  $O$  to  $N$ , which represents the effective arm of the load if the cam had not been used as in figure 8.

The procedure in designing this cam so as to obtain an evenly graduated chart is in itself a somewhat involved mathematical problem which we will not attempt to discuss here.

In spring scales, the spring alone replaces the whole pendulum system just described, thus eliminating the cam, tape, pendulum ball and pendulum knife edge. In addition, since springs resist the applied loads through their own internal stresses rather than through the aid of gravity, they are relatively insensitive to an out-of-level condition and can be made very much lighter in weight with the corresponding decrease in the inertia of the scale.

The principle of springs is so simple that no explanation of their action is required here. Furthermore, the design of a spring for scale use, both from a standpoint of proper materials and general propor-

tions, is too involved for a discussion at this time so that we will pass on to a further discussion of levers.

So far, we have considered comparative weighing in which known standards are compared with the unknown weights through levers. We have also discussed automatic means of weighing such as springs and pendulums in which the values of the weights are read directly on the chart without the use of auxiliary lever systems excepting insofar as the pendulum might be considered a form of automatic lever.

The question may now arise as to the function of levers in automatic scales, since almost all such scales use levers, although they are not theoretically required. If levers are not used it is necessary to so place the chart and weighing mechanism that the load may be suspended

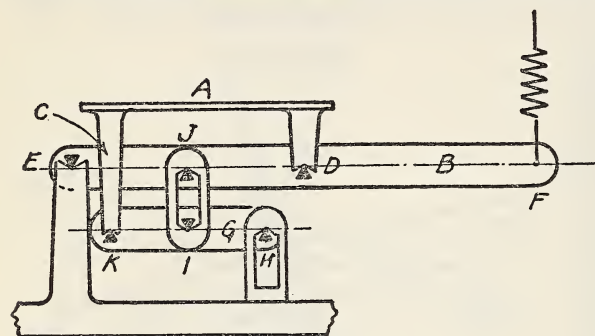


FIGURE 10.

beneath them as in the familiar hanging dial scale. In many applications where a more compact construction is desirable the dial is placed at a lower position and the commodity platform is placed to one side or over the reading face of the scale. In such construction the lever is used to transmit the

force from a point under the platter to a point under the chart.

In most automatic scales it is also desirable to have a light load on the spring or pendulum in order to reduce the size of these parts. This is accomplished with the same lever which transfers the force from one point to the other, through the spacing of pivots. In the Dayton cylinder scales, for instance, this lever has a ratio of  $2\frac{1}{2}$  to 1 so that a 30-pound load on the platter transmits only 12 pounds of force to the springs.

Levers such as those which are used in conjunction with springs or pendulums, are different from the even-balance levers in that they should serve only to transmit the force and decrease its amount. They should not enter into the weighing function as an even-balance lever does, but should leave the weighing entirely to the springs. These levers are therefore designed with the center of gravity on the range line, so that they do not affect the scale readings, regardless of whether they are in the upper position weighing a light load or in the lower position with a heavy load. We must, of course, still keep all of the pivots in the same straight range line in order to avoid the condition mentioned in respect to the even-balance levers.

In the systems which we have discussed so far, we have had all of our platters hanging from the lever, whereas almost all scales except the hanging type place the platter above the lever. This introduces the problem of platter control, since the platter is naturally top-heavy and will tend to overturn if some means are not provided to prevent this.

There are two methods of caring for this condition—the multiple-lever system and the check-link system. Figure 10 shows a sketch of the multiple-lever system. In this case the platter A is supported at

the four corners thus preventing any tendency for it to overturn. If, however, we were to attempt to support the four corners with a single lever such as *B*, the front and back legs would contact the lever at the points *C* and *D*, which points are not equally spaced from the fulcrum *E* and will not transmit equal loads to the point *F*, where the spring or pendulum would be attached. It would, therefore, give different indications of weight according to the position on the platter which the weight occupied, the reading being greater when the weight is placed on the edge of the platter nearer the spring.

To correct this condition a secondary lever *G* is introduced and the legs at the point *C* are carried around the main lever and allowed to bear on this secondary lever *G* at point *K*. This lever *G* is provided with a fulcrum bearing at point *H*. Point *I* is placed midway between points *K* and *H*. The legs at *D* continue to contact the main lever,

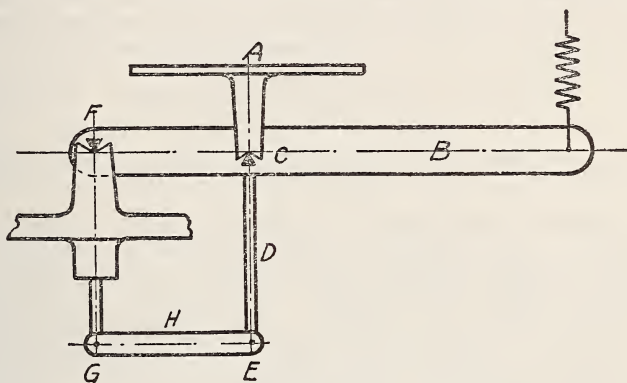


FIGURE 11.

and another bearing is provided at *J*, midway between point *D* and fulcrum *E*. Points *J* and *I* are then connected by means of a link so that the secondary lever hangs on the main lever at this point.

If we assume that the lever *B* is a 2-to-1 lever, we know that if we apply a 2-pound load at point *D* it will exert a 1-pound reaction at point *F*. Now, if a 2-pound load is placed on the platter at point *C*, it exerts a 2-pound load at point *K* on the secondary lever, which is increased to a 4-pound load at point *I*, since point *I* is midway between point *K* and the lever fulcrum *H*. This 4-pound load goes into the main lever at point *J*, midway between point *D* and the fulcrum *E*, at which point this main lever has a 4 : 1 ratio. This 4-pound load then goes through the 4 : 1 lever and appears at point *F* as a 1-pound pull, so that we find that our 2-pound weight will exert a 1-pound pull on the spring regardless of where it is placed on the platter.

A simpler system of accomplishing this result is shown in figure 11, where we have a platter *A* contacting a lever *B* at point *C*. Since this platter contacts the lever only at this one point we do not have to worry about varying ratios of the lever. It is obvious, however, that this platter is top-heavy and will not support a load unless some means be provided to stabilize it. For this purpose we extend the platter support member *D* down to a point *E* directly below *C*, and provide a connection *G* in the frame of the scale at a point directly below *F*, making the distances *FG* and *CE* equal. Between the points *G* and *E* we provide a check link, the length of which is exactly equal to the

distance between  $F$  and  $C$ . Now, any tendency of the platter to rotate is arrested by the push or pull on this check link. By adjusting the distance  $FG$  we bring the check link exactly parallel with the lever  $B$ . Under these circumstances any forces in the check link are completely balanced by the parallel forces in the lever, so that they have no effect on the weighing action of the scale. It is obvious that the farther the check link is from the lever the less will be the forces required to stabilize the platter due to the greater moment arm  $CE$ . This is a desirable condition, and all manufacturers of this type of scale try to get as great a distance between their lever and check link as possible in order to reduce friction and wear on these parts.

We have now discussed very briefly some of the fundamental principles involved in scale design, particularly those in which I believed you to be interested. There are, of course, many other details in scale construction such as racks, pinions, bearings, dashpots, etc., the function of which I am sure is obvious to most of you, but time does not permit any further discussion of these principles.

#### RECENTLY ENACTED ORDINANCE REQUIRING LICENSING OF SCALE REPAIRMEN

By ALEX PISCIOTTA, *Deputy Commissioner, Department of Public Markets, Weights, and Measures, City of New York, N. Y.*

At the National Conference last year, the city of New York was represented by my predecessor, Hon. Matthew J. Diserio, who exhibited our new large-capacity scale-testing equipment and delivered a paper describing this equipment. In a general way, he also discussed the improvements in weights and measures enforcement in New York City. Commissioner Diserio was to appear on your program this year, to present to you a paper on the new city ordinance regulating the dealing in, trading in, selling, and repairing of used scales, weighing or measuring devices. I am happy to inform you, and I know Commissioner Diserio's many friends whom he has made among you, will be glad to hear that Mayor LaGuardia has seen fit to promote him to a higher position in his official cabinet, that of Deputy Commissioner of the Department of Sanitation.

It is somewhat of a coincidence that I, his successor, had similar previous training and experience to undertake this work. We both are members of the legal profession and both were promoted from positions in the Department of Licenses. So I speak to you now with about the same apprehension and presumption that my predecessor must have felt last year.

We have been trying in the city of New York, as elsewhere, to obtain some control over the business of dealing in second-hand scales and other weighing or measuring devices, and its related business of repairing these devices. Our inspectors frequently find, in making their inspections, incorrect scales, which, upon investigation, are found to have been purchased from second-hand dealers who have no idea of their accuracy and have neither the knowledge nor the means to determine this fact. The dealer sells the scale, "as is." There is often no representation made as to its accuracy and certainly no guarantee or warranty.

We found also that scales and measuring pumps which had been condemned by us were supposedly repaired by all kinds of people holding themselves out to be scale repairers. They have very little

knowledge of scale mechanics, often no test weights or measures, or test weights or measures which are not frequently tested for accuracy. They prey upon the unsuspecting merchant, who has purchased a used scale from a second-hand or junk dealer or at a public auction. He often makes the "repair" more extensive than is required and frequently endeavors to sell the merchant a new scale, or a rebuilt scale.

There are a number of itinerant mechanics to be found in a city like New York, who try to augment their earnings during the daytime at some regular occupation by setting themselves up as "expert scale men" or "scale experts" in their spare time. Every merchant in the city is bothered continuously by such men soliciting their business.

We had a number of cases in New York last year in which 20-pound spring scales of the type used extensively by peddlers had been tampered with by removing the 20-pound dial and substituting a 25-pound dial, thereby making it possible to defraud the purchaser  $\frac{1}{4}$  pound on each pound, or 5 pounds on a 20-pound purchase.

It was with such conditions as these in mind, that our Department presented to the Board of Aldermen, an ordinance designed to correct these abuses.

The new ordinance requires that every person, firm, copartnership, corporation, or association who or which maintains or carries on the business of dealing in, selling, trading in, receiving, or engages in the repairing of condemned, rebuilt, or used scales, weighing or measuring devices, shall obtain a certificate of registration. The annual fee is \$25. No certificate is to be issued to any person who is not a citizen of the United States, or who at least has not declared his intention of becoming a citizen by the procuring of his first papers. Before issuing a certificate, the Commissioner is required to cause an inquiry to be made concerning the applicant and must be satisfied with his experience and training as a mechanic with knowledge of repairing scales, weighing and measuring devices. The applicant must agree to comply with all the provisions of the new ordinance and to all the rules and regulations of the Department of Public Markets, Weights, and Measures or any other city department applicable to him or to his business.

Dealers in second-hand or used scales or weighing or measuring devices must be licensed by the Department of Licenses as second-hand dealers, in addition to registration with our Department. For that license, all such dealers are fingerprinted and their record checked with the Police Department. So you see we have a double check on all dealers who handle such scales.

Another section of the law provides that every repairer or dealer of condemned, rebuilt, repaired, or used scales, weighing or measuring devices shall, within 5 days after the making of such repairs, or the sale and delivery of a repaired, rebuilt, exchanged, or used scale or other device, serve a written notice to the Department, giving the name and address of the person, firm, or corporation for whom such repair was made, or to whom a repaired, rebuilt, exchanged, or used scale, etc. was delivered and a statement that the same has been so altered, rebuilt, or repaired as to conform to the standard specifications and regulations of the Department.

There is a section which provides that anyone who accepts a scale, weighing or measuring device, which has actually been condemned by the Department, which is intended to be dismantled or destroyed,

shall remove the condemned tag and return it to the Department with a statement describing the instrument and giving the name and address of the person from whom it was received and that it had been dismantled or destroyed.

There is a further provision that every person, firm, or corporation registered under the ordinance must keep records which shall be open for inspection by any police officer or inspector or other person authorized by the Commissioner of Public Markets, Weights, and Measures or any magistrate of the city of New York, which records shall include the name and address of every person for whom scales, weighing or measuring devices are repaired or to whom a repaired, rebuilt, exchanged, or used weighing or measuring apparatus or device has been sold or delivered.

There is a very essential requirement that every dealer or repairer of used weighing or measuring devices shall submit their testing equipment at least once a year to the testing station of the Department for comparison and calibration with the Department's standards, after which the Department shall issue a certificate of its findings as to such comparison and calibration.

A fine of not more than \$100 for each offense or imprisonment not to exceed 10 days, or both such fine and imprisonment is fixed as the penalty for violating any of the provisions of the law, and the Commissioner is authorized to revoke or suspend or cancel the certificate of registration.

This law took effect March 1 and it is too soon now to judge of its effects. The legitimate, reputable scale dealers and repairers of scales, gasoline pumps, and other measuring and weighing devices welcome it. We have received excellent cooperation from them. One effect seems reasonably certain from our experience so far, that is, we have materially reduced the number of dealers in this business. When the law was signed by Mayor La Guardia, it had not received much publicity and, of course, in a city the size of New York, had not attracted much attention even from those in the trade who should have kept themselves informed of such matters.

We have gone through the telephone directories, obtained lists from available sources and have had our inspectors make a survey of places in their districts which offered used or second-hand scales or who advertised such a business in any manner. Through these means we have compiled a list of about 300 concerns who would come under the provisions of the law. Notices were sent to all of these and this was followed by departmental summons to our office to have them apply for certificates. After about 2 months we have been successful in issuing less than 100 certificates. A great many have informed us that scales are a side line and that they are discontinuing dealing in them, rather than pay the \$25 fee and come within the provisions of the ordinance. Of course, this will be satisfactory to us and accomplishes one of the purposes of the law. You would be surprised to see how fast the second-hand scales disappeared from view in the display windows of second-hand dealers, junk dealers, and auction rooms. We have the means at our disposal to see that they live up to their statement and I am sure that we will be able to force them to comply or stay out of this business.

We have been receiving the notices required from those registered as to the used and repaired devices they have been delivering and have been able to send out men to check up on their accuracy.



Now that the ordinance is in effect, we confidently expect that before the end of a year, we will have every concern in the business registered and that we will be inspecting within a reasonable time all of the repairs made by them and any scales sold by them. If we can do this successfully, I feel we will have accomplished a great deal.

It is perhaps unfortunate that the law did not provide some means for the licensing or registration of all mechanics employed by the larger concerns. Of course, we shall hold the employers responsible for any irregularity on the part of any mechanic employed by a licensee. However, it might have been better if each individual mechanic who does the actual repairing had been registered. It is yet too soon to see the effect of that phase of the ordinance. If it becomes necessary, the law may be amended.

In New York City the Division of Weights and Measures, even as increased during the present administration of Mayor La Guardia, is very much undermanned, a condition which I suppose is complained of by nearly every weights and measures official in the country. It is very difficult, as you know, to make the governing authorities appreciate the value and need for this work. I must confess that I, myself, was not so greatly impressed, nor even knew about the splendid work this division was doing for the public, until I took over the work and had first hand knowledge. With our limited organization, we have a territory of over 300 square miles, over 5,500 miles of streets, and a population of nearly 7 millions. The proper supervision of the coal business or gasoline stations alone could easily occupy our entire time.

In addition to enforcing weights and measures provisions, we are now licensing coal and ice dealers, and only last Friday, a law went into effect licensing all dealers in live poultry. The enforcement of this law has also been turned over to our Division. Therefore we are not able to devote as much attention to this matter of scale and measuring device repair and the distribution of second-hand devices as we should like, but I think we are proceeding in the right direction and it will be only a matter of time when we shall have it under complete control.

On July 20, 21, and 22, the New York State Association of Sealers of Weights and Measures will hold its annual convention in New York City, at the Hotel Commodore. I shall be very glad to have as many as possible of you gentlemen who are vitally interested in weights and measures attend this convention. Elaborate arrangements have been made for your entertainment and I can assure you that the stay with us in New York will be both an instructive and a pleasant one. Mayor La Guardia of the city of New York through me extends to you all a most cordial invitation and will be very happy to greet you on that occasion.

#### DISCUSSION OF ABOVE SUBJECT

The CHAIRMAN. Discussion of this paper will be opened by R. E. Gould, Corresponding Secretary, Horological Institute of America. Mr. Gould will describe the way in which that Institute determines the qualifications of candidates for watchmakers' certificates.

Mr. HOLBROOK. Mr. Chairman, the application of watchmaking to scale repairing may not be immediately obvious. I may say, therefore, that in discussing the licensing of scale repairmen it was deemed to be a matter of interest to show how the watchmakers are proceeding

to regulate their own industry in qualifying men to take care of watches. In a similar way a scale repairman might be required to demonstrate his efficiency in scale repairs.

CERTIFICATION OF WATCHMAKERS BY THE HOROLOGICAL  
INSTITUTE OF AMERICA

By R. E. GOULD, *Corresponding Secretary*

In 1921 a group of men interested in the development of the science of horology in its various phases and especially in the repair and maintenance of timepieces, met in Washington to consider ways and means of bettering the grade of work and raising the standards of the watchmaker at the bench. This conference led to the organization, under the auspices of the National Research Council, of the Horological Institute of America as a nongovernmental body with which the various Government bureaus could cooperate, but which would be self-governing and controlled by its own members. On the Advisory Council of the Institute are representatives of the National Research Council, the United States Naval Observatory, the Smithsonian Institution, and the National Bureau of Standards, as well as representatives of the horological schools, watch factories, trade journals, local horological societies, and the watchmakers at the bench. This enables the Council to consider its problems from various viewpoints and to come to decisions agreeable to all.

One of the stated objects is "To establish a system of varying attainments for watch- and clock-makers, and to issue graded certificates to such applicants as shall, through careful examinations, demonstrate their worthiness to receive them." One of the first steps taken was to establish two grades of examinations, the junior watchmaker grade for the younger and less experienced men and the certified watchmaker grade for men of longer practical experience at the watchmaker's bench. These examinations cover both the theoretical and the practical sides of watch repairing, and furnish a very good test of the applicant's ability. The grading of these examinations is done by an examining board of six experienced practical watchmakers, which meets bimonthly, generally in Washington.

Let me explain the details of procedure for conducting the examination. A watchmaker files an application for examination in the grade for which he is eligible, together with the required watch (or watches) and fee. In this application he is required to name a "monitor" to supervise his written examination and a "voucher" to oversee the repair work on his watch. In some sections, local horological societies, associated with the Institute, have appointed approved supervisory boards to assist in conducting the examinations within their respective areas, but, where no such board exists, the applicant names his own monitor and voucher, subject to approval of the Certification Committee of the Institute.

Suppose a man applies for the junior grade examination, what is the procedure? He sends in with his application a pocket watch to be mutilated and returned to him for repair. He repairs and adjusts this watch to the best of his ability. When he has accomplished this to his satisfaction, he sends the repaired watch to the Secretary. Meanwhile, the applicant has taken a written examination and returned his answers to the Secretary.

About 2 weeks before the meeting of the Examining Board all repaired watches on hand are turned over to the Time Section of the National Bureau of Standards for performance rating. When the tests are completed the watches are again returned to the custody of the Institute. They are now given to one of the examiners for detailed examination of the quality of the repair work. He takes each watch down and examines each part, making note of what he finds. He then reassembles the watches and returns them to the Secretary to be held for the meeting of the Examining Board. When the Board meets it examines the watches and papers, taking into consideration the results of the Bureau's tests and the comments of the man who made the detailed examination, and grades the applicant accordingly. If a passable grade is made on each portion of the examination, a certificate of junior watchmaker is granted and the certificate is sent as soon as it has been signed by the officers and examiners. If a man fails in either part of the examination, he is generally given an opportunity to repeat that part in which he failed.

The examination for certified watchmaker is conducted in a similar manner, only the applicant is required to repair a bracelet watch as well as a pocket watch and to set jewels in a small plate sent him with the mutilated watches. For this grade, the requirements, both in the repair work and in the written examination, are much more severe than for junior grade.

The procedure may seem rather lengthy. It generally requires about 3 months to complete either examination after filing the application. The result, however, furnishes a very fair basis for judging an applicant's ability, and it is felt that in very few cases has it miscarried. When a watchmaker obtains a certificate and displays it in his place of business, he has something to show the public to prove that he has been examined and found capable of doing good repair work.

