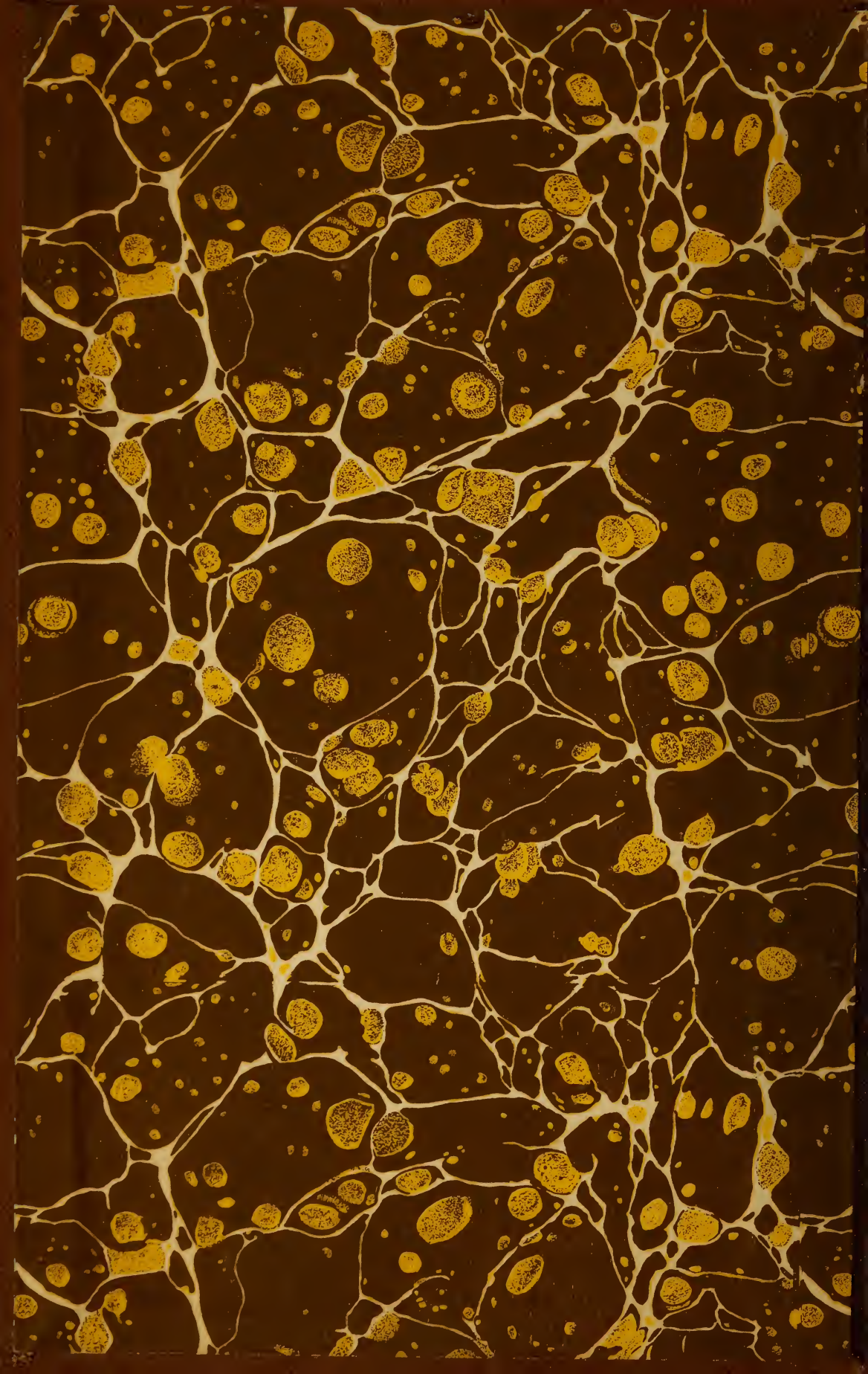