The spread of certification in both grades since the organization of the Institute speaks for itself, and the increasing demand on the part of the public that work on watches be done by men of certified ability justifies the work that the Institute is doing toward raising the standards of repair work. A total of 1,262 junior and 568 certified watchmaker certificates have been granted, and new applications are being received regularly. There are watchmakers in either one grade or the other in every State of the Union, and in some States laws have actually been set up or are contemplated for their regulation. In Wisconsin a law has been passed requiring the licensing of watchmakers. In Illinois, Wyoming, and California bills for this purpose have been introduced in the legislatures but have not yet been acted upon.

A year's active membership is given to each watchmaker who passes either of the certification examinations, and to each member is sent the journal and news letters of the Institute. He is thus kept informed of what is happening in related fields. One does not have to be a member of the Institute to take the examinations—they are open to all qualified watchmakers.

Mr. DAVIS. A law was recently enacted in Vermont which follows along the lines of the one enacted in New York, which the gentleman from New York has just read to you. Scale repairmen were going

through Vermont and the condition was such that the men who were purchasing scales that were repaired by these men, were being imposed upon in many instances. We have two large scale manufacturing concerns in Vermont, and during the time of the depression people who had been employed there would go out trying to earn a dollar by repairing scales. Perhaps the man had been employed in a sealing room and knew something about his business, but I have known of men who had been employed in crating up those scales who tried to repair. When they were through with a scale, it was in no better condition, and perhaps was worse, than it was when they started on it. The buyer or user of the scale was being gypped, so we, through the good offices of Mr. Diserio, got a copy of this ordinance that was passed in New York, and we have followed it very closely in drafting our legislation. We are hoping that it is going to do good in Vermont.

I would like to ask the gentleman from New York what the effect would be if the scale manufacturers or the pump manufacturers were to take out licenses, and send out their repairmen who were not individually licensed.

Mr. PISCIOTTA. As the law is now it concerns itself only with the matter of licensing. The concern itself obtains the license and that license covers all the employees. That is one of the things that perhaps should not have been done. If we find that it doesn't work, later on we will amend the law to cover the individual mechanics.

Mr. DAVIS. Then you wouldn't recommend a law for examining the ability of the individual mechanic?

Mr. PISCIOTTA. If the individual mechanic makes application we inquire as to his personal character, his business connections, and his experience. He has to submit letters of recommendation from where he has worked before and where he learned the trade. In the case of the concern we investigate the type and character of the concern. If we know it is reputable and responsible, and will employ only good mechanics, we will license it. However, if we find that they do not employ good mechanics, and that they should not have been licensed, we still have the power to revoke or cancel the license, or refuse to renew the license. The power of revocation is a very strong factor in licensing in that you can practically put out of business a concern which is not what it is supposed to be.

Mr. SWEENEY. I would like to ask the gentleman from New York whether they require that the party who does the work shall keep a permanent record of the work done in order that subsequent investigations might be made by inspectors from his Department to verify whether or not proper returns have been made.

Mr. PISCIOTTA. They are supposed, within 5 days, to make a report of any measuring device or scale which they have repaired or rebuilt. We immediately send an inspector to check up on the work that has been done, to see whether the work has been properly done. If the report does not come in we have another means of catching the people who are perhaps either unlicensed or who do not make a report. The inspectors may find a peddler or a merchant with an incorrect scale. He may say, "Why, I just had the scale repaired." "Who repaired the scale?" "John Jones." We immediately go to John Jones, and if he has been licensed we check up on why he did not make a report, and if he is not licensed we prosecute him for not obtaining a license. As complaints come in we continually investigate them.

According to the law they must keep for a period of 1 year their records, and those records are subject to inspection at all times by our inspectors or the police department or by any city magistrate or other authorized person.

Mr. LEONARD. How do you determine whether a man can repair a scale or not—just from affidavits?

Mr. PISCIOTTA. You have to take a certain amount of chance with the people you license. That is true in all licensing. We try to diligently go into all his qualifications, but there is no examination provided for. There is no means of testing his ability until we have complaints from people for whom he has repaired scales. If we find he hasn't done his work properly we can revoke or suspend his license.

Mr. LEONARD. But you have no other requirement other than what the man says he has done?

Mr. PISCIOTTA. He has to submit letters of recommendation from a concern where he has been employed or from people for whom he has done work. It is left to our discretion as to whether or not the man is qualified. We give him his first chance. If he makes good he keeps his license.

Mr. LEONARD. Then, if he has an easy job and gets over the hurdle he is all right. If he runs into a difficult job it may be otherwise.

Mr. PISCIOTTA. If there is no complaint there is no objection.

#### PRESENTATION TO THE CHAIRMAN

Mr. FULLEN. Dr. Briggs, at this time it affords me great pleasure, as a representative of Governor James V. Allred of Texas and the Directors of the Pan-American Exposition, to present to you a scroll from Governor Allred, commissioning you as "Ambassador Extraordinary." Your duties will be to promote friendship, peace, and good will, and you will hereafter be known as El Hidalgo Lyman J. Briggs.

I understand that last year Dr. Briggs received the largest hat that he had ever had in his life. At this time a big State presents perhaps the smallest hat, but in memory of a great occasion.

Dr. BRIGGS. You will please express to the Governor and his associates my very deep appreciation of this honor.

#### SALESMANSHIP IN THE WEIGHTS AND MEASURES FIELD

By ROBERT L. FULLEN, *Chief Sealer of Weights and Measures, City of Dallas, Texas*

Mr. President and gentlemen of the Conference, the success of this Conference, or any conference, depends largely upon the first word of the subject which has been assigned to me for discussion—"Salesmanship"—and the success of your job and mine, as weights and measures officials, depends entirely on the success that we or others have in selling the public and public officials on the need of a weights and measures department. Whenever we have dealings with anyone, whether on matters of business or otherwise, the natural laws of salesmanship are operating, and the ultimate result—whether success or failure—depends upon the quality of the salesmanship exercised. The impressions we convey govern our success financially and otherwise.

*Arousing interest.*—The knowledge of the need for such service as is rendered by a weights and measures bureau is as dormant as the shriek of a wheel of a wagon when it is stopped, and, unless the buying public is awakened to some of the practices that are being carried on before their own eyes, it will stay dormant. In other words, we must pull the wagon before the wheel will squeak; on the other hand, we must impress thoroughly upon the minds of the public that there is a real need, and that without such service as we render, they face practices that are costing them money for which they are not receiving any benefits.

I believe there is not a man or a woman in the world who would not vigorously protest at being "horn-swoggled" or deliberately cheated. They will usually admit that it was not the amount so much as it was the principle involved. When one is willfully cheated, it all revolves back to that old confidence game. The prospective purchaser goes into a place of business believing he will get what he asks for and pays for, or else he would never offer to make a purchase. After all, if you arouse enough personal interest—weights and measures problems are of a personal nature—you are going to get some action. Every man and woman has a certain amount of pride which compels him or her to detest being defrauded out of a penny. So by arousing public interest you are certain to put them on the defensive. The philosophy of salesmanship is the philosophy of leadership; and the philosophy of leadership always consists in keeping the public on the defensive.

There are far too many of us who work for money or fame. There is only one legitimate purpose in life, and that is to serve humanity. A man's aim should be to serve his family, to serve the public, and to serve posterity.

*Creating a desire.*—After sufficient interest has been aroused, and you have shown beyond any reasonable doubt a need for a greater weights and measures bureau, or closer cooperation, you must next create a desire among your citizens. When you create a desire, you do it because of what individuals think and feel, because you have made an appeal to, and satisfied some self-interest motive. When you fail to create a desire, and therefore fail to put over your proposition, you fail to do so because of what your audience or public thinks or feels. You fail because your appeal has failed to touch the self-interest chord in the heart. In selling the weights and measures department to the public you must make sure they will derive some kind of satisfaction and benefit from the so-called purchase.

In creating a desire, you must determine what motive is first and foremost. In the weights and measures endeavor I would say that the fear of being defrauded or having to pay an excess amount of profit would perhaps be the principal motive; however, I think that many people's pride would be crushed to think they let someone cheat them right before their own eyes. Perhaps caution would be another motive. These motives are selfish ones, and selfish motives are more or less dominating in human life.

*Influencing the public in favor of weights and measures.*—In discussing influencing I shall use the words of Lyman Abbott, who said: "The greatest and most vital power in influencing life is personality. It is greater than law or example."

Perhaps I had better give you a definition of personality that I read some years ago: "Personality is that magnetic outward expression

of inner life, which radiates courage, courtesy, and kindness. It attracts people by producing a pleasing effect, and is a product of the development of the positive qualities; it makes a man a leader in the affairs of life instead of a follower."

A weights and measures official must at all times be courteous, kind, diplomatic, pleasant, sincere, and tactful; but at the same time he must know his business, be firm in his decisions, demand respect of himself and the weights and measures laws. An official is judged by his qualities, be they positive or negative.

In the selling of the weights and measures department, it must always be remembered that to the other man his name is the greatest name of all and that he likes to hear it. To be able to call his name is to be able to have a certain influence on him. When a person hears his name called he will listen and it much depends on what you say, or perhaps how you say it, as to how he is influenced.

In order to actually be able to put salesmanship into practice, you must be able to influence or persuade people to want something they already need, or, in other words, be able to change human needs into human wants.

You will please excuse me for a more or less personal reference, but to the press of Dallas is due a word of appreciation for more than 100 articles and many pictures which they have contributed to our local educational campaign within the last year. Commendation is also due radio station WRR for the time they contributed to our weights and measures discussions.

We, as weights and measures officials, have many human-interest stories, so let's get better acquainted with the boys of the press; give them facts and they will do the rest.

#### ACTIVITIES OF THE NATIONAL SCALE MEN'S ASSOCIATION

By C. R. LETZKUS, *President, National Scale Men's Association*

Mr. President, members of the National Conference on Weights and Measures, ladies, and gentlemen: The members of the National Scale Men's Association appreciate the fact that you have recognized their organization by inviting its presiding officer to speak to you of the Association's activities. It is a great pleasure for me to be able to accept your kind invitation.

The National Scale Men's Association is an organization not unlike your own. It has several local chapters which are functioning in as many of the large cities. Similar to your State Associations of Weights and Measures these chapters are counted upon to deliver the proper personnel for filling the major offices of the parent body and to furnish the topics for annual meetings. The members are located in many parts of these United States and I believe the Association could rightfully be called the International Scale Men's Association since several members come from Canada. You should acquaint yourselves with the location of these local chapters so that you may join them if you wish.

The members of the National Scale Men's Association are men who are well qualified in the technical, practical, and commercial problems appertaining to scales. The Association deals only in scale problems which cover the standardization of design, test, testing equipment, inspection, repair, maintenance, and distribution. Many interesting

topics were presented before the members during the last annual meeting held in Pittsburgh, Pa., March 23 to 25, 1937.

The subject of the proposed revision of the specifications for hand-operated and automatic grain hopper scales was introduced. A committee selected from the membership of the Association was appointed to collaborate with the AREA Committee appointed by the Association of American Railroads for drafting the final revision of the grain-scale specifications. One of the members spoke on the revision of the specifications for two-section scales. He reported that the permissible loading on cast iron had been increased and the loading on steel had been decreased. Other changes consisted principally of a rearrangement of the old specifications in more logical order.

The matter of licensing scale repairmen was thoroughly discussed with the final result that a motion was passed requesting the resolutions committee to prepare a resolution to be presented at the executive session. The following is the wording of the resolution adopted by the National Scale Men's Association on this subject:

Whereas, in the practice of our art, we know of conditions prejudicial to public interest in the repairing of weights and weighing equipment for use in trade and commerce and otherwise, and

Whereas our interest as an association is identical with that of the general public; therefore be it

*Resolved*, That this, the National Scale Men's Association, in the twenty-first annual convention assembled in Pittsburgh, Pennsylvania, this 24th day of March 1937, does hereby record its judgment that persons engaged in the practice of installing and repairing weighing apparatus should be subject to strict examination, to registration, to permit (revocable for cause), and to bond, all under the jurisdiction of lawful authority.

A resolution was introduced and adopted which puts the Association on record as desiring an experimental research to be undertaken to establish the adequacy of materials and processes not now permitted by scale specifications, for scale pivots and bearings, and particularly to the end of determining the safe loads per inch of contact at degrees of hardness economically obtainable in shop practice. This resolution concludes as follows:

*Resolved*, That the National Bureau of Standards, as the outstanding institution for industrial research in the public interest, be advised of this desire by a copy of this resolution formally transmitted to the Director of the Bureau by the officers of this Association.

Many interesting papers were read before the meeting. One was on the subject "Scales and Weighing in Industry." This paper covered the use of scales from the smallest laboratory scale to the huge railway track scale during the manufacture of steel products. Two State officials gave very interesting talks on their motortruck testing equipments; one presented slides showing the equipment, the other had his equipment placed at the side of the hotel for a practical demonstration. Among other papers may be mentioned, "Motion Weighing", "Automatic Weighers, and the Elimination of Human Errors", "Weight Agreements"—concerning the problems of the weighing and inspection bureaus, "Indicators Applied to Weighing Beams", "Coupled Motion Weighing" relating to the weighing of cars coupled in motion during the handling of iron ores", and "Tolerances". A talk and slides were presented relating to "Individual Wheel Load Weighing for High-Speed Locomotives"; this is a very live topic as the Association in general is trying to learn of a more economical



design than the present very expensive and possibly not accurate scale in use. The present high-speed locomotives require an accurate record of the dead load on each individual wheel.

A motion was made and carried to permit the ladies, whose husbands are members of the Association, to use the name of the National Scale Men's Association in designating an auxiliary being formed. A lady from Texas was selected as President and a lady from Pennsylvania as Secretary. The ladies could select their own entertainment program while the annual meeting was in session. Many of the members attend the annual meeting and continue on to other parts of the country with their wives and families, thereby combining a few days of business with their vacation period.

In conclusion, I would feel remiss if I did not take this opportunity to say to the members of this Conference that during the past 15 years I have been operating one of the Bureau's railway track scale testing equipments and have worked with many of the State, county, and municipal weights and measures officials. During these pleasant associations I can honestly say here to you all that I have received whole hearted support and cooperation from each of you and it has been deeply appreciated. I have not found one of you whom I have not liked and I look forward to many more of these pleasant associations. I thank you.

Mr. BAUCOM. In view of the fact that we have a man here celebrating the twenty-fifth anniversary of his first attendance at this Conference, I move that we adjourn in honor of James A. Sweeney, of Massachusetts.

(At this point, at 12:55 p. m., the Conference took a recess until 2 p. m.)

SIXTH SESSION—AFTERNOON OF THURSDAY, JUNE 3,  
1937

TOUR OF THE LABORATORIES OF THE NATIONAL BUREAU OF  
STANDARDS

(The afternoon session of the Conference consisted of a visit to various laboratories of the National Bureau of Standards, particular attention being devoted to the Division of Weights and Measures. Special demonstrations were given in the laboratories, designed to illustrate the character and scope of their activities. In order to make the tour 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.)

## SEVENTH SESSION—MORNING OF FRIDAY, JUNE 4, 1937

(The Conference reassembled at 9:35 a. m., at the Raleigh Hotel, Dr. Lyman J. Briggs, President of the Conference, in the chair.)

### REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN, AND DISCUSSION THEREON

Gentlemen: Your Committee on Specifications and Tolerances respectfully submits the following report, recommending certain changes in several codes formerly adopted by the Conference. The reasons for the changes suggested will be set out at the time that the report is presented to the Conference for action thereon.

(Signed) F. S. HOLBROOK, *Chairman*,  
CHARLES M. FULLER,  
JOSEPH G. ROGERS,  
JOHN P. MCBRIDE,  
GEORGE F. AUSTIN, Jr.,

*Committee on Specifications and Tolerances.*

Mr. HOLBROOK. The detailed recommendations which I have to present this morning and which constitute the report of the Committee were distributed at the Wednesday morning session and have been in your hands since that time for consideration.

In accordance with well-established custom, it is suggested that it would be advisable if these various provisions were passed upon as read, for the reason that they refer to paragraphs widely scattered in various codes, and in frequent instances the various provisions have no relation one to another. Therefore if we act upon each of them individually as read, it will be efficient, since it will not then be necessary at the conclusion of the reading of the report to go back over the ground and duplicate the presentation, to discuss and act upon the various provisions.

(It was agreed that the Conference would proceed in the manner outlined.)

Mr. HOLBROOK (reading):

#### SECTION ON SCALES

##### A. GENERAL DEFINITIONS

Add the following at the end of paragraph A-2c:

A vehicle scale is a large-capacity scale designed to be used to determine the weight of a motor truck or wagon, loaded or unloaded.

(The definition as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

##### B. GENERAL SPECIFICATIONS

B-2w. Shift test of scales.

The first portion of this paragraph reads as follows:

A scale having four main-load bearings shall give results correct within tolerance when a load of one-quarter capacity or less is placed so that its center of gravity lies over any one of the main-load bearings, as indicated by the points designated 1 in the following diagram, and when a load of one-half capacity or more is so

placed at the center of any quarter of the platform, as indicated by the points designated 2 in the following diagram.

Amend the above material to read as follows:

A scale having four main-load bearings shall give results accurate within tolerance when a load of one-quarter capacity or less is placed so that its center of gravity lies as nearly as may be over any one of the main-load bearings, as indicated by the points designated 1 in the following diagram, and when a load of one-half capacity or more is so placed at the center of any quarter of the platform, as indicated by the points designated 2 in the following diagram: Provided, however, That in the case of a vehicle scale the results on any corner may be in error by twice the allowable tolerance, but the algebraic mean of the errors on the two corners at one end of the scale shall not exceed the tolerance.

There are two amendments in that. The first is formal. The words "as nearly as may be" are added. We know it would be extremely difficult to place a load so that the center of gravity would exactly lie over the main-load bearing; it should be placed so that it will lie approximately over the main-load bearing.

The second amendment is very much more important. This, you will see, doubles the tolerance on a corner of a vehicle scale, but requires the end of the scale to be within the present tolerance.

The Committee is of the opinion that a vehicle scale will never be used with only one corner loaded. It is perfectly obvious that when one drives a vehicle onto a vehicle scale both of the corners at the end of the scale are loaded. We have heard at this Conference and at the meeting last year, discussions on corner testing versus end testing of vehicle scales. The end testing of vehicle scales is coming into more general use. Now of course, sometimes a corner test is advisable, especially when the testing load is inadequate, because putting the whole load upon one corner stresses that corner to the greatest degree possible with the available load, and helps to disclose errors that might otherwise not be detected. However there seems to be no good reason why either corner, if not too much in error, should not be allowed to have an error somewhat greater than was formerly allowed, provided that the two corners at one end of the scale taken together, do not develop an error greater than the normal error now allowed upon test. This idea is provided for in the language I have read to you.

(The specification as proposed by the Committee was duly adopted.)

Mr. HOLBROOK. I might make the general remark here inasmuch as the several following provisions also refer to vehicle scales, that these amendments which we are now proposing are being made as a result of the vehicle-scale test work of the National Bureau of Standards, which has been described to you in detail earlier in the Conference.

In making our tests and in writing up our reports we have been impressed by the fact that the sensibility reciprocal requirements and the tolerances of the Conference could safely be liberalized in some respects; if this is the case it is particularly desirable to improve them at this time if possible, before the first annual report on the work of the vehicle-scale test unit is made by the National Bureau of Standards. If any amendments which are adopted here are applied to the tests which we have made so far, and if it is hereafter unnecessary to make any further changes in the tolerances, then it is perfectly obvious that the results of our work year by year will be directly comparable with the results on the work done theretofore; whereas were any changes in tolerances made after one or more annual reports had been issued

and those new tolerances were applied thereafter, the various annual summaries would not be directly comparable, which would be an unfortunate situation.

The next amendment suggested is as follows:

### I. SENSIBILITY RECIPROCAL (SR) REQUIREMENTS

#### I-1. For large-capacity scales.

This paragraph reads as follows:

The maximum SR allowable on a large-capacity scale, at the capacity of the scale or at any lesser load, shall be the value of two of the minimum weighbeam graduations: Provided, however, That the manufacturers' maximum allowable SR, or the maximum SR allowable on a new large-capacity scale, shall be the value of one of the minimum beam graduations.

Amend the above material to read as follows:

The maximum SR allowable on a large-capacity scale, at the capacity of the scale or at any lesser load, shall be the value of two of the minimum weighbeam graduations, except that the maximum SR allowable on a vehicle scale shall in no case be less than 10 pounds; Provided, however, That the manufacturers' maximum allowable SR, or the maximum SR allowable on a new large-capacity scale, shall be the value of one of the minimum beam graduations.

The amendment to that paragraph fixes a minimum value of 10 pounds for the maximum allowable SR on vehicle scales at present in use, but the requirements for new scales are unchanged. The present maximum sensibility reciprocal allowable on vehicle scales in use having 2½-pound graduations is doubled; the only SR values which are affected by this provision are those on vehicle scales having a minimum graduation of 2½ pounds or less.

Mr. BAUCOM. Mr. President, I would like to make this observation: You have made this general in its application. Now what is a large-capacity scale? Is the inspector to decide when the 10-pound value is applicable. Previously we have been given a value equal to two graduations; the manufacturers have decided upon the graduations and it worked very nicely. I am wondering, if we set up a specific value and apply it in general, whether we will at any time run into trouble.

Mr. HOLBROOK. The values for the maximum sensibility reciprocal on all large-capacity scales except vehicle scales are unchanged. The values for the maximum sensibility reciprocal allowed on vehicle scales are unchanged except that a minimum value of 10 pounds is specified. Thus the SRs on scales having a minimum graduation of 5 pounds or more are not affected. The only change that is made by this amendment is that the minimum value of the maximum sensibility reciprocal allowable on vehicle scales having a graduation of less than 5 pounds is made 10 pounds, instead of the value at present in force.

The value at present in force in the case of a 2-pound scale is 4 pounds, and in the case of a 2½-pound scale is 5 pounds. Our results on vehicle scales tested so far show that an extremely small percentage comply with the requirement which I have mentioned, and we think the requirement unnecessarily severe.

Mr. BUSSEY. If I understand Mr. Holbrook, he intends this to apply to vehicle scales only, while the specification says "large-capacity scales." All large-capacity scales are not vehicle scales.

Mr. HOLBROOK. The body of the paragraph refers, as formerly, to all large-capacity scales and present requirements remain in force in relation to all large-capacity scales, except vehicle scales. You will note that the language of the proviso reads, "except that the maximum

SR allowable on vehicle scales shall in no case be less than 10 pounds"; thus the new minimum is specifically limited to apply to vehicle scales.

(The requirement as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

#### J. TOLERANCES

J-1. For large-capacity scales.

The first proviso under paragraph J-1a reads as follows:

1. On a beam scale, the tolerance shall in no case be less than the value of one of the minimum beam graduations.

Amend this material to read as follows:

1. Except as is provided herein, the tolerance on a beam scale shall in no case be less than the value of one of the minimum beam graduations; on a vehicle scale, when a load of test weights of not less than 8,000 pounds is employed in any test, the tolerance shall in no case be less than one of the following values: 5 pounds on a scale having a minimum graduation of  $2\frac{1}{2}$  pounds or less; 10 pounds on a scale having a minimum graduation of 5 or 10 pounds; 20 pounds on a scale having a minimum graduation of 20 pounds.

This will require a little explanation. The National Bureau of Standards is, as I think all of you will agree, a conservative institution. The Bureau does not desire to go throughout the country and declare very large percentages of scales to be inaccurate unless, in the case of each scale so reported, the error developed is such an error that in our best judgment we feel that the scale should, in fact, be classed as an inaccurate weighing machine.

Now there have been various reports of tests sent in by our inspectors in the case of which, on the data shown, it was necessary, under a strict application of the tolerances of the Conference, to call a scale inaccurate when in our opinion, the scale was a reasonably satisfactory weighing machine. In general, we are wedded to the tolerance of 0.2 of 1 percent on a scale in use. For many years the National Bureau of Standards has used such a tolerance as a criterion of the accuracy of railway track scales and we are convinced that the tolerance of 0.2 of 1 percent is, in general, a perfectly satisfactory tolerance for large-capacity scales, including vehicle scales. However, when a scale is tested at light loads relatively insignificant errors may cause the scale to exceed a flat tolerance of 0.2 of 1 percent, due to the fact that the percentage is being computed upon a small quantity.

For instance, in our vehicle scale test report no. 31, on a 40,000-pound-capacity scale, we found that one error only was outside of the tolerance of 0.2 of 1 percent; this error was 10 pounds on a load of 3,000 pounds, a percentage error of 0.33 percent. The minimum graduation on the weighbeam was 5 pounds. Under our present requirements the minimum tolerance was 5 pounds—one of the minimum graduations on the beam. Thus the tolerance was exceeded and it was necessary to classify the scale as inaccurate due to the fact that on this small load of 3,000 pounds we had an error of more than 0.20 percent. Under the proposal as presented that scale would now be called an accurate scale.

Another instance: Here is scale report no. 352, on a 20,000-pound scale. One error only was found to be in excess of the present tolerances. That error was 3 pounds on a 1,000-pound load, resulting in a percentage error of 0.30. The minimum graduation on the weigh-

beam was 2½ pounds; thus under our present requirements the minimum tolerance was 2½ pounds, and therefore the scale appears as an inaccurate scale, because it had an error of 3 pounds on 1,000 pounds. Mind you, in both of these cases, with all heavier loads the scales were correct within 0.2 of 1 percent.

It is inadvisable to raise the minimum tolerance in the case of all tests. If a weights and measures official is using an inadequate test load—and under present conditions the great majority of sealers in the United States are using an inadequate test load—these small errors on the small loads cannot safely be overlooked. For, suppose that a sealer's total test load is 1,000 pounds (unfortunate as that may be, it is often the case). Suppose further that when he puts this test load on the scale, an error of 10 pounds is developed. That is an error of 1 percent. If the minimum tolerance which he may enforce against that scale is 10 pounds, then he would necessarily be required to call that scale accurate although if that error of 10 pounds on 1,000 pounds was a straight multiplication error, as it should be, he would be allowing an error of 400 pounds on 40,000 pounds, which would be an indefensible error for the sealer to allow. Therefore, we propose to increase these minimum tolerances only in cases where adequate test loads are used and where the essential accuracy of the scale at the higher loads has been demonstrated in the test made.

I think that perhaps is an adequate explanation, but I would be glad to go into it further if the delegates desire further information.

(The tolerance paragraph as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

The second proviso under paragraph J-1a reads as follows:

2. On an automatic-indicating scale, the tolerance on the reading face shall in no case be less than the value of one of the minimum graduations on the reading face, or one five-hundredth of the capacity of the reading face, whichever is less, except that when the minimum graduation on the reading face is 1 pound or more such tolerance shall in no case be less than 1 pound.

Amend this material to read as follows:

2. Except as is provided herein, the tolerance on the reading face of an automatic-indicating scale shall in no case be less than the value of one of the minimum graduations on the reading face, or one five-hundredth of the capacity of the reading face, whichever is less, except that when the minimum graduation on the reading face is 1 pound or more such tolerance shall in no case be less than 1 pound; on an automatic-indicating vehicle scale, when a load of test weights of not less than 8,000 pounds is employed in any test, the tolerance shall in no case be less than one of the following values: 5 pounds on a scale having a minimum graduation of 2½ pounds or less; 10 pounds on a scale having a minimum graduation of 5 or 10 pounds; 20 pounds on a scale having a minimum graduation of 20 pounds.

That merely applies the same requirements to an automatic-indicating scale that have already been explained in the case of beam scales.

(The tolerance paragraph as proposed by the Committee was duly adopted.)

SECRETARY'S NOTE.—No change in the third proviso was recommended by the Committee to the Conference. However, after a subsequent review of the provisions it is indicated that this proviso should be modified somewhat in order consistently to carry out the purpose of the amendment made in proviso 1. Proviso 3 reads as follows:

3. On an automatic-indicating scale, the tolerance on any weighbeam and the tolerance on ratio shall in no case be less than the minimum value specified in the preceding proviso, or the value of the minimum graduation on any beam with which the scale may be equipped, whichever is less.

In order to harmonize the several provisos it appears necessary to modify this language to make it read as follows:

3. On an automatic-indicating scale, the tolerance on any beam and the tolerance on ratio shall in no case be less than the minimum value specified in the one or the other of the preceding provisos, whichever is less.

In view of the nature of the change, it is considered that this may be made without formally referring the matter to the Conference.

Mr. HOLBROOK (reading):

The fourth proviso under paragraph J-1a reads as follows:

4. The tolerance on new scales shall in no case be less than one-half of the tolerance value arrived at by the operation of provisos 1, 2, or 3.

Amend this material to read as follows:

4. The tolerance on new scales shall in no case be less than one-half of the tolerance value arrived at by the operation of provisos 1, 2, or 3, except that the special minimum tolerance values specified therein to apply to vehicle scales only, shall not be employed in computing the values of the tolerances on new vehicle scales.

The effect of this provision is to make the increase in minimum tolerances applicable only to scales in use; new vehicle scales are subject to the same tolerances as heretofore.

(The tolerance paragraph as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

Table II under paragraph J-1a reads as follows:

TABLE II.—Tolerances for large-capacity scales

Load <sup>3</sup>	Class A <sup>1</sup>		Class B <sup>2</sup>	
	Tolerance on ratio <sup>4</sup>	Tolerance on weigh-beam, reading face, or unit weight indications	Tolerance on ratio <sup>4</sup>	Tolerance on weigh-beam, reading face, or unit weight indications
<i>Pounds</i>	<i>Ounces</i>	<i>Ounces</i>	<i>Ounces</i>	<i>Ounces</i>
0 to 99, inclusive.....	½.....	1.....	.....	.....
100 to 199, inclusive.....	1.....	2.....	.....	.....
200 to 299, inclusive.....	2.....	4.....	.....	.....
300 to 399, inclusive.....	3.....	6.....	.....	.....
400 to 499, inclusive.....	4.....	8.....	.....	.....
500 to 599, inclusive.....	5.....	10.....	10.....	20.....
600 to 799, inclusive.....	6.....	12.....	12.....	24.....
800 to 999, inclusive.....	8.....	16.....	16.....	32.....
1,000 and over.....	½ lb. per 1,000 lb.	1 lb. per 1,000 lb.	1 lb. per 1,000 lb.	2 lb. per 1,000 lb.

<sup>1</sup> "Class A" scales include all large-capacity scales which are not specifically included within "Class B."

<sup>2</sup> "Class B" scales include only the following: Scales of the railway-track, motortruck, and wagon types; and also scales of the dormant, self-contained, and built-in types which are not installed inside of a building having side walls and roof, and which are consequently exposed to weather effects and sudden changes of temperature.

<sup>3</sup> The amount of weight on the load-receiving element of the scale.

<sup>4</sup> The ratio is the multiplying power of the scale. This tolerance is applied to parts requiring the employment of removable weights.



Amend this table to read as follows:

TABLE II.—Tolerances for large-capacity scales

Load <sup>3</sup>	Class A <sup>1</sup>		Class B <sup>2</sup>	
	Tolerance on ratio <sup>4</sup>	Tolerance on weigh-beam, reading face, or unit weight indications	Tolerance on ratio <sup>4</sup>	Tolerance on weigh-beam, reading face, or unit weight indications
<i>Pounds</i>	<i>Ounces</i>	<i>Ounces</i>	<i>Ounces</i>	<i>Ounces</i>
0 to 99, inclusive.....	½	1	-----	-----
100 to 199, inclusive.....	2	2	-----	-----
200 to 299, inclusive.....	3	4	-----	-----
300 to 399, inclusive.....	4	6	-----	-----
400 to 499, inclusive.....	5	8	-----	-----
500 to 599, inclusive.....	7	10	13	20.
600 to 799, inclusive.....	8	12	17	24.
800 to 999, inclusive.....	11	16	22	32.
1,000 and over.....	¾ lb. per 1,000 lb.	1 lb. per 1,000 lb.	1½ lb. per 1,000 lb.	2 lb. per 1,000 lb.

<sup>1</sup> "Class A" scales include all large-capacity scales which are not specifically included within "Class B."

<sup>2</sup> "Class B" scales include only the following: Scales of the railway-track type; and also scales of the dormant, self-contained, and built-in types which are not installed inside of a building having side walls and roof, and which are consequently exposed to weather effects and sudden changes of temperature.

<sup>3</sup> The amount of weight on the load-receiving element of the scale.

<sup>4</sup> The ratio is the multiplying power of the scale. This tolerance is applied to parts requiring the employment of removable weights.

The essential differences in those two tables is that the tolerance on ratio of a class A scale is increased from ½ pound per 1,000 pounds to ¾ pound per 1,000 pounds, and the tolerance on ratio on a class B scale is raised from 1 pound per 1,000 pounds to 1½ pounds per 1,000 pounds, and the values in the body of the table are recomputed on those bases.

The tolerances on scales having a weighbeam are, as you know, 0.1 of 1 percent and 0.2 of 1 percent, for class A and class B scales, respectively. The tolerances on the ratio of scales using counterpoise weights have formerly been 0.05 of 1 percent and 0.1 of 1 percent, respectively, or half of the tolerances allowed on scales with weighbeams. The reason the tolerance on ratio of scales utilizing counterpoise weights is smaller than the tolerance on a weighbeam or reading face is, that the weights themselves must be allowed a tolerance and there will be an error on the indication of the scale equal to the algebraic sum of the error on the multiplication ratio and of that resulting from the use of the counterpoise weight.

A thorough examination of this subject indicates that the percentage error which will be contributed by the counterpoise weights will be in the neighborhood of 0.05 of 1 percent. In the case of a class B scale, if we require a ratio to be accurate within 0.10 percent and require the weights to be accurate within 0.05 percent, the maximum error on the combination will not exceed 0.15 percent, which value is

to be compared with the tolerance on a beam of 0.20 percent. By increasing the ratio tolerance to 0.15 percent, to which may be added a tolerance on weights amounting in general to approximately 0.05 percent, we will have the scale using counterpoise weights and the scale having a weighbeam on the same basis so far as tolerances are concerned.

I think perhaps that is a sufficient explanation.

(The tolerance table as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

#### K. GENERAL REGULATIONS

K-1. Maximum lading.

This regulation reads as follows:

A scale shall not be used for weighing loads greater than its nominal or rated capacity.

Amend this material to read as follows:

K-1.—Lading.

K-1a. Maximum.—A scale shall not be used for weighing loads greater than its nominal or rated capacity.

K-1b. Minimum on vehicle scales.—A vehicle scale shall not be used for weighing loads of less than 1,000 pounds.

In explanation of this regulation, I may say that in our work with the vehicle-scale test unit the men operating the equipment were instructed to find out from the scale owner and record on the field record the range of weights which the scale was used to determine. We found some very extraordinary statements in relation to the range of tare weights and the range of gross weights on vehicle scales in use. For instance, on test no. 210, which refers to a motortruck scale having a capacity of 20,000 pounds, we find that the range of tare weights being determined upon the scale was 25 to 6,500 pounds, and the range of gross weights was 25 to 14,000 pounds. Upon the admission of the owner of the scale we have a 20,000-pound motortruck scale used to weigh loads of 25 pounds. Such a condition is so ridiculous as to need no comment. In many other cases the reports indicate that scales are being used in weighing loads for which they were not designed, with the result that the percentage errors may be tremendous even though the scale complies with all applicable tolerances.

After giving the matter very serious consideration, the Committee has come to the conclusion that States might reasonably enforce a regulation to the effect that vehicle scales should be used for weighing loads only of 1,000 pounds or more. It is considered that a vehicle scale is not a proper scale for weighing loads of less than 1,000 pounds.

It occurs to us that a coal yard, for instance, which is going to sack coal, certainly needs another weighing machine in addition to its vehicle scale to determine the individual weights of bags of coal. To put a vehicle scale to such a use may innocently result in tremendous percentage errors which should not be countenanced.

Mr. SWEENEY. I am in thorough agreement with what the Secretary is driving at. However, suppose we pass upon a heavy-capacity type of scale and find it within the tolerances. By enforcing the regulation suggested would we be in any way abridging the rights of the man who has that scale which we as sealers have duly tested and sealed as being correct? If a load is weighed on that scale which is greater than the

graduations, would we have any right to abridge the rights of that man to use that scale?

(At this point Mr. Cullen, Vice President of the Conference, assumed the chair.)

Mr. HOLBROOK. I understand Mr. Sweeney's question to be: "If a sealer seals a device as satisfactory, may its use be limited?" I might call attention to an existing regulation of the Conference that provides that the value of the minimum graduation on a scale used in the retail sale of foodstuffs shall not exceed 1 ounce. In other words, Mr. Sweeney will seal many scales having 2-, 4-, and 8-ounce graduations, but with a regulation of that kind in effect he will limit the use of scales having a graduation of more than 1 ounce; he will not allow them to be used in the retail sale of food. If Massachusetts enforces regulations in relation to prescription scales, as I presume they do, Mr. Sweeney will doubtless decline to permit the druggist to use his counter scale, designed to weigh commodities in bulk, in putting up his prescriptions.

Similarly, I think there is no question but what the sealer of weights and measures by regulation has a right to limit the use of vehicle scales to loads of not less than 1,000 pounds. The suitability of equipment for its intended purpose must be given consideration by the weights and measures officials if they are going to enforce laws properly.

Mr. SWEENEY. Well, Mr. President, I merely raised that question because the thought came to me in reference to public weighmasters, who use vehicle scales. If anyone brought them a load which approximated 800 or 900 pounds, weighing it on that scale would be a violation of the regulation.

Mr. HOLBROOK. Certainly the public weighmaster who is issuing certificates of weight should use his equipment properly; perhaps he would be charged with a greater duty to use his equipment properly than the ordinary merchant, because he is going to certify a weight. He certainly doesn't want to certify an incorrect weight.

Mr. HAMMON. In the State of Idaho a great many vehicle scales are used as stock scales. Most of the scales have from 1- to 2½-pound graduations on the beam. If we attempted to enforce this regulation, what would our stock dealers do when they attempt to buy one animal?

Mr. HOLBROOK. He should provide a satisfactory scale for weighing loads of less than 1,000 pounds. The mere fact that this thing is done does not make it right. We know that it is done; we think that it is not right; that is why we propose the regulation.

The stockman who is selling one animal does not want to have the weight of the animal determined to an accuracy of 10 or 20 pounds because that is much too large a percentage of the weight of the animal.

Mr. SOLBERG. Then if we adopt this suggestion it seems to me we are placing even our stockyards in our big terminals in a very embarrassing position. In South St. Paul we inspect scales every 30 days and we pass them if they are within tolerance, but I venture to say that 50 to 75 percent of the stock bought is weighed in lots of less than 1,000 pounds. And it isn't only there, but throughout the whole State of Minnesota we have hundreds of these scales on which individual cattle are bought, weighing less than 1,000 pounds, from veal calves up, and if we place a restriction of this kind on them you can readily see that we are imposing a tremendous imposition.

Mr. HOLBROOK. I would answer that by saying that I think it a tremendous imposition upon the seller to weigh one animal on a 40,000-pound scale, perhaps, which was never designed to weigh one animal. The mere fact that a stockyards provides only one scale does not cause them to weigh one animal correctly on the scale which they have. My idea is that in case lots of less than 1,000 pounds are to be weighed, a smaller scale should be provided.

However—and this is not intended to destroy the validity of my argument that a scale should not be used for weighing loads for which it is not intended—a stockyards scale is not included within the provisions of this regulation, because this regulation refers only to vehicle scales and a stockyards scale is not a vehicle scale.<sup>5</sup>

(At this point, Dr. Lyman J. Briggs, President of the Conference, assumed the chair.)

THE CHAIRMAN. Gentlemen of the Conference, I have a great personal pleasure in presenting to you at this time a gentleman who is thoroughly in sympathy with the idea of complete and effective cooperation between the States and the Federal Government, reserving to the States in the full their duties and responsibilities in that regard. I present the distinguished Secretary of Commerce, the Hon. Daniel C. Roper.

#### ADDRESS BY HON. DANIEL C. ROPER, SECRETARY OF COMMERCE

I extend greetings to the delegates to the Twenty-Seventh National Conference on Weights and Measures. You are here from thirty-two States and have been taking part for several days in studies and discussions, looking to more effective coordination of essential services to the American public. This is in recognition of the joint responsibility of the Federal, State, and municipal governments and industry to perfect closer uniformity in methods, mechanisms, and procedures.

The National Bureau of Standards of the United States Department of Commerce is honored to be the sponsor of this Conference. A wide diversity of related interests is represented in this group of outstanding scientists, manufacturers, and public officials. This is as it should be and justifies our confidence that your labors will contribute further to needed exactness in dealing with the public. In these times our lives must be adjusted to a mechanical era. The mechanisms of this period must be so utilized as to safeguard exactness in equity, and meet the requirements of increasing consciousness of responsibilities to the people. It should be encouraging to you as it is to me that we are cooperatively endeavoring to meet this challenge of trusteeship.

The National Bureau of Standards is equipped in mechanics and in its expert personnel as a great scientific workshop. Its mission is to cooperate with you and all others throughout our country charged with like responsibilities to ours.

To begin with, the home of the Bureau is ideally located for serene thinking and sound conclusions, on 56 acres of beautifully landscaped grounds overlooking this great Capital City. Its staff, untiring in the pursuit of studies and experiments, is delighted at all times to serve the Federal, State and municipal governments, and industrial agencies which seek and need our assistance in solving problems they them-

<sup>5</sup> The discussion of the report of the Committee on Specifications and Tolerances is continued on p. 90 et seq.

selves have found not to yield to their own treatment. It is not the purpose or desire of this Bureau or of the Government which supports it, to take over the studies and responsibilities of outside units working along similar lines. Our purpose is to conform to statutory requirements and to stimulate and coordinate the thinking and action of all concerned for the best results for all. We recognize that many of the problems lying in your field in these complicated times are subject to analysis and solution only through combined resources and efforts. In meeting such conditions, the conference method such as you have inaugurated is the most effective procedure. It brings to bear the talent, training, and experience of all for the solution of the problems. I therefore congratulate you on the purposes of your coordinated conferences and look forward as already stated to increasing value from such meetings as you are holding here this week.

May I state, for our uniform understanding, briefly, at this point, the functions of the National Bureau of Standards as they have been outlined by the Congress of the United States. These are: The development, construction, custody, and maintenance of the reference and working standards used in science, engineering, industry, and commerce; their intercomparison, research connected with standards, and the determination of physical constants and the properties of materials. Under the organic act, the Bureau exercises these functions "for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments." This reflects the broad intent of Congress in providing for the Bureau's services.

The primary duty of the Bureau is to maintain for every industry, derived standards based on the national standards. The setting up and maintenance of derived standards is just as exacting as the establishment of the basic standards. The Bureau must even anticipate the need for new types and kinds of standards, and, therefore, it conducts research in all the fields of standardization and measurement so as to keep ahead or abreast of the requirements of industry, as to range, accuracy, or variety.

For example, a few years ago, few of us could have dreamed of the necessity of a standard of radio frequency good to 1 part in 5 million. Yet, the broadcasting of such a standard is now a routine function of the Bureau. Nearly 300,000 tests were completed by the Bureau last year covering almost every object from medical thermometers to cement. These have contributed to the progress and happiness of the human race.

The 400 scientists who patiently and efficiently are carrying forward the research work of the National Bureau of Standards do not noisily herald their achievements, to be sure. Therefore, the public is not generally conversant with the vast activities that are being carried forward behind the scenes for safeguarding them against fraud. There is much drama in our scientific laboratories that does not penetrate beyond the walls of these research institutions, yet the public is the beneficiary of indispensable protective services.

In this highly competitive era, with the consuming public more discriminating and more exacting in its demands than ever before, honesty on the part of the seller is not only the best policy but the

only policy that will retain confidence and build trade volume. Competition itself, therefore, is an influential factor in enforcing honest weight and measure standards. Yet, there are always willful minorities who, through subterfuge and camouflage, take unfair advantage of their customers. It is this group that must be brought and kept within terms of the law.

It seems remarkable to me that we have been able to maintain a reasonable degree of uniformity in regulations without the benefit of a central authority. This has been made possible by understanding and intelligent coordination of rules and regulations on the part of States and municipalities.

We cannot regard this system as perfect but these local units of government must be encouraged to assume a greater share of the responsibility for uniformity so that enforcement of regulations will not become a function of the Federal government alone. Therefore, the major problem is the consideration of plans for a better degree of uniformity in plans and in enforcement. This does not mean that a single pattern is imperative, but that each governmental unit should exercise its initiative in setting up the procedure that these conferences decide to be most effective in promoting the objective of honest and reasonably uniform standards and uniform enforcement.

In our planning and research, we should think in broad, national fashion and not solely in local, community fashion. Our States in fact have exercised too little initiative in this regard.

Lack of economic research information resulted in a great handicap for the States in cooperating with the Federal Government in dealing with problems of economic reconstruction, following the recent economic collapse. Only a few States were in position to show what procedure was wise and necessary in their localities. Thus, we need scientific research, as well as scientific planning not only to meet current conditions but to be prepared to cope with future emergencies.

Uniform legislation and regulations throughout the country looking to this end are necessary. Such information is needed more under emergency conditions than during normal times. Therefore, we should recognize the wisdom of action on the part of Federal and State Governments in keeping alive scientific research.

In this manner, basic information can be kept current for softening the shock of economic stress and as a nucleus for carrying forward further necessary scientific action. The best approach to this program in the interest of stabilized national safety is to broaden our thinking and action in terms of the Nation in its sphere as a composite unit. Segmentary thinking is not an effective instrument for mutual progress. Most of our problems are national in scope. Therefore the results for which you are striving cannot be adapted effectively to the sole advantage of a State or community which you represent individually. They must be thought out and solved in the light of national needs. Hence, the importance of the uniformity in the structure of legislation in the set-up of scientific units and the objectives of all.

This consciousness of our interdependence in our scientific research will prompt us to demonstrate statesmanship qualities in science, in manufacturing, and in supervision. Cooperative thinking and endeavors create the momentum that gives impetus to the progress of our Nation. That should be the objective of all. I am sure it is your objective.

The CHAIRMAN. Mr. Secretary, I assure you that the Conference is deeply indebted to you for being with us this morning. We only regret that you cannot stay with us, but we know the many obligations that rest on your shoulders.

(At this point, Mr. Cullen, Vice President of the Conference, assumed the chair.)

Mr. GRIFFITH. May I interrupt the proceedings just a moment to offer a motion of thanks to the Secretary of Commerce for the wonderful address he has just delivered, and in doing so remark that of the several Secretaries I have had the pleasure and privilege of hearing, this was the most constructive message that has ever been given to the Conference. I move you, sir, that this Conference record its appreciation by a vote of thanks to Secretary Roper, and that the same be recorded in the minutes; and further, that a copy of that address be mimeographed as soon as possible and delivered or sent to all of the members of this Conference for use in their work. It has provided me with more arguments than I have ever thought of for working out a State department in Maryland.

(The motion was passed by a rising vote.)

#### THE USE OF VEHICLE SCALES IN THE HIGHWAY PLANNING SURVEY

By EDWARD H. HOLMES, *Highway Engineer Economist, Bureau of Public Roads, United States Department of Agriculture*

Before considering the use of vehicle scales in the highway planning survey, it is perhaps desirable to outline very briefly just what the highway planning survey consists of, since I doubt if many of you are familiar with the details of this work.

This highway planning survey is a detailed study of the existing highway facilities, of their use and of their financing, now being conducted by 40 States in cooperation with and under the direction of the Bureau of Public Roads, United States Department of Agriculture. The survey is divided into three broad phases. First, the road inventory, which requires a complete and detailed study of roads as we now find them with respect to their width, surface type, condition, and various other details, and, as well, a record of the cultural development alongside them. It might be observed that while many States have a fair knowledge of their State systems, not one knew prior to this survey even the total mileage of local roads.

With the completion of the physical inventory, we are in the second broad phase of the survey conducting studies of the movement of traffic over the roads of the several highway systems. In this traffic survey we not only determine the total number of vehicles which use these systems, but also classify them as to whether they are local or foreign, as to their type and, in the case of commercial vehicles, as to their size, body type, and the loads they carry. Further studies show the origins, destinations, and lengths of trips of both passenger and commercial vehicles.

Then with the knowledge of our highway facilities and the use that is made of them, we make careful investigation of the financial structure which has made the highway system and its use possible. These financial studies not only include a detailed examination of the accounts of the highway departments to determine the sources of revenue

and the direction of expenditures on the various highway systems within each State; they also include a study of the location of all motor vehicles and the use which the owners of these vehicles make of the various highway systems. They will determine the extent that the average city motor-vehicle owner uses the city streets and the rural highways, both State and local, and also the use which the rural owners make of their own local roads and of the city streets. And the financial studies include as well a detailed examination of the whole tax structure of the State and its local subdivisions to permit a comparison of the source and distribution of highway taxes compared to all other expenditures.

Then in a further general study, we are investigating the life expectancy of the various highway surfaces which we find in our highway systems, as a means of determining how long we may expect our present system to last under its present and anticipated use.

The use of the vehicle scales in connection with this planning survey, as you might expect, is in connection with the study of traffic, and particularly of commercial vehicles. I use the word "vehicles" advisedly in this connection because the pit scales are actually for that purpose, to study vehicles, as distinguished from traffic. We have, scattered throughout all the States, many stations which are operated on a regular schedule, once every 26 days by parties equipped with portable scales. These parties are determining for commercial vehicles the origin, destination, trip length, commodity carried, total load of the vehicle and, where possible, the weight of the carried load. These studies, when interpreted by the data from the numerous traffic-counting stations, will give with a very fair degree of accuracy figures on what we may call the flow of weight over State highway systems, or in other words, the total weight of commodities moved, the nature of the commodities, and some idea as to the number of vehicles utilized in this movement. This we may call a study of the truck traffic.

As distinguished from this study, as I said before, we are studying in more detail at the pit scales the individual vehicles which make up the traffic. Since we are not concerned with the total movement over various routes, we need a relatively few pit scales, if they are carefully located, so as to provide a fair sample of the vehicles used throughout the State. To cite a specific State, for example, we have in Ohio three pit scales. Many of you undoubtedly are familiar with Ohio. One scale is in the eastern part of the State not far from Youngstown at which we can study the type of vehicles used in that section of the State, where there are a preponderance of heavy loads, particularly coal and products of the nearby steel industries. In the northern part of the State, not far from Fremont, we have a scale located on route U. S. 20 at which we obtain samples of vehicles, largely common carriers and contract haulers, engaged usually in a general freight movement. Then in the western part of the State near Vandalia there is a third scale at which we study vehicles largely engaged in moving the products of agriculture. We have thus at three locations in that State provided means for a detailed study of the vehicles engaged in moving various products typical of the State of Ohio.

In the different States we find pit scales of various types. Most States prefer the so-called motor-truck scales, large enough enough to



accommodate the entire vehicle. The length of the platform in such cases is generally 34 feet and the capacity of the scale is seldom less than 30 tons. A number of States, however, have installed what we call axle-loading scales in which the length of the platform is but 3 or 4 feet as against a width of 10 feet, it being understood that the 3-foot dimension is parallel to the center line of the highway. The capacity of these scales is generally 15 tons. A few States have installed a still different type of scale which we call a dual-platform type, and which permits the weighing of individual wheel loads. The length of these platforms is generally 5 to 8 feet, their width 5 feet, and they are installed about a foot apart. The capacity of each platform is at least 10 tons. Each of these types of scales has its peculiar advantages and usually the type is determined by the laws in the particular State. A State, for instance, which limits the loads on the highway by restrictions on the weight of the entire vehicle is generally more inclined to install the full platform scale, so that a vehicle can be weighed in one operation. Other States, however, whose load limit is based on the weight of the individual axle, sometimes prefer the axle-loading scales.

These scales generally have been installed as Federal-aid projects, and as such the installation has been under the supervision of the State highway department and the Bureau of Public Roads. The specifications have provided for a level apron on either end of the platform in order that we may be assured that the vehicle is level when weighing individual axles. The platform is located at a sufficient distance from the edge of the pavement to insure safety for the passing traffic, as well as for those concerned with the weighing operations. Surfaced runways approaching and leaving the platform insure that no vehicle will be required to stop on the highway while waiting to be weighed.

The scale houses have been provided by the States, and vary in character and appointments with the desires and resources of the various States. They range from a mere protecting shelter for the scale beam to an almost pretentious brick house equipped with a fireplace, and with the surroundings carefully landscaped. The weight indication is sometimes by means of a dial, and sometimes a scale beam, and in some instances a recording device is included, especially where it is proposed to eventually utilize the scales for enforcement purposes.

We have in this way installed or will have installed 85 pit scales, which added to 54 already installed in the various States, prior to this survey, gives us a total of 139 stations at which this pit-scale study will be conducted. These stations are operated daily, each scale being used for a 6 weeks' period, generally three times a year to insure the sampling of vehicles which might be operated only during certain seasons. The information obtained is by no means confined to a determination of the total weight of the vehicle. We determine, in addition, the weights of the individual axles, the size of tires, the length, width and height of the vehicle, and information on the rated capacity, the registered capacity, and the actual gross load rating assigned to the truck by the manufacturer as it appears on the specification or caution plate.

The use of this information is probably almost self-evident. However, I should like to review the use we propose in connection with these surveys.

We are very definitely not using them for purposes of enforcement. We are merely collecting data on which the States may base their future programs of legislation and of highway design. For purposes of design, we need to know the loads the highways and bridges will be required to sustain, which means an analysis not only of the total weight of the vehicles, but of the individual axle loads, and how these loads are distributed as shown by our wheel base and tire size data.

It is, however, to provide a basis for equitable regulation and taxation of these vehicles that the information will have its greatest value. For the first time, we will have accurate knowledge of what the effect will be of limitations on the weight of vehicles, or on their length, width, or height. We will be able to determine what vehicles are most generally used in the hauling of certain commodities, and whether certain regulations will hinder or favor the movement of one or more commodities with respect to others. And we will know for the first time how the loading practice conforms to the registration limits, how it conforms to the manufacturers' ratings, how we can best bring all three into conformity, and assess motor vehicle fees on an equitable basis.

The use of these vehicle scales will not be concluded with the completion of our present program of field work. In fact, their use should become more important as time goes on. Once adequate and equitable regulations are made effective, it will be necessary to continue their rigid enforcement. If we are to preserve our tremendous investment in our highway systems, and if we are to maintain and extend these systems as we shall, we must by a continuous campaign of education and enforcement insure that loads in excess of those for which the surface is designed will be excluded from the highways, and that each vehicle owner pays in motor-vehicle fees an amount commensurate with the use he receives from our highways. We anticipate that the trend will be toward more intelligent legislation and regulation in all the States, following the lead of the newly organized Bureau of Motor Carriers of the Interstate Commerce Commission in its regulation of interstate carriers. It is to prepare for this end that we are cooperating in and encouraging the installation and use of the vehicle scales.

#### DISCUSSION OF REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES—Continued <sup>6</sup>

Mr. SAMENFINK. In New York State the Governor recently signed a bill in regard to weighing coal, which may put all the small coal dealers that we have in Rochester, N. Y., out of business. Under the new act anything over 100 pounds will have to be weighed on a vehicle scale that can weigh gross, tare and net. I think, when that new act is considered, it is really going to put a burden upon the dealer if this regulation goes through that you can't use a vehicle scale to weigh loads of less than 1,000 pounds.

Mr. HOLBROOK. This regulation is merely to the effect that a vehicle scale shall not be used for weighing loads of less than 1,000 pounds. The light weight of a vehicle presented to a vehicle scale is almost invariably over 1,000 pounds. This regulation does not prevent the weighing on a vehicle scale of 500 pounds of coal, for instance, on a vehicle. The vehicle is tared on the scale, and its

<sup>6</sup> For previous discussion of this report see pp. 75 to 84.

weight is more than 1,000 pounds; the gross weight of the vehicle when the coal has been loaded is also necessarily more than 1,000 pounds; the difference between the gross and tare weights may be less than 1,000 pounds without any violation of this regulation, since the loads weighed upon the vehicle scale have not been less than 1,000 pounds in the case cited.

Mr. SAMENFINK. Under our new law, anything weighing over 100 pounds must be weighed by a licensed weighmaster on a scale that will weigh gross, tare, and net. In other words, if somebody ordered 400 pounds of coal, under the old act it could be weighed 100 pounds at a time. Under the new act that cannot be done.

Mr. HOLBROOK. Will you have any vehicles used in the distribution of coal which weigh less than 1,000 pounds?

Mr. SAMENFINK. I am not saying we have, but it could be possible.

Mr. HOLBROOK. Well, vehicles used in the sale of coal will normally weigh more than 1,000 pounds, in which case they may be weighed upon a vehicle scale. What we are trying to eliminate is, for instance, the sacking of coal in 100-pound sacks on a 40,000-pound vehicle scale.

Mr. SAMENFINK. I brought up the question of a scale having a capacity under 1,000 pounds.

Mr. HOLBROOK. Such a scale would not be a vehicle scale. A vehicle scale is a scale which is designed to be used in the weighing of wagons or motortrucks, by definition.

Mr. SAMENFINK. Mr. Sweeney said that anything weighing 25 pounds, such as a bag of coal, would not be allowed to be weighed on that scale.

Mr. HOLBROOK. The vehicle scale cannot be used for weighing loads of 25 pounds.

Mr. SAMENFINK. That is what I am trying to bring out. As I said, I don't think it is fair not to let them use that scale under 1,000 pounds.

Mr. HOLBROOK. What—a 40,000-pound scale? Do you believe in weighing of loads of 25 pounds on a 40,000-pound scale?

Mr. SAMENFINK. You have a tolerance of so many pounds.

Mr. HOLBROOK. Your scale may be legally in error by 10 pounds, and 10 pounds on a 25-pound load is 40 percent. Do you believe the weight of a load should be in error by 40 percent?

Mr. SAMENFINK. No, I don't.

Mr. HOLBROOK. That is what the regulation is designed to accomplish—to prevent excessive errors in small loads due to the large minimum tolerances on vehicle scales.

Mr. SAMENFINK. I get your point; I know what you mean.

Mr. O'KEEFE. If you inserted the word "gross" in there, would it help the gentleman? I am thinking of the gentleman over here talking about his cattle. That would include your vehicle, and so forth.

Mr. HOLBROOK. Well, the gross load would be a load of the vehicle plus the load on the vehicle, and these scales will often be used in weighing the tare loads of the vehicle also. If we use the words "gross load" we do not cover that.

Mr. O'KEEFE. Must the net load be 1,000 pounds?

Mr. HOLBROOK. The net load may be 500 or 250 pounds, provided it is on a vehicle. That is reasonable, because if you tare the vehicle

on the scale and then weigh a load of 500 pounds on the vehicle, it is probable that the errors in the two weights caused by an error in the scale will tend to cancel each other.

Mr. O'KEEFE. I am not going to try to tell you what to do, but I think the wording could be clearer.

Mr. MILLER. In the State of West Virginia we have livestock scales located at various points, a very fine selection, of capacities running from 10,000 to 20,000 pounds with graduations of  $2\frac{1}{2}$  or 5 pounds. I will venture to say that 50 percent of all the drafts that go over this type of scale are from 100 to 1,000 pounds. What I would like to know is, would this scale come under that amendment? If so, would we be in a position to compel them to put in an auxiliary scale? We have one auxiliary scale at the largest auction. They make all their light weights on the scale, and I think that is the proper method, but will we be able to compel the other fellows to put those in when we have sealed and approved their scales?

Mr. HOLBROOK. I think you should. However, if there is a fence around the platform, the scale is not within the purview of the regulation under discussion, since it is obviously not a vehicle scale. A vehicle could not be presented and weighed on it; it is not designed for weighing a vehicle.

Mr. MILLER. They are large stock scales, and if you take the fence away there would be no difficulty in running a large truck on them.

Mr. HOLBROOK. I would say that a scale with a fence around it and with cleats on the platform is designed to weigh stock on the hoof and would not be a vehicle scale under our definition.

Mr. MILLER. I wanted to know, because 50 percent of those weights are under 1,000 pounds.

(The regulation as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading).

K-6. Weight graduations on food scales.

This regulation reads as follows:

The value of the minimum weight graduations on a scale equipped with a weighbeam or reading face, used in the sale of foodstuffs at retail, shall not exceed 1 ounce: Provided, however, That this shall not apply to a scale used exclusively in the sale of vegetables.

Amend this material to read as follows:

K-6. Weight graduations on scales.

K-6a. Food scales.—The value of the minimum weight graduations on a scale equipped with a weighbeam or reading face, used in the sale of foodstuffs at retail, shall not exceed 1 ounce: Provided, however, That this shall not apply to a scale used exclusively in the sale of vegetables.

K-6b. Vehicle scales.—*The value of the minimum weight graduations of a vehicle scale equipped with a weighbeam or reading face shall not exceed 20 pounds.*

(The regulation as proposed by the Committee was duly adopted.)

Mr. HOLBROOK. We have now completed that portion of the report which refers solely to vehicle scales and will take up various proposals relating to scales in general. The first refers to the section comprising the definitions and is concerned with the definition of sensibility reciprocal. It reads as follows:

#### A. GENERAL DEFINITIONS

A-2b (3). SR of equal-arm scales, and of unequal-arm scales without trig loop.

This paragraph reads as follows:

The change in load required to move the lever system from its position of equilibrium when the scale is in proper balance to a position of equilibrium at

either limit of its motion. Provided, however, That when the scale is properly equipped with a well-designed special balance-indicating device—such as, for instance, an indicator cooperating with one or with a series of graduations, or two indicators which move in opposite directions—which device does not directly indicate weight values, the SR is the change in load required to cause a relative change in the position of rest of the indicating elements equal to 0.04 inch or to one graduated division whichever is the greater.

Amend the above material to read as follows:

The change in load required to move the lever system from its position of equilibrium when the scale is in proper balance to a position of equilibrium at either limit of its motion: Provided, however, That when the scale is properly equipped with a well-designed special balance-indicating device comprising two indicators which move in opposite directions, the SR is the change in load required to cause a relative change in the position of rest of the indicators equal to 0.04 inch. (See also paragraph A-2b (4).)

NOTE.—The parenthetical reference, “(See also paragraph A-2b (4).)” should also be added at the end of paragraph A-2b (2).

Add a new paragraph to read as follows:

A-2b (4). SR of scales equipped with over-and-under indicators.—In the case of a scale equipped with device comprising an indicator cooperating with a single balance-indicating or “zero” graduation, the SR is the change in load required to move the indicator from its position of equilibrium when the scale is in proper balance to a position of equilibrium such that there is a clear interval between adjacent edges of the indicator and of the graduation, equal to the appropriate value in the following table:

Class of scale	Clear interval Inch
Small-capacity scales-----	0.04
Large-capacity scales other than vehicle scales-----	.12
Vehicle scales-----	.25

In the case of a scale equipped as above with a device provided with a series of graduations which do not directly indicate weight values, the SR shall be as defined above, or the specified movement shall be increased to a value equal to one division on the graduated scale if this value is greater than that first specified.

This definition is designed to require that scales with over-and-under indicators be properly sensitive; that is, to require a movement of the weight indicator such that it can readily be seen for the various classes of scales. In other words, this requires that there be a satisfactory movement of the indicator to denote in proper cases that the load is over or under the load represented by the weighing elements of the scale.

Mr. BOYLE. Mr. President, I would like to ask if this amendment relates to small over-and-under scales, such as would be used for packaging crackers. Also, I would like to ask concerning a scale originally designed with a 1-pound beam by quarter ounces, and afterward fitted with an auxiliary beam with graduations representing one twenty-fifth of an ounce. Should the sealer in a test subsequent to the addition of the special tare beam apply any new SR or tolerance other than that applied on the first test?

Mr. HOLBROOK. This specification does not refer to scales having over-and-under indicators with graduated faces representing weight indications. Such a scale, under our definitions, is an automatic-indicating scale. This specification merely refers to over-and-under indicators cooperating with a single graduation representing a balance condition, or with a series of graduations which do not directly indicate in terms of weight.

In relation to your second question, as to whether SRs and tolerances are changed when a more finely divided beam is attached to a scale, I would say that putting such a beam on the scale will probably

result in reducing the SR and in reducing the minimum tolerance, because those values are functions of the minimum graduation and the minimum graduation will, in the instance you have cited, have been reduced.

Mr. BOYLE. Would a scale used in packaging crackers be construed as one weighing food for retail sale, inasmuch as the weighing operation is the only weighing of the individual package? Later on, however, a number of packages are gathered together and they are reweighed in lots, say, of 20 or 24 pounds.

Mr. HOLBROOK. I would say that a scale in a factory which is used for weighing small amounts of food in individual packages would be a scale used in the retail sale of food products. However, I think many sealers do not test these, perhaps on the ground that the sale is not immediate. The remedy is perhaps to apply proper regulations to the individual packages and to see to it that reasonable tolerances on packages are not exceeded. Doubtless under many of the State laws the official would have the power to test such scales.

Mr. BOYLE. In Maine we have no commodity tolerance on food or fuel.

(The regulation as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

## B. GENERAL SPECIFICATIONS

B-2m. Weight indicators on automatic-indicating scales.

B-2m (4). Clearance.

The first portion of this paragraph reads as follows:

*The clearance between the index of the indicator and the reading face shall not exceed 0.06 inch in the case of all automatic-indicating scales. \* \* \**

Amend this material to read as follows:

*The clearance between the index of the indicator and the reading face shall not exceed 0.06 inch—except as is provided in paragraph B-2m (5)—in the case of all automatic-indicating scales. \* \* \**

Add a new paragraph to read as follows:

B-2m (5). Magnified weight indicators.—*When in normal usage any weight indicator and reading face are necessarily viewed or may be viewed as magnified by means of a lens system, the requirement of paragraph B-2m (4) as to maximum clearance between the index of the indicator and the reading face shall be that the specified maximum clearance shall be reduced in inverse proportion to the angular magnification of the lens system.*

NOTE.—Specification "D-2b. Indicators" under the heading "Computing Scales" contains the same requirement as to clearance in relation to weight and value indicators. This specification should be amended and a new specification added to make these requirements consistent with the material as amended above.

In relation to these amendments I may say that it was called to the attention of the committee by Mr. Baucom that when a magnifier was used the parallax errors on scales were increased. It had not occurred to the committee that that would be the fact.

We referred this question to the Optics Division of the National Bureau of Standards and the Optics Division stated, after some inves-

tigation, that the parallax error would be increased roughly in the same proportion as the image was increased in size; that is, the parallax error would be multiplied by a factor representing the angular magnifying power of the lens. In other words, if one looked at a chart and indicator without a magnifier and found that the parallax under a stated set of circumstances was  $\frac{1}{2}$  ounce, then if a magnifying device with a multiple of two was placed on the scale, the parallax would be increased approximately to 1 ounce. In view of this it appeared to the committee that in the case of a scale using a magnifier the indicator should be required to be closer to the chart in order that the parallax error might not be increased, and these amendments are designed to apply to that requirement.

Mr. SMITHERS. What would be the ruling in the case of a concern selling gold who supplied their own magnifying device, the angular magnification of which was four? The scale is tested by a sealer, the distance between the indicator and the reading face is checked, and found to be excessive. What would happen in such a case?

Mr. HOLBROOK. An adjustment of the clearance to meet terms of this specification.

(The specifications as proposed by the Committee were duly adopted.)

Mr. HOLBROOK (reading):

Add a new paragraph to read as follows:

B-2y. Over-and-under indicators.—*An over-and-under indicator which does not directly indicate weight values, whether it is integral with or is attached to a scale, shall conform to the requirements of sections B-2j, B-2k, B-2l, B-2m, and B-2n, insofar as these requirements are applicable.* The attachment to a scale of an over-and-under indicator which directly indicates weight values shall be construed as constituting such scale an automatic-indicating scale, and all requirements for such scales shall apply accordingly.

The latter portion is retroactive because it is considered to be merely a restatement of present requirements.

(The specification as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

## F. PRESCRIPTION SCALES AND BALANCES

### F-1. Application.

Add the following at the end of this paragraph:

The specifications and tolerances for class A prescription scales and balances shall also apply to scales used in the purchase and sale of gold, insofar as they are applicable.

It was called to the attention of the Committee that this Conference had no specifications and tolerances for scales used for the purchase and sale of gold, although we know that the purchase and sale of gold has been a very popular traffic since the value of gold in terms of our dollar has been increased. It seemed to the Committee that the specifications and tolerances for class A prescription scales were such as properly to be applicable to a scale used for the purchase and sale of gold. This paragraph is intended to make all class A specifications

and tolerances for prescription scales applicable to scales and balances used in that particular service.

(The requirement as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

SECTION ON WEIGHTS

The table of tolerances for weights in the avoirdupois system reads as follows:

Avoirdupois System

Weight	Tolerance, weights for equal-arm scales, ratio 1:1	Tolerance, counterpoise weights for multiplying-lever scales		
		Ratio less than 100:1	Ratio 100:1 and less than 1,000:1	Ratio 1,000:1 and over
<i>Pounds</i>	<i>Grains</i>	<i>Grains</i>	<i>Grains</i>	<i>Grains</i>
50	100.0	60.0	40.0	20.0
25	60.0	36.0	24.0	12.0
20	60.0	36.0	24.0	12.0
15	40.0	24.0	16.0	8.0
10	40.0	24.0	16.0	8.0
8	30.0	18.0	12.0	6.0
5	30.0	18.0	12.0	6.0
4	20.0	12.0	8.0	4.0
3	20.0	12.0	8.0	4.0
2	15.0	9.0	6.0	3.0
1	10.0	6.0	4.0	2.0
<i>Ounces</i>				
10	10.0	6.0	4.0	2.0
8	5.0	3.0	2.0	1.0
5	5.0	3.0	2.0	1.0
4	5.0	3.0	2.0	1.0
2	3.0	1.8	1.2	0.6
1	2.0	1.2	.8	.4
$\frac{1}{2}$	2.0	1.2	.8	.4
$\frac{1}{4}$	1.0	.6	.4	.2
$\frac{1}{8}$	.5	.3	.2	.1
$\frac{1}{16}$	.5	.3	.2	.1
$\frac{1}{32}$	.5	.3	.2	.1
$\frac{1}{64}$	.2	.12	.08	.04

Amend this table to make it read as follows:



## Avoirdupois Weights

Weight	Tolerance, weights for equal-arm scales	Tolerance, counterpoise weights for multiplying- lever scales
<i>Pounds</i>	<i>Grains</i>	<i>Grains</i>
50	100.0	-----
25	70.0	-----
20	60.0	-----
15	40.0	-----
10	40.0	20.0
8	30.0	18.0
5	25.0	13.0
4	25.0	12.0
3	20.0	10.0
2	15.0	8.0
1	10.0	5.0
<i>Ounces</i>		
10	8.0	4.0
8	7.0	3.0
5	5.0	2.0
4	4.0	2.0
2	3.0	1.0
1	2.0	1.0
$\frac{1}{2}$	2.0	1.0
$\frac{1}{4}$	1.0	-----
$\frac{1}{8}$	0.5	-----
$\frac{1}{16}$	.5	-----
$\frac{1}{32}$	.5	-----
$\frac{1}{64}$	.2	-----

You will note that this table is proposed to be very much simplified. It becomes a two-column instead of a four-column table. While there was a reasonable fundamental basis for setting up different tolerance values for counterpoise weights to be used upon scales having various ratios, nevertheless, this resulted in specifying tolerances for weights to be used on scales having a ratio of 1,000:1, which we consider to be unenforceable in the field.

I will take one instance. By referring to the last column of the original table we find the tolerance on a 1-pound weight intended to be used on a scale having a ratio of 1,000:1 and over was 2 grains. The weights in the hands of the sealers in field work are weights conforming to class C tolerances. The class C tolerance is 1 grain. This tolerance on a commercial weight is, then, only double the class C tolerance. We would have this situation: We would have the sealer attempting to determine an error on the weight with a weight which might be in error by 1 grain, on a field portable balance which had a sensibility reciprocal of approximately 1 grain and an error of arms which was indeterminate. The possibility that he will be able to enforce a 2-grain tolerance on a commercial weight under such circumstances is, in the opinion of the Committee, negligible. Therefore, we have simplified this table by specifying only one tolerance on counterpoise

weights for multiplying-lever scales regardless of their ratio, and that series of values is one-half of the series of values allowed for weights for use on even-arm scales. It is five times the series of tolerance values allowed for class C weights.

In the opinion of the Committee most of those tolerances can be enforced on the balances and with the class C weights in use, although, even here, on very small weights where the tolerance is only 1 grain considerable difficulty may be experienced in enforcing the values specified.

(The tolerance table as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

#### G. PERSON WEIGHERS

G-3c. Weight indications.

G-3c (1). General.

The material under this heading reads as follows:

G-3c (1). General.—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, or the insertion of a coin in the coin slot will automatically be prevented.

Amend by making the above material nonretroactive.

We believe the character of this requirement is such that it should not be applied to scales that are in use but only to new scales hereafter put into use.

(The amendment as proposed by the Committee was duly adopted.)

Mr. HOLBROOK (reading):

#### SECTION ON VEHICLE TANKS

Specification 5 reads as follows:

5. Indicators.—*An indicator shall be provided within the fill opening of each compartment, which shall be located approximately midway between the ends of the compartment. The indicator shall be so designed that it will clearly, distinctly, and unmistakably define the height to which the compartment must be filled in order to contain its marked capacity. If this indicator is adjustable it shall be so constructed that it can be sealed in such a manner that its position cannot be changed without destroying or mutilating the seal.*

Amend by adding the following words after the word "capacity" in line 5:  
*and the change in height of the liquid surface at the index of the indicator equivalent to the volume representing the tolerance on the compartment capacity, shall in no case be less than 0.04 inch.*

Vehicle tanks customarily employed at the time this specification was adopted had domes which extended a considerable distance above the top of the tank, the indicator was located in this dome, and the sensitiveness of the indication was governed by the diameter of the dome, which was reasonably small. Thus a sensitive indication was provided.

With the advent of streamlined vehicle tanks the indicator may now be located at such a point that it contacts the surface of the liquid within the shell of the compartment. Under such circumstances the sensitivity of the indication is very greatly decreased because the area of the top surface of the liquid is very greatly increased.

It appears that a tank should not be sealed unless an amount of liquid equal to the tolerance produces such a change in height of the liquid surface that it is readily appreciable on the indicator provided. This amendment sets up a criterion of 0.04 inch change in vertical height of the liquid to represent the volume equal to the tolerance on the compartment of the tank being tested. If some such requirement is not enforced we may have tank wagons in use the accuracy of which can not be measured within the tolerance provided.

Mr. RAGLAND. I want to transmit to our secretary an amendment.

Mr. HOLBROOK. Mr. Ragland proposes the following amendment:

Amend specification 5 by adding a new sentence to read as follows:  
The minimum dimension of the fill opening shall not be less than 10 inches.

Do you want to explain that amendment, Mr. Ragland?

Mr. RAGLAND. I will be glad to. Gentlemen, I am heartily in favor of the proposed amendment. With due respect to our Tolerance Committee, they haven't gone far enough. This amendment is for the sake of the field man. On steamlined trucks the domes sometimes are made only 6 inches in size, and it is impossible for men to get their hands into the dome to apply the seal to the indicator.

Mr. HOLBROOK. It occurs to me that this amendment should be made to some specification in relation to the fill opening, rather than to the specification referring to the indicator.

Mr. RAGLAND. That is perfectly agreeable to me, sir. I noticed that this specification referred to the fill opening and I thought that would be a good place to give some idea of how large that fill opening should be. Let's give the inspectors plenty of room to seal since we require the indicator to be sealed.

The ACTING CHAIRMAN. Suppose we dispose of the Committee proposal and then consider Mr. Ragland's amendment.

Mr. RAGLAND. It is entirely satisfactory to me.

Mr. BAUCOM. Mr. President, I address my remarks to the Committee amendment. We have about 150 of these big transport tanks carrying around 4,000 gallons, a good many of them single-compartment. If you are going to require only a twenty-fifth of an inch it won't even be seen. I don't think that is sufficient.

I have drawn up here an amendment to that, in order that it might be perfectly clear as to what that amendment means. I propose that we should amend by changing the added words to read: "and the surface upon fill of the compartment shall be so reduced in area that the change in height of the liquid surface, at the index of the indicator equivalent to the volume representing the tolerance on the compartment shall in no case be less than 0.04 inch." That is, when you fill up this 4,000-gallon tank the area at the indicator ought to be drawn down so small that the tolerance allowed on the 4,000 gallons would be readily observed. As we now have it, with a single indicator in the middle, the change in the height of the surface is only about 1 inch for 50 gallons. I am wondering if the thirty-second of an inch proposed is adequate. I know it is said a minimum, and we can make it more. Can we condemn a tank if a manufacturer abides by that requirement?

Mr. HOLBROOK. The Conference has gone on record many times in its specifications to the effect that 0.04 inch is readily detectable, and this applies the same criterion that is applied in the case of many other devices. So far as the language of the amendment is concerned,

the committee proposal was considered to be a satisfactory statement. Mr. BAUCOM's suggestion is just different language which I think is intended to mean the same thing. I take it the requirement is the same.

Mr. BAUCOM. It is the same thing, only I found that a good many didn't clearly understand what we were driving at and I was trying to make it a little clearer. I don't know whether you want to substitute that.

Mr. FOSTER. Does this mean that the dome of the compartment must be large enough to take care of the expansion, so that at your sealing point the surface of the liquid will be up in the dome instead of in surface of the compartment?

Mr. HOLBROOK. The requirement for expansion space remains as in the present specification.

Mr. FOSTER. I understand that, but will this require that the compartment have a dome sufficiently high so that the liquid will remain above the shell point?

Mr. HOLBROOK. The volume representing the tolerance must result in a change in height of 0.04 inch. That must be true regardless of where the indicator is placed. We make no requirement as to the placing of the indicator, but we require that the indication be a satisfactorily sensitive one.

Mr. FOSTER. That being the case, it will be necessary to make the dome sufficiently large to take care of the expansion.

Mr. HOLBROOK. That would probably be the result, Mr. Foster.

Mr. SWEENEY. Mr. President, it appears to me that a proper correction for conditions that might exist in the future would be that the minimum capacity of the dome should bear some relation to the value of the compartment itself, the object in view being to have the dome large enough to allow for the proper expansion of 0.75 percent. We have several vehicle tanks at the present time where the indicators are in the body of the compartment and of course the proper filling of that is liable to bring about a discussion, especially when the tank is not on a level surface.

Mr. HOLBROOK. The size of the dome is not regulated except as it will be incidentally regulated by the enforcement of a specification which requires a satisfactory change in the height of the liquid at the indicating device, so that the tolerance on the compartment can be readily enforced.

The ACTING CHAIRMAN. We have Mr. Baucom's motion. The language proposed is about the same as the Committee amendment.

Mr. HOLBROOK. I think the requirement is intended to be identical.

The ACTING CHAIRMAN. We will vote on Mr. Baucom's amendment. There is practically no difference in that from the one presented by the Committee on Tolerances, so far as I can see.

(The amendment was duly adopted.)

The ACTING CHAIRMAN. That will take the place of specification 5. It is now in order to take up Mr. Ragland's amendment.

Mr. HOLBROOK. I take it now that the request is that at a proper place in the specifications there be included the following language: "The minimum dimension of the fill opening shall not be less than 10 inches." That means the diameter, does it not?

Mr. RAGLAND. No, because the fill opening in these streamlined trucks is not a circle, it is a parallelogram.

Mr. HOLBROOK. Would you consent to striking out the words "shall not be less than", because that is what "minimum" means. How would you like this language: "The minimum dimension of the fill opening shall be 10 inches."

Mr. RAGLAND. That is satisfactory.

Mr. BAUCOM. Let's analyze that a second. What would the dimensions of an oblong dome be? The intent of Mr. Ragland is that he wants the smallest dimension 10 inches.

Mr. RAGLAND. Mr. Baucom is correct, and when I used the word "minimum" it covered that point.

(The amendment was duly adopted.)

Mr. GRIFFITH. At this moment I would like to ask a question that would be pertinent to the present discussion; it is in regard to the location of the indicator. The present common practice is to have the indicator in the dome head itself. The dome head can be unscrewed; it is interchangeable, usually, with those of other compartments on the tank truck. The indicator for one compartment would not be correct as an indicator for another. We have found that due to some carelessness or because of deliberate change, these indicators are moved. It strikes me that if we should add to our specifications a provision that the indicator, which is usually an iron rod adjustable by a nut screwing on a thread, should be attached to the top of the shell of the tank truck, we would eliminate that difficulty.

Mr. FOSTER. We do not allow the indicator to be attached to the dome head. It must be attached to the compartment itself; and, furthermore, when it is properly set we weld it in place, so that even if the seal wire breaks you always know that you are right. We found that a spot weld on that thread makes it certain the indicator is not going to be punched up and down by the fill pipe that is stuck in there. We never allow a fill point to be attached to the dome head.

Mr. GRIFFITH. That is true, Mr. Foster, but I venture to say that 90 percent of the men have found the condition I have mentioned and have not been able to apply such a remedy. If it were in the specifications there would be no argument with the manufacturers or the users of tank trucks. It might not be practical to make the specification retroactive until after a certain date, at which time we could require them all to comply, just as we do at present with air eliminators on tank trucks.

I believe that such a specification would eliminate any further difficulties we might otherwise have in that connection.

Mr. RAGLAND. You live and learn. I disagree with my good friend, Captain Griffith. If that was tried in my territory I would act under that very promptly.

While I am on my feet I would like to say, sir, that I intended that the amendment offered by me should be nonretroactive.

Mr. BAUCOM. If we may refer back, then, to specification 5, how would it do to add an amendment that indicators shall be permanently attached to the compartment?

Mr. HOLBROOK. Would not the word "shell" be a better one than the word "compartment"?

Mr. BAUCOM. I move that we leave it to the Secretary or the Committee to get the proper phraseology.

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

SECRETARY'S NOTE.—This amendment and the one introduced by Mr. Ragland and adopted immediately prior to this, have been incorporated in specification 5, so that this specification now reads as follows:

5. Fill Openings and Indicators.—*The minimum dimension of the fill opening shall be 10 inches.* An indicator shall be provided within the fill opening of each compartment; *this indicator shall be permanently attached to the shell of the compartment and shall be located approximately midway between the ends of the compartment.* The indicator shall be so designed that it will clearly, distinctly, and unmistakably define the height to which the compartment must be filled in order to contain its marked capacity, *and the surface upon fill of the compartment shall be so reduced in area that the change in height of the liquid surface at the index of the indicator equivalent to the volume representing the tolerance on the compartment capacity shall in no case be less than 0.04 inch.* If this indicator is adjustable it shall be so constructed that it can be sealed in such a manner that its position cannot be changed without destroying or mutilating the seal.

Mr. BOYLE. We have found in some cases that where the compartments of a vehicle tank have been calibrated and the tank has afterward been submitted for a retest, the calibration has changed owing to the displacement of the partitions. We have overcome this by bracing the partitions with rods in the compartments. Is there anything in the specifications which prohibits that condition or that would correct it in the case of new trucks? We have found a change of as much as 3 gallons in adjacent compartments. Sometimes in the pump jobs the pressure developed by the pump will cause the plates to bulge.

Mr. HOLBROOK. Mr. Boyle, there is a requirement that a vehicle tank shall be of sufficiently substantial construction that it may reasonably be expected to withstand ordinary usage without impairment of the accuracy of the deliveries made therefrom. The partitions should be so constructed that they will not be distorted under any conditions of ordinary lading.

#### 8. Diversion from Manifold.

This specification reads as follows:

When two or more compartments discharge through a manifold, effective and automatic means shall be provided to prevent the passage of liquid from the manifold into the discharge line from any compartment.

Amend this specification to read as follows:<sup>7</sup>

Discharge through Manifold.—When two or more compartments discharge through a manifold, effective and automatic means shall be provided to prevent the passage of liquid from the manifold into the discharge line from any compartment. When such discharge lines are equipped with independently operable discharge valves, the construction shall be such that deliveries shall be accurate whether or not more than one of the valves are partially or wholly open.

That is the Committee amendment that has been made in response to a resolution passed at the last Conference, that the Committee give attention to specifications on manifolds of vehicle tanks. The resolution was passed as a result of certain remarks made by Mr. McBride as to difficulties which he had found in Massachusetts.

Mr. RAGLAND. Mr. President, would a check valve in the manifold comply with that requirement? You see the great trouble is, if two of these valves are opened, with one compartment empty and the other full, the man could perpetrate a fraud.

Mr. HOLBROOK. That was already prohibited by the original specification. A check valve to prevent the liquid from flowing back into an empty compartment will not meet the situation. The situation described last year was that when a full compartment delivery was being made and the discharge valve from an empty compartment was open to the manifold, the pump would suck in so much air from

<sup>7</sup> See Secretary's Note following.

the empty compartment that the air eliminator could not effectively dispose of it, and the air would pass through the meter and result in a short-measure delivery.

This merely provides that when two compartments can be independently opened, a test may be made delivering from a full compartment with a valve from an empty compartment open, and deliveries shall be within tolerance. The means shall be such that this condition of test shall be met.

(The specification as proposed by the Committee was duly adopted.)

SECRETARY'S NOTE.—Upon review, subsequent to the Conference, it was determined that the amendment adopted in relation to manifolds should not have been incorporated in specification 8 since this specification is limited to apply only to vehicle tanks used as measures, whereas the condition sought to be remedied exists in relation to vehicle tanks equipped with meters.

The amendment made is germane to the material contained in specification 14. Therefore, specification 8 should remain as first written above, and the amending material should be added to specification 14, to make this specification read as follows:

14. Discharge Lines.—If the unit be designed for discharge by gravity, the discharge line shall be as short as practicable and there shall be no shut-off valve at its discharge end. If the unit be designed for discharge by means of a pump, the discharge line shall be of the wet-hose type with a shut-off valve at its discharge end, and immediately adjacent to this discharge valve there shall be installed a spring-loaded check valve so adjusted that drainage of the discharge line will automatically be prevented. When two or more compartments discharge through a manifold and the discharge lines are equipped with independently-operable discharge valves, the construction shall be such that deliveries shall be accurate whether or not more than one of the valves are partially or wholly open.

Mr. HOLBROOK (reading):

#### SECTION ON LIQUID-MEASURING DEVICES

Specification 52 reads as follows:

Sensitiveness.—Wholesale devices shall be so designed and constructed that they can readily be operated to deliver an amount of 50 gallons within the tolerances on such amount hereinafter provided.

Amend this specification to read as follows:

Sensitiveness.—Wholesale devices shall be so designed and constructed that they can readily be operated to deliver an amount of 50 gallons within the tolerances on such amount hereinafter provided and *whenever any scale or dial is at some point or points or at all points the sole or most sensitive means of determining the amount of liquid discharged, a volume of one gallon shall be represented on such scale or dial by a length of not less than 0.20 inch.*

This is designed to reduce to figures the general requirement that scales or dials shall be such that the tolerance can surely be read. The requirement of 0.20 inch per gallon, provides that there shall be a movement of slightly over 0.04 inch on the dial to correspond to a change in volume equivalent to the minimum tolerance on a wholesale meter.

(The specification as proposed by the committee was duly adopted.)

Mr. HOLBROOK. That concludes the report.

The ACTING CHAIRMAN. Thank you, Mr. Holbrook, for a very interesting report.

#### THE APPEARANCE IN TRADE OF LIQUID MEASURES OF NON-STANDARD SIZES

By ROLLIN E. MEEK, *Chief, Bureau of Weights and Measures, State of Indiana*

Mr. Chairman, ladies, and gentlemen of the Conference, I attribute my appearance on this program to recent correspondence between

officials of the Indiana State Bureau of Weights and Measures and Mr. F. S. Holbrook, Co-Chief, Division of Weights and Measures of the National Bureau of Standards. This correspondence pertained to the appearance in trade in Indiana of the  $\frac{1}{2}$ -quart milk bottle and to a proposed regulation for containers of ice cream or other similar frozen products. I assume our correspondence on the subject of  $\frac{1}{2}$ -quart milk bottles and other nonstandard sizes of liquid measures and containers is typical of the correspondence of this character received by Mr. Holbrook.

It is probable that the officials of the Indiana State Bureau of Weights and Measures are confronted with a situation no different in this respect than is faced by weights and measures officials of other jurisdictions; neither is it likely that we have anything to add to the subject that could be considered entirely new. We do welcome, however, the opportunity of stating the position taken by weights and measures officials of Indiana on the question of nonstandard sizes of liquid measures and refillable containers which are recognized and used as liquid measures. We are unalterably opposed to the use of liquid measures of nonstandard sizes and believe that all weights and measures officials should exercise a united effort to stamp out a growing tendency to use such measures.

I wish to refer you to the Code of Specifications and Tolerances for Liquid Capacity Measures which has been recommended by the National Conference on Weights and Measures to the various States for adoption. Indiana is one of many States which have adopted this code. Specification 2 of this code establishes sizes which are of the customary system and requires that liquid measures shall be of one of the following capacities only: One gallon, a multiple of the gallon, or a binary submultiple of the gallon—that is, a measure obtained by dividing the gallon by the number 2 or a power of the number 2. The tolerances for liquid capacity measures as adopted in this code are for sizes as established in specification 2. Weights and measures officials recognize these tolerances in ascertaining the capacity of liquid measures and the tolerances, furthermore, guide the manufacturers in their construction. This code does not recognize liquid measures of nonstandard sizes, such as  $\frac{1}{6}$ -quart,  $\frac{1}{2}$ -quart,  $\frac{1}{2}$ -gallon, 3-quart, 5-quart, 6-quart, and other sizes surreptitiously manufactured and used. May I ask the following question to better illustrate my point? What tolerances guide the manufacturer in the construction of these nonstandard sizes and what tolerances are recognized by the weights and measures official in determining their degree of accuracy?

We all realize that liquid measures of the customary system are based on the standard gallon of 231 cubic inches and are of one of the following capacities only: 1 gallon, a multiple of the gallon, or a binary submultiple of the gallon; therefore, it appears that I need not dwell at great length upon the recognized and established sizes. I would rather devote my time to a discussion of the use of nonstandard sizes of measures. I shall endeavor to point out the necessity for a curb to be placed upon the encroachment of spurious liquid measures in the commercial field.

Weights and measures officials should always bear in mind the three essential objectives of specifications and tolerances which serve as a guide for the elimination from use in trade of various devices used



for the determination of quantity. They are for the purpose of removing from trade those devices which are faulty, those which are not reasonably permanent in their construction and are likely to become faulty, and those which lend themselves to, or which facilitate the perpetration of fraud. These objectives are truly laudable and may be regarded as cornerstones upon which the entire structure of weights and measures supervision is founded. To disregard the importance of any one of the three would result in a loss in the effectiveness of our work.

We appreciate the importance of the three objectives in the adoption of specifications regulating the manufacture and use in trade of scales, weights, and measuring devices—and I mean by the latter liquid-measuring devices other than standard liquid measures. Let us consider these objectives in relation to the manufacture and use in trade of liquid measures.

The first requisite is that these measures or devices be accurate and this of course is easily determined in instances where close adherence to the standards, as approved and recommended by the National Conference on Weights and Measures, is maintained. Nonstandard sizes do not easily lend themselves to a test to determine accuracy as I have previously illustrated. Inspectors of weights and measures naturally do not have in their possession standards for applying such tests and at the best, any test which might be applied, would be merely superficial. No measuring device should be tolerated, the accuracy of which cannot be readily determined by an inspector in possession of recognized and approved testing equipment.

A measure or container of nonstandard size, in all probability, could be made as permanent in its construction as standard size measures and I shall advance no argument in this connection.

In my opinion the strongest argument which can be advanced against nonstandard sizes is that they lend themselves to or facilitate the perpetration of fraud. Few persons can distinguish at a casual glance, the  $\frac{1}{2}$ -quart, the  $\frac{1}{2}$ -gallon and other confusing nonstandard sizes. Specification 2 of the Code of Specifications for Liquid Capacity Measures provides for a sufficient number of sizes to properly cope with any business transaction involving liquid measures without introduction of irregularities to our recognized code.

As a concrete example of the use of spurious liquid measures, I wish to discuss the  $\frac{1}{2}$ -quart milk bottle which size and necessary tolerance is not mentioned in the Milk Bottle Code. This code, which recognizes the sizes and tolerances as set out in the Code of Specifications for Liquid Capacity Measures has been adopted in Indiana. Milk bottles were strictly standardized to the end that when one of the most important and universal articles of food was sold, it should be properly sold, and because they were to be used as measures over and over again, of foods of special importance.

One of the reasons advanced to justify the use of  $\frac{1}{2}$ -quart milk bottles is that they enable the milk dealer to meet competition afforded by bottlers of soft drinks. Soft drinks and beverages are ordinarily bottled and regulated only as package goods, and any size of container may be used if properly marked with the contents; therefore these drinks are usually bottled in sizes which can be sold at a "magic" price, either 5 or 10 cents. It is the contention of milk dealers that present prices of milk do not justify its sale in standard-size bottles

when it is being sold for immediate drinking in factories, restaurants, and schools. They contend their customers do not care for a full pint of milk for quick consumption for two reasons: First, it is more milk than they care to drink at one time, and, second, they object to the odd penny sale which is often necessitated and which they profess is bothersome.

In conferences with milk dealers I have listened, as has probably every other State weights and measures official, to all the reasons advanced to justify the use of measures of nonstandard sizes and I still remain unconvinced of their practicability, insofar as customer protection is concerned. While each suggestion contains some merit, the all important question which is to be decided by weights and measures officials is—Is it to the advantage of the public that we insist on maintaining our standards? If our standards are broken down in one place what is to prevent their breaking down in another and probably less-suspected place.

If a  $\frac{1}{2}$ -quart size milk bottle and other nonstandard measures are provided as convenient containers the contents of which could be charged for at one or the other "magic" price of 5 or 10 cents, consistency might demand another size when the price of the commodity changed. This condition could be carried so far as to keep weights and measures officials busy changing their standards to meet current changes in prices of commodities.

An odd-size container, one which could not be properly classified as a measure, but one the use of which bore a close relationship to the use of nonstandard measures, made its appearance in Indiana a few years ago. This was a  $\frac{1}{2}$ -gallon ice-cream container introduced by some ice-cream manufacturers. The reason assigned for the introduction of this container was that because of its smaller size and shape it more readily fitted the freezing compartments of household refrigerators. In conducting an investigation of the use of the  $\frac{1}{2}$ -gallon container it was found, by making numerous purchases of ice cream, that the retail dealer often represented and sold the  $\frac{1}{2}$ -gallon container as a quart. I have used the above illustration to show the ridiculousness of some of the suggestions advanced in order to circumvent the standards. It is needless to say immediate steps were taken to break up this practice by calling to the attention of the ice-cream manufacturers the existence of a code of specifications regulating the size of ice-cream containers.

The 5- and 6-quart oil measures represent another perennial endeavor to introduce new sizes of liquid measures. To my knowledge measures of these sizes are not being used in Indiana, but I do understand they have made their appearance in some other jurisdictions. It is quite probable in the not distant future, efforts may be made to legalize containers of these sizes, but we should be hesitant in taking any such action as it would be another deviation from our accepted standards.

We should not lose sight of these truths—*our standards must be kept inviolate and must not be changed or evaded at the whims of a few individuals—commodity prices must be based on our accepted standards and not our standards based on commodity prices—standards may be perpetually maintained but commodity prices due to many reasons are continually changing.*

The tendency to depart from the standard units, which is done at the expense of customer protection, is one of the most dangerous

trends facing the weights and measures official. There is an old axiom with which we are all familiar, "a chain is no stronger than its weakest link", and this truth may well be applied to weights and measures administration. While the subject of my paper precludes the discussion, at great length, of problems of weights and measures inspectors other than those connected with liquid measures, I do wish to impress you with its close relationship to practically every function of weights and measures supervision. Such odd-size weights as the  $\frac{1}{2}$ - and  $\frac{3}{8}$ -pound weights and the manufacture of scales and liquid measuring devices graduated in units other than those recognized in existing codes tend toward the breaking down of existing standards.

We, in Indiana, are unalterably opposed to the use of liquid measures of nonstandard sizes and wish to commend the officials of the National Bureau of Standards and the National Conference on Weights and Measures for the stand taken by them in support of our existing standards. Every weights and measures official should lend his untiring support to a program designed to maintain and improve our standards. This course will, in no respect, work a hardship on equipment manufacturers but it will be responsible for greater consumer protection, the objective or goal of weights and measures officials.

At this time I want to express my appreciation to the chair for the honor conferred upon Indiana in having the invitation extended to us to appear on your program.

Mr. WILHELM. How soon will we get the report of this Conference?

Mr. HOLBROOK. Almost certainly not before January 1.

Mr. WILHELM. That seems like a long time.

Mr. HOLBROOK. I may say that it is gotten out of the National Bureau of Standards at the earliest possible moment. We cannot predict how long the Government Printing Office will take to produce it, and we do the best we can under those circumstances.

#### CITATION BY OFFICIALS OF IMPORTANT COURT DECISIONS IN THEIR JURISDICTIONS

Mr. ROLLIN MEEK. I brought to this Conference a report of a recent prosecution in Richmond, Ind., which I think is most outstanding. If the Conference would care to hear it, I would like to read it, otherwise I would be glad to pass it up.

The ACTING CHAIRMAN. Suppose you present it to the secretary and it will be embodied in the report.

SECRETARY'S NOTE.—A statement of the facts in the case is as follows:

The perpetration of an unusual method employed for the purpose of defrauding the public was discovered near Richmond, Ind., recently by local officials. A charge of obtaining money under false pretense was lodged against the two defendants, who pleaded guilty and were sentenced from 1 to 7 years in the State prison.

The defendants were caught operating a tractor-truck equipped with two hydraulic jacks; the one located in front of the fifth wheel was used in buying, and the one located back of the fifth wheel was used in selling. On using the front jack, a considerable amount of the weight of the trailer was transferred to the tractor. On selling, the back jack was used, throwing a proportionate amount of the weight of the tractor upon the scale. A heavy log chain weighing approximately 150 to 200 pounds was wrapped around the entire length of the front bumper to gain weight and to add leverage to the tractor. Two gages were located in the glove compartment on the dash, one a 10,000-pound and the other a 25,000-pound hydraulic.

Two men were always with the truck and on weighing one man would remain in the cab, keep the motor running and operate the jacks. The gages in full

view would readily show the operator of the jacks how much they were gaining on each load. On questioning, the men admitted that they would sometimes set the brakes on the trailer and let the clutch slide against the load which would increase the weight on the load platform. At the time of arrest the prevailing price of shelled corn was \$1.37 per bushel and the men admitted, with the aid of the jacks, that they were able to obtain a fraudulent profit of between \$50 and \$60 per load.

The entire hydraulic-jack system was hidden from view, being enclosed in a sheet-metal case. A piece of canvas was placed across the front end and extended around to the sides, which was approximately 18 inches wide and of triple thickness. The jack equipment could not be seen unless one was really looking for it.

The jack equipment was confiscated by Carl J. Kutter, City Inspector of Richmond, who assisted in the investigation.

#### REPORT OF COMMITTEE ON NOMINATIONS, PRESENTED BY JOHN P. McBRIDE, CHAIRMAN, AND ELECTION OF OFFICERS

Your Nominating Committee respectfully submits the following names for the designated offices:

For President, Lyman J. Briggs; Vice Presidents, Rollin E. Meek, W. S. Bussey, C. J. P. Cullen, John J. Levitt; Secretary, F. S. Holbrook; Treasurer, George F. Austin, Jr.

For members of the Executive Committee, C. E. Tucker, William C. Witfoth, K. K. Solberg, Howard E. Crawford, H. N. Davis, C. L. Klocker, S. T. Griffith, James O'Keefe, B. W. Ragland, George M. Roberts, Louis G. Waldman, George Warner, S. H. Wilson, James Boyle, James Sweeney, Charles C. Read, and Charles H. Bulson.

(Signed) JOHN P. McBRIDE, Massachusetts, *Chairman*,  
CHARLES H. BULSON, Jefferson Co., New York,  
C. B. TOLAN, Fort Wayne, Indiana,  
B. W. RAGLAND, Richmond, Va.,  
H. N. DAVIS, Vermont,  
C. E. TUCKER, California,

*Committee on Nominations.*

(It was moved and seconded that the report be adopted, the question was taken, and the motion was agreed to. Accordingly, the gentlemen nominated by the Committee on Nominations were duly elected to the respective offices.)

The CHAIRMAN. At this time the Resolutions Committee will make its report. I would appreciate it if Vice President Levitt would come to the platform and take the chair.

(At this point Mr. Levitt, Vice President of the Conference, assumed the Chair.)

#### REPORT OF COMMITTEE ON RESOLUTIONS, PRESENTED BY JOHN J. LEVITT, AND ADOPTION OF RESOLUTIONS

##### APPRECIATION TO DIRECTOR AND STAFF OF THE NATIONAL BUREAU OF STANDARDS

Whereas Dr. Lyman J. Briggs, F. S. Holbrook, R. W. Smith, and their able and efficient staff have extended valuable assistance and guidance to this Conference, of which the Conference is highly appreciative: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures, does hereby record its grateful appreciation to the above-named gentlemen.

##### APPRECIATION TO MANAGEMENT OF HEADQUARTERS HOTEL

Whereas the Management of the Hotel Raleigh has done everything within its power to make our present meeting the success which it has been: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures, assembled at the Hotel Raleigh in Washington, D. C., this 4th day of June 1937, does express its warmest appreciation and thanks to the management of the said hotel for the careful provisions made for our meeting; and be it further

*Resolved*, That the Secretary of the Conference be instructed to transmit a copy of this resolution to the management of the Hotel Raleigh.

IN MEMORY OF DECEASED MEMBERS

Whereas during the past year we have lost through the plan of Divine Providence several members of this Conference; and

Whereas our association with these departed brothers has been an inspiration to us to continue with greater determination toward the ideals set by them: Therefore be it

*Resolved*, That we of the Twenty-seventh National Conference on Weights and Measures, hereby record this expression of sincere sorrow at the loss of these brothers.

APPRECIATION TO THE PRESS AND TO THE SCALE JOURNAL

Whereas the press of the city of Washington has been generous in reporting the activities of our present meeting; and

Whereas the Scale Journal has been likewise generous in giving advance notices of our present meeting: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures, does hereby record its grateful appreciation to the press of Washington and to the Scale Journal.

ENDORSEMENT OF PROPOSED BILL TO FIX THE STANDARDS OF WEIGHTS AND MEASURES OF THE UNITED STATES

Whereas our President, Dr. Lyman J. Briggs, has formally called to our attention a proposed bill to fix the standards of weight and measure of the United States, and

Whereas this Conference is of the opinion that the proposed bill should be adopted and passed by the Congress: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures, does hereby fully endorse the proposed bill as reported to the Conference by Dr. Briggs, and does urge its passage; and be it further

*Resolved*, That copies of this resolution be transmitted by our Secretary to the appropriate committees of Congress.

APPRECIATION TO OFFICIALS COOPERATING

Whereas the Governors and the county and city officials of the various States, through their manifest interest in weights and measures work, have made it possible for their respective jurisdictions to be represented at this, the Twenty-seventh National Conference on Weights and Measures, and

Whereas such cooperation and attendance have in a most practical way furthered uniformity in regulations for the various jurisdictions and have otherwise assisted the general good of the work: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures, does appreciate such practical cooperation and does make this resolution a part of the record of its meeting.

ENDORSEMENT OF PROPOSED FEDERAL LEGISLATION FOR STANDARDIZATION OF PACKAGES FOR CANNED FOODSTUFFS (H. R. 6964)

Whereas our attention has been formally called to certain needed legislation with reference to the standardization of packages for canned foodstuffs, and

Whereas Hon. Harry Sauthoff, Member of Congress from Wisconsin, has introduced in the Congress a bill, known as H. R. 6964, which is intended to accomplish the necessary control of this matter in a manner consistent with the beliefs of this Conference: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures does hereby record its hearty endorsement of the bill known as H. R. 6964; and be it further

*Resolved*, That a copy of this resolution be transmitted by our Secretary to both the Committee on Coinage, Weights, and Measures and the Hon. Harry Sauthoff.

**ENDORSEMENT OF PRINCIPLE OF GENERAL STANDARDIZATION OF PACKAGED GOODS**

Whereas we have knowledge of the benefit which would accrue from a standardization of all packaged goods: Therefore be it

*Resolved*, That this, the Twenty-seventh National Conference on Weights and Measures, does hereby record its sincere belief that a general standardization of packaged goods is greatly to be desired, and does direct its Executive Committee to consider ways and means of accomplishing this and, at the same time, of eliminating the so-called slack-filled package.

**REGULATION OF USED COMMERCIAL WEIGHING DEVICES, AND LICENSING OF SCALE REPAIRMEN**

Whereas there have come to the attention of this Conference certain abuses in the resale and reinstallation of used commercial weighing devices, and

Whereas consideration of the available facts indicates clearly the necessity for closer supervision over such equipment and its resale and reinstallation: Therefore be it

*Resolved*, That it is the sense of this, the Twenty-seventh National Conference on Weights and Measures, that the sale, resale, and reinstallation of all used commercial weighing devices should be subject to strict regulation by the weights and measures official having jurisdiction at the proposed place of use; and be it further

*Resolved*, That, as a further means of accomplishing this end, all scale repairmen should be subjected to a qualifying examination and should be registered and licensed.

**MODIFICATION OF SPECIFICATIONS FOR SMALL-CAPACITY SPRING SCALES**

Whereas the small-capacity spring scale commonly used by hucksters, peddlers, produce merchants, and grocers, has been and is being cheapened by the manufacturers of this class of equipment to such an extent that the accuracy of this type of scale is being seriously impaired and its useful life so shortened as to offer more opportunities for fraud and be detrimental to the public good: Therefore be it

*Resolved*, That the Committee on Specifications and Tolerances of this, the Twenty-seventh National Conference on Weights and Measures, be hereby instructed to review the Conference specifications covering the above type of equipment and to report at the Twenty-eighth Conference its recommendations for any modifications in those specifications which will tend to improve the present condition.

(Signed) C. J. P. CULLEN, Pennsylvania, *Chairman*,  
L. J. ALLEN, Washington,  
C. D. BAUCOM, North Carolina,  
WILLIAM H. ISING, Kentucky,  
JOHN J. LEVITT, Illinois,  
CHARLES C. READ, New Jersey,  
ARTHUR J. WILHELM, Michigan,  
*Committee on Resolutions.*

(As each of the above resolutions was read, it was duly adopted, the third by a rising vote; an amendment was adopted in the case of the fifth resolution providing that it be referred to the appropriate committees of Congress and this material has been incorporated in the text given above.)

The ACTING CHAIRMAN. Gentlemen, on behalf of the Resolutions Committee I want to express our appreciation for the assistance given by the different members of the Conference in aiding us to draw up these resolutions. We also thank you for your cooperation in accepting the resolutions as presented.

**RESOLUTION IN RELATION TO LABELING ELECTRIC-LIGHT BULBS**

The ACTING CHAIRMAN. I also have a resolution which has been handed to the chair. I will read the resolution which was presented from the floor.

Whereas the purpose of weights and measures activities is to protect purchasers and/or consumers; and

Whereas the electric-light bulb or lamp is a device designed for the purpose of emanating light rather than for the consumption of energy; and

Whereas the value of light so emanated does not appear on the principal label, stamp, or marking of the electric-light bulb or lamp as now being offered for sale, sold, or distributed: Therefore be it

*Resolved*, That the Twenty-seventh National Conference on Weights and Measures go on record declaring that in order to protect the consumers of electric light a condition exists necessitating labeling, branding, or stamping on each and every electric-light bulb or lamp the illuminating value in terms of lumens or candlepower in total or per unit of energy consumed, and request that the United States Department of Commerce, through the National Bureau of Standards and/or other Government agencies, set in motion such machinery as necessary to effect the labeling as herein defined; and be it further

*Resolved*, That a copy of this resolution be sent to the United States Department of Commerce.

The ACTING CHAIRMAN. Are there any comments on this resolution?

Mr. HOLBROOK. I move that that be laid on the table. It seems to me that such a resolution as that should have come regularly through the Resolutions Committee so that it would have had prior consideration.

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

Mr. CULLEN. Gentlemen, I wish to refer to the resolution just presented and to offer an explanation so there won't be any misunderstanding.

At the meeting last evening Mr. Baucom mentioned and proposed this resolution. While it was not drawn up, the outline of it was discussed. This morning he came to me and to another member and we told him to draw the resolution up and present it, stating that he could discuss it from the floor. The Resolutions Committee was aware that this resolution was being presented, but we did not see the contents of it. There was nothing underhanded done and I want you to know that.

The ACTING CHAIRMAN. Mr. Cullen, the resolution has been voted upon. I am sorry I did not know the circumstances connected with it at the time, but it strikes me that electric-light bulbs are not a weights and measures proposition. I do not know whether the National Bureau of Standards considers it so or not, or whether they have some other division which takes care of that. Mr. Holbrook could probably give us a little enlightenment on that subject.

Mr. HOLBROOK. The reason I made the motion to lay upon the table was that I considered that the time was insufficient to develop the desirability of the resolution and it did not seem that this Conference should pass such a resolution as that without extremely careful consideration. I think that if at some future Conference such a resolution is brought before the body when it can be thoroughly discussed, the Conference can at that time act upon it intelligently. The reasons for it would have to be very carefully developed, and the time now is insufficient to do that. I know absolutely nothing about the desirability of the resolution and I judge that most of the delegates here are in my situation. Perhaps Dr. Briggs would like to tell us something about the subject.

Dr. BRIGGS. Candlepower alone does not tell us anything about the efficiency of a lamp. Neither does the wattage. The ratio of these

two quantities is a measure of the efficiency. Lamps can easily be made that will have a specified candlepower and a long life and yet be very inefficient.

The Government purchases several million incandescent lamps annually. The contract specifies that the light output shall not be less than a certain number of lumens per watt. Tests made by the National Bureau of Standards in connection with these contracts show that the manufacturers are steadily increasing the efficiency of their lamps. There are many technical aspects to this subject, but if the Resolutions Committee feels that it comes within the scope of activities of the National Conference, the Bureau will give such technical assistance as may be desired.

A standard high-grade 50-watt lamp costs 15 cents and has an average life of 1,000 hours. Assuming electric power to cost 5 cents per kilowatt hour, the power bill for 1,000 hours would be \$2.50. The power bill is so much greater than the original cost of the lamp that it is most unwise to buy cheap, inefficient lamps, which use just as much power but give out less light.

Mr. BAUCOM. I would like to rise to a point of personal privilege. There seems to be an idea that I have slipped something over. It so happens that one member of the Committee last night was not present when these resolutions were drawn. I couldn't help that. We discussed this somewhat and the members spoke well of it and I was instructed to proceed to draw up the resolution as presented and have it ready by this morning. Well, you know the conditions that have existed, with everybody busy, and I read it over to Mr. Cullen and one or two others and it seemed to meet with their approval, and it was agreeable to them that it be submitted. It so happens that it did not get in with the resolutions that came up from the Committee.

Now, getting back to the point, I feel that when you buy electric-light bulbs you don't buy watts or voltage—you buy illumination. If a lamp does not give illumination in accordance with a standard that you have set up in your mind as being proper for a 100-watt lamp, you are being short-measured in light. You may think that a little far fetched, but if you follow through you will recognize that you are buying light, even though you are paying for wattage.

We also recognize that at the present time this country is being flooded with lamps made in a foreign country that are underselling our lamps. They do not give the illumination our lamps give, but they sell for 10 cents whereas our lamps cost 15 cents. We have no way of knowing how much light we are going to get for 100 watts on our meter, and the purpose of this resolution was to set in motion some investigation by the Bureau or the Department of Commerce, which would disclose the true value of the illumination you should get when you buy a 100-watt lamp. We know that some lamps marked 100 watts will probably consume 120, and their illuminating power is way below standard, yet we go right along and buy them every day. They burn out, and we are just victims of the situation.

The major illuminating engineers of the country are strongly in favor of something being done which will absolutely classify these lamps according to their true value. That was the purpose of the resolution. The intent was good, there was absolutely nothing done under cover, and I believe that in the course of time you will come to



realize and agree that we are not buying wattage when we buy lamps, but that we are buying illumination.

Mr. HOLBROOK. I don't think my motion to lay the resolution on the table can be construed as a criticism of anyone. I had no idea where the resolution came from. However the resolution seems to have produced the desired effect through the offer of Dr. Briggs to have the National Bureau of Standards cooperate with the Conference in further developing this subject at a future meeting.

Mr. GRIFFITH. I am quite sure the entire Conference is fully aware of the fact that the resolution was presented in good faith by Mr. Baucom. Nobody had any idea of any ulterior motives.

The ACTING CHAIRMAN. I want you to know that I did not know that you had presented the resolution. There is nothing personal about this. The resolution was just handed to me; I am sorry I didn't know about it. I hope it is cleared up to your satisfaction.

REPORT OF THE TREASURER, GEORGE F. AUSTIN, JR.

Receipts:

Balance on hand June 1, 1936.....	\$332. 19
June 11, 1936, dues, 1936 Conference.....	194. 00
Accrued interest.....	7. 54
<hr/>	
Total receipts.....	533. 73

Disbursements:

July 18, 1936. Stenographic services, 1936 Conference.....	\$10. 00
July 24, 1936. Messenger services, 1936 Conference.....	10. 00
July 26, 1936. Stenographic services, Resolutions Committee, 1936 Conference.....	3. 40
<hr/>	
Total disbursements.....	23. 40

Balance on hand June 1, 1937.....	510. 33
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(Signed) GEO. F. AUSTIN, JR., *Treasurer.*

(The report was duly accepted.)

Mr. McBRIDE. I make a motion to authorize payment of the customary expenditures incident to the conduct of this Conference, and also the special expenditure made this year by reason of the trip to Annapolis.

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

DATES FOR AND CONDUCT OF CONFERENCE

Mr. SWEENEY. I desire at this time to offer a suggestion that some consideration be given to an earlier meeting. I think we have all suffered a great deal from the heat during the past week, and I think it would be very nice if arrangements could be made to have the meeting a month earlier, so as to get the benefit of a little cooler weather and to have, during our stay here, a little more energy than we have possessed during the past week. I offer that as a suggestion and I hope it will be considered.

While I am on my feet, I would like to offer another suggestion, and that is that the valuable part of this Conference is the discussion on specifications and tolerances, and I would suggest that arrangements be made in the future that those items be taken up in the

early part of the Conference and not on the last day, because of the fact that everyone seems desirous of getting away and full time is not given to the consideration of the various items.

Mr. HOLBROOK. In relation to those two items, I may say that the date of the Conference is upon the heads of those who attended the last Conference. After the last Conference we sent a questionnaire to each official delegate asking him to suggest a time of meeting, and the majority of delegates voted for the first week in June.

Now, in relation to the second question, it has several times been suggested that the delegates did not have enough opportunity to study the report of the Committee on Specifications and Tolerances before it was presented to the Conference. The Committee on Specifications and Tolerances is enabled to meet only once a year, in the 4 days immediately preceding the Conference, and it then issues its report in mimeographed form. This year the report was available on Wednesday morning. Now the expressed desire of the delegates formerly has been that they have that report in their hands as long as possible to give them an opportunity to familiarize themselves with the amendments which will come up. Therefore, it seemed logical, in order to give the delegates sufficient time, that the report of the Committee be given on the morning of the last day.

I may say, with regard to the desire of the delegates to get home, that this is distinctly a 4-day Conference and the last day is, in our consideration, just as important as the first, second, and third days. We think that the delegates should stay over for the last session or cut the Conference down to a shorter period of time.

The ACTING CHAIRMAN. Mr. Sweeney, you offered that as a suggestion. I am sure that the Executive Committee and the others in charge will consider your suggestions for what they are worth.

SECRETARY'S NOTE.—In connection with the above discussion it may be mentioned that in the programmed item "Report of the Secretary of the Conference", which was withdrawn on account of shortage of time, the following was to have been included:

Shortly after the meeting of the Twenty-Sixth National Conference on Weights and Measures held in June 1936 a questionnaire was sent out to the weights and measures officials in attendance, designed to elicit information which would be helpful in the arrangement and conduct of future meetings. Seventy-three officials filled out and returned their sheets. For the information of the delegates the results are presented below:

69 officials favored annual meetings, while 4 expressed a desire for biennial meetings.

60 believed the meeting should be scheduled for 4 days, while 13 favored a 3-day session.

60 were in favor of the setting aside of  $\frac{1}{2}$  day for a tour of Bureau laboratories, while 12 voted against this.

65 favored the retention of the customary reports of State delegates and representatives of State associations, one or two qualifying their replies; 8 were in favor of dropping this program item.

63 favored the retention of the program item, "Demonstration of Recent Developments in Weighing and Measuring Apparatus by Representatives of Manufacturers" and the exhibit held in connection therewith; 5 were opposed to this item.

70 voted in favor of the continuation of the program item, "General Consideration of Subjects of Interest and Questions Brought up for Discussion by Officials"; only 2 would dispense with this.

As to the time recommended to be assigned to this item there was a considerable divergence of opinion. 16 suggested periods of from 1 to 2 hours; 7, 2 to 3 hours; 21,  $\frac{1}{2}$  day; 1, 1 day; 7 believed that as much time as was needed should be devoted to it. Scattered votes suggested " $\frac{1}{4}$  session", " $\frac{1}{4}$  time", " $\frac{1}{4}$  hour for each State delegate", and "10 minutes for each delegate."

On the question of the preferred week for the Conference sessions the vote was as follows:

1st week in June.....	42
(2 votes coupled with this, the 2d week in June.)	
One of the last 2 weeks in May.....	16
2d week in June.....	6

One or two votes each were received for the following: "April or early May", "after June 1st", "Fall or winter", and "3d week in June."

PAPER CONTAINERS FOR MILK

Mr. KRENGEL. Within the last year or two a new container made its appearance on the market—a paper container for milk. In communicating with various State officials we find that different attitudes are taken by different officials with regard to the container. There are a number of them made by a number of firms. The container is used only once—as a wrapper around a certain predetermined quantity of milk which is measured by machine. I would like to leave the thought with you that it should be decided whether a container of that type should comply with the specifications established for the glass bottle or whether it should be regarded as a wrapper for milk.

Mr. HOLBROOK. The specifications and tolerances of the Conference in relation to milk bottles regulate only such packages as are used as measures in the sale of milk.

Now the ordinary glass bottle is a measure, because the capacity of the bottle itself determines the amount of milk which will be put into the bottle. In other words, the quantity of milk is not premeasured in any way; the milk is put into the bottle, the filling machine cuts off the milk at a certain predetermined point, and delivery is made accordingly. Some of the paper containers are used as measures in that way. The container itself is the only measure which is used in determining the amount of milk, and those containers are regulated by the Conference code.

There is another type of container which is entirely different. It is used in connection with a machine which predetermines the amount of milk, and that predetermined amount of milk is poured into the container. In the opinion of the Committee on Specifications and Tolerances that character of container is not used as a measure and is not regulated by our present code. In other words, a predetermined quart of milk is put into one of these containers, the package is labeled and sold as a quart, and the Committee on Specifications and Tolerances believes that that is a package and that it should be regulated as all other package goods are regulated.

Mr. GRIFFITH. Mr. Chairman, perhaps I can throw some light on the subject, having just recently had experience with the paper package mentioned particularly by the gentleman who spoke from the floor, which is a package only, the amount of milk being predetermined. But in drawing up regulations for paper milk containers or bottles you have to give consideration to all classes in order to meet the situation involved. As Mr. Holbrook mentioned, some paper containers are measures themselves and they of course must comply strictly with the code now in force on glass bottles. The introduction into our market in Maryland recently of the paper package the gentleman spoke of, however, involves a commodity which is so commonly used and is so vital that our city administration desired, since there were no regula-

tions, as I told them, that we should draw such regulations as nearly as possible approximating the present regulations on the milk bottle. That being so, we drew up a set of regulations and I think they are reasonable, because a great deal of latitude has been given. A copy of them will be furnished anyone desiring them if they will request it of me. The Conference Committee on Specifications and Tolerances has a copy and it suggested some of the items we had included in it.

The ACTING CHAIRMAN. I think your question will be considered by the Committee on Specifications and Tolerances.

Mr. ALLEN. Speaking on that point, the secretary mentioned that those machines that gave a predetermined quantity placed packages outside of the category of measures. The question arose in my mind as to how we are going to determine whether the bottles are filled by one machine or another when there is a large number of dairies using the container. Recently I had this matter called to my attention, and I made a number of tests. There was even a greater variation in the capacity of these paper bottles than there was in the capacity of the glass bottles.

I immediately wrote to the manufacturers' representatives, notifying them they would have to comply with the specifications for milk bottles. It seems to me that even though these are used but once they are a container for a quart of milk, and they come under the classification of measures. Certainly if a person today gets a glass bottle presumed to be a quart or a pint and tomorrow gets a paper bottle presumed to be a quart or a pint, they should contain the same quantity of milk.

The ACTING CHAIRMAN. Is there any further discussion? Are there any further items of business?

(A motion was made and seconded that the Conference adjourn, the question was taken, and the motion was agreed to.)

(Thereupon, at 1:20 p.m., the Twenty-seventh National Conference on Weights and Measures adjourned sine die.)

## APPENDIX

### DATA ON THE VEHICLE-SCALE TESTING UNIT OF THE NATIONAL BUREAU OF STANDARDS, AND ON RECORDS AND REPORTS PREPARED IN CONNECTION THEREWITH

There is here presented some of the material distributed at the Conference in connection with the paper on "Results of Tests of Vehicle Scales made with National Bureau of Standards Equipment in Program of Cooperation with States", which paper appears on pages 46 to 53 of this report.

Dimensional and other data on the vehicle-scale testing unit are as follows:

Number of axles.....	3
Number of tires.....	10
Size of tires.....	9.75×20
Normal wheel base.....	202½ in.
Wheelbase of two rear axles.....	45 in.
Wheelbase, front to rear axles.....	225 in.
Gross weight (approx.).....	40,000 lb.
Front-axle load (approx.).....	8,500 lb.
Rear-axle load (approx.).....	15,500 lb.
Load per inch of tire width (approx.).....	400 lb.
Over-all height.....	129 in. (10 ft 9 in.)
Over-all body width.....	97 in. (8 ft 1 in.)
Over-all body length (bumper to bumper).....	290 in. (24 ft 2 in.)
Over-all length (front bumper to end of boom).....	350 in. (29 ft 2 in.)

The unit comprises a motortruck upon which is mounted a power-operated, horizontal-boom crane. The primary load consists of fifteen 1,000-lb test weights; small weights, a two-wheel weight-handling cart, tools, and testing accessories are also carried. The regular crew consists of two men.

The truck carries red flags and three kerosene flares, and is equipped with road lights and clearance lights and reflectors as specified in the recommendations of the National Highway Users Conference.

The unit travels under license plates "National Bureau of Standards, Department of Commerce, U. S.—1."

The inserts which follow are typical test and inspection records prepared in the field, and typical reports on accurate and inaccurate vehicle scales as issued by the National Bureau of Standards to scale owners and to the weights and measures officials in whose jurisdictions the scales are located. The test and inspection sheets are facsimile reproductions of the official records on one of the routine tests made by the testing unit, except that blank forms have been substituted for those portions of the sheets on which are entered data which would serve to identify the particular scale in question. The two reports are copies of reports issued in normal course, the inaccurate scale being the one for which the field data are shown on the test and inspection records. The "Supplement" appearing on the reverse of the report forms outlines test procedure, tolerances, SR requirements, and other information in connection with vehicle scales; this supplement is the one in current use and embodies the changes agreed upon by the Twenty-seventh National Conference on Weights and Measures. It may also be noted that the face of each report form as here presented, differs slightly from the form originally used, and that some changes have recently been made in the inspection report, as compared with the form here presented, in order to provide for the ready entry of a few additional items of information.



Test No.

UNITED STATES DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS

Sheet No. ....

Test begun .....

Test ended .....

VEHICLE-SCALE TEST RECORD

Form 250  
....., 19.....

Observer.....

Place ..... Address .....

Owner ..... Scale designation .....

Original report to ..... (Name) (Street address) (Post office)

Copy of report to ..... (Name) (Street address) (Post office)

Weather conditions .....

Character W-T-S	Position L-R-N-F T-D	LOAD		INDICATIONS			ERROR	SE	REMARKS
		Test weights	Balancing weights	Weightbeam	Reading face	Counterpoise weights			
		Initial balance			-10*				
		0	50	0					Balanced
		0	67	0				17	
W	R	4000	96	4000			-46		
W	R	4000	98	F990 3000					F-12
W	R	8000	100	8000			-50		
W	R	8000	97	F990 7000					F-7
W	R	15000	89	15000			-39		
W	L <sup>R</sup>	15000	79	15000			-29		
W	L <sup>R</sup>	15000	96	15000				17	
W	L	15000	82	15000			-32		
W	L	8000	78	8000			-28		
W	L	4000	85	4000			-35		
		0	87	0					B.C.-37
T	R	0	55	23140					Gas 5*
T	L	0	50	23190					
WT	L	8000	50	31040			-150	-149	
WT	L	15000	50	37900			-290	-286	
WT	L	15000	65	37900				15	
WT	R	15000	60	38120			-25	-263	Gas 2*

W=Test weights; T=Carrying truck; S=Other strain load; L=Left; R=Right; N=Near; F=Far; D=Distributed.

U.S. GOVERNMENT PRINTING OFFICE

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UNITED STATES DEPARTMENT OF COMMERCE  
 NATIONAL BUREAU OF STANDARDS  
 VEHICLE - SCALE INSPECTION RECORD

NOV 1936

C 798  
 (Inspector)

(Owner's representative)

SCALE DATA

(W. & M. official present)

(Position)

Make	Type	Shop No.
Installed Date	By	Material weighed
Character of vehicles	Range of tare weights	Range of gross weights
Regularly tested by	Last test Date	Result
Last repairs Date	By	Kind

*MT*  
*Prior 1927*  
*Trucks + Wagons*  
*City*  
*None*  
*1000 - 12000*  
*Oct 1936*  
*Misc (Master Scale)*  
*2000 - 30000*  
*O.K.*

Lever system	Straight or Forston Levers	Indicating elements	Recording or Nonrecording Weighbeam
	A or RR Pattern		Open or Unit Wts.
	Rigid or Suspension Bearings		Main Bar
	When Extensions		Tare Bar
Pivot Protection	Reading Face	Platform	Enclosed in
Accessibility	Size		Material
Character	Weatherguards		Approaches
Drainage	Lever Foundations		

*GREASE*  
*Good*  
*Scale house*  
*40000 x 1000 - 990 x 10*  
*20' x 9'*  
*Plank*  
*None*  
*Sharp incline, curve, both ends*

Adjustments this date *NONE*  
 Modifications this date \_\_\_\_\_

INSPECTION REPORT

Fractional poise rack bar is broken near center of bar, and is loosely held together by the screws which hold it to the fractional poise. Part of a tooth of the rack bar is broken out at the break, and the poise sticks and binds when moved past 500 on the indicator. Weighbeam notches are dirty. Platform planks are slightly rotted. Scale pit and scale parts, pivots and bearings dirty. Structural steel rusting. Bearing suspension assemblies at near left and at right corners are badly out of plumb, and suspension bolt in both of these assemblies is not seated in proper position on the rocker block, causing a bind both of these assemblies.

Recommend overhaul of main and fractional poises, replacing the broken rack bar with a new one. Recommend weighbeam notches be kept clean, all scale parts and pit be cleaned; lever system should be repainted, and pivots and bearings repacked with grease; recommend that out of plumb conditions of bearing assemblies be corrected, and suspension bolts correctly seated on their rocker blocks.

See report #136



## National Bureau of Standards

## REPORT OF VEHICLE SCALE TEST

Scale owner:

Date of test:

Scale location:

Test number:

Scale description: 40,000-pound \_\_\_\_\_ Motor-Truck Scale

The scale was tested with standard weights in an amount of 15,000 pounds in combination with a strain load of approximately 23,000 pounds.

The scale was found \_\_\_\_\_ to be sufficiently sensitive, the maximum SR being 17 pounds. (The maximum allowable value for the SR of this scale is 20 pounds.)

The scale was found to be inaccurate; its weighing performance is indicated by the results reported below, selected from the complete test data.

## TEST RESULTS

ELEMENT UNDER TEST	TEST LOAD		STRAIN LOAD	ERROR	
	Position	Pounds	Pounds (Approximate)	Pounds	Percent
Weighbeam	Right end	4000		-46	-1.15
"	"	8000		-50	-0.62
"	"	15000		-39	-0.26
"	Left end	4000		-35	-0.88
"	"	8000		-28	-0.35
"	"	15000		-32	-0.21
"	Distributed	15000		-29	
"	Left end	8000	23000	-149	-1.86
"	"	15000	23000	-288	-1.92
"	Right end	15000	23000	-23	

The fractional weighbeam bar was separately checked and its indications were found to be in error by approximately 10 pounds per thousand, the weighing error being in the minus direction.

At the conclusion of the first portion of the test reported above, before the application of the strain load, the scale was found to have shifted its zero balance by about -37 pounds. At the end of the test there was noted a further balance shift of -7 pounds.

As found, the scale had a zero balance error of -10 pounds.

[See the reverse side of this sheet for an outline of the test method and a statement of the applicable tolerances and SR limits]

U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
WASHINGTON, D. C.

SUPPLEMENT TO REPORT OF VEHICLE-SCALE TEST

1. *Test loads.*—The total test-weight load available consists of fifteen 1,000-pound weights. The strain load consists of a vehicle, placed on the scale platform to put the scale parts and structure under an initial load preparatory to a reapplication of the test weights; in the case of a scale of very large capacity, strain loads of different weights may be applied, if deemed necessary.

2. *Test method.*—The regular test of a vehicle scale of a capacity of 40,000 pounds or more, consists of (a) the application of test-weight loads up to 15,000 pounds, at each end of the scale and divided between the ends; (b) the application of a strain load consisting of the carrying truck, balanced first with its rear wheels on one end of the scale platform and then with its position reversed; (c) the reapplication of the full test-weight load, by loading the weights into the carrying truck; and (d) reversal of the position of the loaded truck to place its rear wheels on the opposite end of the platform. If the nominal capacity of the scale is less than the combined weight of carrying truck and test weights, the number of weights reapplied as in (c) above will be so limited that the total load will not exceed the nominal scale capacity, and, if necessary and practicable, a strain load of lesser weight will be utilized. In the case of scales of relatively small capacity, the initial test-weight load is appropriately reduced and the strain load is omitted. The several elements of the scale are separately checked. In the case of a scale utilizing counterpoise weights the ratio errors of the scale are determined by using standard weights at the tip of the weighbeam, the scale counterpoise weights being separately tested on a balance against standard weights.

In the test of a wagon scale, the foregoing procedure is further modified to adapt it to such a scale; for example, end loading is restricted to one-half the nominal scale capacity and corner tests may be made in certain cases.

3. *Errors.*—The amount by which the scale indication differs from the value of the applied test-weight load is the error of the element or elements being tested, for the given position and for the test-weight load being utilized. If the scale indication exceeds the value of the test-weight load, the error is designated as plus (+); if the scale indication is less than the value of the test-weight load, the error is designated as minus (-). If a counterpoise weight is heavier than standard value, its error is designated as plus (+), and if it is lighter than standard value its error is designated as minus (-). (A counterpoise weight having a plus error will cause a minus weighing error when it is used on a scale, and vice versa.)

4. *Tolerances on scales.*—A scale is reported as accurate when its indications conform to standard values within the appropriate tolerances:

(a) Tolerance on weighbeam, or on reading face (in combination with unit weights if these are utilized):  $\pm 0.20$  percent of the test-weight load being utilized, but with the appropriate minimum value following: On a beam scale or on beam of automatic-indicating scale; 5 pounds on each beam, when the minimum graduation of any beam with which the scale may be equipped is  $2\frac{1}{2}$  pounds or less; 10 pounds when such minimum graduation is 5 pounds or 10 pounds; 20 pounds when such minimum graduation is 20 pounds. On reading face of automatic-indicating scale; same values as above for equivalent minimum graduations on reading face.

(b) Tolerance on ratio of beam scales or automatic-indicating scales—applied to parts designed for use with manually removable counterpoise weights:  $\pm 0.15$  percent of the test-weight load being utilized, but with a minimum value computed as in paragraph (a) from the element having the smallest graduations.

In the case of new scales, that is, scales newly installed and being tested for the first time or for acceptance on contract, the applicable tolerances are one-half those given above, except that the minimum tolerance shall be a value equivalent to one-half of one of the minimum weighbeam or reading-face graduations. In the case of automatic-indicating scales used exclusively in the determination of freight charges, the applicable tolerances are twice those given above.

5. *Tolerances on counterpoise weights.*—A counterpoise weight is reported as accurate when its value conforms to standard value within the appropriate tolerance: One-half pound weight,  $\pm 3$  grains; one-pound weight,  $\pm 5$  grains; two-pound weight,  $\pm 8$  grains; four-pound weight,  $\pm 12$  grains; five-pound weight,  $\pm 13$  grains. In the case of new counterpoise weights, the applicable tolerances are one-half those given above.

6. *Sensitivity reciprocal (SR).*—SR is a measure of the sensitiveness of a scale; it is the amount of weight required to move the position of equilibrium of the weighbeam, pointer, or other indicating device of the scale a definite amount, at the capacity or at any lesser load. SR does not apply to scales utilizing reading faces which indicate directly in terms of weight.

The SR of a vehicle scale of the beam type is the change in load required to move the weighbeam from a position of equilibrium at the center of the trig loop to a position of equilibrium at the top or at the bottom of the trig loop, or if the scale is equipped with a device comprising an indicator cooperating with a single balance-indicating or "zero" graduation, or with a series of graduations which do not directly indicate weight values, the SR is the change in load required to move the indicator a specified distance from its position of equilibrium when the scale is in proper balance. A vehicle scale is reported as sufficiently sensitive if the maximum SR does not exceed the value of two of the minimum weighbeam graduations, except that the maximum SR allowable shall in no case be less than 10 pounds; in the case of a new scale the maximum SR shall not exceed one of the minimum weighbeam graduations.

7. *Identification of parts.*—When an observer is standing at the weighbeam or reading face of a scale and facing the platform, the "left" and "right" ends of the scale are those at the observer's left and right, respectively, and the "far" and "near" sides are, respectively, the one farther away from, and the one closer to, the observer.

8. *Regulations.*—The National Conference on Weights and Measures has adopted regulations providing: (a) That a scale shall not be used for weighing loads greater than its nominal or rated capacity; (b) that a scale shall be maintained in balance; (c) that a vehicle scale shall not be used for weighing loads of less than 1,000 pounds; and (d) that the value of the minimum weight graduations of a vehicle scale having a capacity of not more than 60,000 pounds, shall not exceed 20 pounds. These regulations are recommended by the National Bureau of Standards for adoption by the several States.

RESULTS OF INSPECTION AND RECOMMENDATIONS:

It was found on inspection of the scale that on the near side at the left end and on the far side at the right end of the scale the main bearing assemblies were badly out of plumb and the suspension bolts of the assemblies were not properly positioned on the rocker blocks, resulting in binding conditions at both points. It was also found that the scale pit, the lever system, and the pivots and bearings, were dirty, that the structural steel in the pit was rusting, that there were accumulations of dirt in the weighbeam notches, and that the weighbeam poise was in need of repair, the rack bar of the fractional poise having been broken. The platform planks were beginning to rot.

It is recommended that the scale pit and scale parts throughout be thoroughly cleaned and be maintained in clean condition. To protect the structural steel from deterioration this should be cleaned of rust and should be painted. The faulty conditions in the two bearing assemblies should be corrected. The weighbeam poise assembly should be reconditioned in a scale shop and resealed to correct value. At some convenient time suitable repairs should be made to the scale platform.

Following the repairs the scale should be retested and, if necessary, adjusted to weigh within approximately one-half the prescribed tolerance.

Insofar as practicable the approaches to the scale should be made straight and in the same plane as the scale platform for a reasonable distance at either end of the scale; where the approaches are inclined the scale assembly is subjected to unnecessary wear and possible derangement.

Lyman J. Briggs, Director

Washington, D. C.

THE HISTORY OF THE UNITED STATES

The first part of the book is devoted to the early history of the United States, from the discovery of the continent by Christopher Columbus in 1492 to the establishment of the first permanent English colonies in the early 17th century. This period is characterized by the gradual westward expansion of European settlement and the development of a distinct American identity.

The second part of the book covers the period from the American Revolution to the Civil War. This era is marked by the struggle for independence from British rule, the formation of the federal government, and the eventual secession of the Southern states. The Civil War, which lasted from 1861 to 1865, was a pivotal moment in American history, as it resolved the issue of slavery and preserved the Union.

The third part of the book discusses the Reconstruction period and the subsequent decades of the 19th century. This period saw the reintegration of the Southern states into the Union and the implementation of Reconstruction policies. It also covers the westward expansion, the gold rush, and the rise of industrialization and urbanization.

THE HISTORY OF THE UNITED STATES

THE HISTORY OF THE UNITED STATES

RWS:HER

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**National Bureau of Standards****REPORT OF VEHICLE SCALE TEST**

Scale owner:

Date of test:

Scale location:

Test number:

Scale description: 40,000-pound \_\_\_\_\_ Motor-Truck Scale - Shop No.

The scale was tested with standard weights in an amount of 15,000 pounds in combination with a strain load of approximately 23,000 pounds.

The scale was found \_\_\_\_\_ to be sufficiently sensitive, the maximum SR being 17 pounds. (The maximum allowable value for the SR of this scale is 20 pounds.)

The scale was found to be accurate within the applicable tolerances.

The fractional and tare weighbeam bars were separately checked and their indications were found to be in agreement with those of the main weighbeam bar.

There was found at the scale an improvised counterpoise weight marked to show that it had a counterpoise value of 4320 pounds. It is reported that this weight is used upon occasion to weigh loads in excess of the rated capacity of the scale. This weight is not of approved construction and upon test was found to be inaccurate. It is recommended that the weight be discarded.

**RESULTS OF INSPECTION AND RECOMMENDATIONS:**

The scale was found on inspection to have been very well installed and in general to be in a very good state of maintenance. The beam rod was found to be very slightly out of plumb and the two main-load bearing assemblies on the near side were slightly out of plumb; these conditions are not sufficiently serious to require attention at this time. Some accumulations of sand were found around the pivots and bearings of the lever system. It is suggested that these parts be cleaned and be then repacked with fresh grease. The installation of dirt shields over the load-bearing assemblies is suggested to prevent the accumulation of dirt on these parts.

Lyman J. Briggs, Director

Washington, D. C.

[See the reverse side of this sheet for an outline of the test method and a statement of the applicable tolerances and SR limits]

U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
WASHINGTON, D. C.

SUPPLEMENT TO REPORT OF VEHICLE-SCALE TEST

1. *Test loads.*—The total test-weight load available consists of fifteen 1,000-pound weights. The strain load consists of a vehicle, placed on the scale platform to put the scale parts and structure under an initial load preparatory to a reapplication of the test weights; in the case of a scale of very large capacity, strain loads of different weights may be applied, if deemed necessary.

2. *Test method.*—The regular test of a vehicle scale of a capacity of 40,000 pounds or more, consists of (a) the application of test-weight loads up to 15,000 pounds, at each end of the scale and divided between the ends; (b) the application of a strain load consisting of the carrying truck, balanced first with its rear wheels on one end of the scale platform and then with its position reversed; (c) the reapplication of the full test-weight load, by loading the weights into the carrying truck; and (d) reversal of the position of the loaded truck to place its rear wheels on the opposite end of the platform. If the nominal capacity of the scale is less than the combined weight of carrying truck and test weights, the number of weights reapplied as in (c) above will be so limited that the total load will not exceed the nominal scale capacity, and, if necessary and practicable, a strain load of lesser weight will be utilized. In the case of scales of relatively small capacity, the initial test-weight load is appropriately reduced and the strain load is omitted. The several elements of the scale are separately checked. In the case of a scale utilizing counterpoise weights the ratio errors of the scale are determined by using standard weights at the tip of the weighbeam, the scale counterpoise weights being separately tested on a balance against standard weights.

In the test of a wagon scale, the foregoing procedure is further modified to adapt it to such a scale; for example, end loading is restricted to one-half the nominal scale capacity and corner tests may be made in certain cases.

3. *Errors.*—The amount by which the scale indication differs from the value of the applied test-weight load is the error of the element or elements being tested, for the given position and for the test-weight load being utilized. If the scale indication exceeds the value of the test-weight load, the error is designated as plus (+); if the scale indication is less than the value of the test-weight load, the error is designated as minus (−). If a counterpoise weight is heavier than standard value, its error is designated as plus (+), and if it is lighter than standard value its error is designated as minus (−). (A counterpoise weight having a plus error will cause a minus weighing error when it is used on a scale, and vice versa.)

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(b) Tolerance on ratio of beam scales or automatic-indicating scales—applied to parts designed for use with manually removable counterpoise weights:  $\pm 0.15$  percent of the test-weight load being utilized, but with a minimum value computed as in paragraph (a) from the element having the smallest graduations.

In the case of new scales, that is, scales newly installed and being tested for the first time or for acceptance on contract, the applicable tolerances are one-half those given above, except that the minimum tolerance shall be a value equivalent to one-half of one of the minimum weighbeam or reading-face graduations. In the case of automatic-indicating scales used exclusively in the determination of freight charges, the applicable tolerances are twice those given above.

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6. *Sensibility reciprocal (SR).*—SR is a measure of the sensitiveness of a scale; it is the amount of weight required to move the position of equilibrium of the weighbeam, pointer, or other indicating device of the scale a definite amount, at the capacity or at any lesser load. SR does not apply to scales utilizing reading faces which indicate directly in terms of weight.

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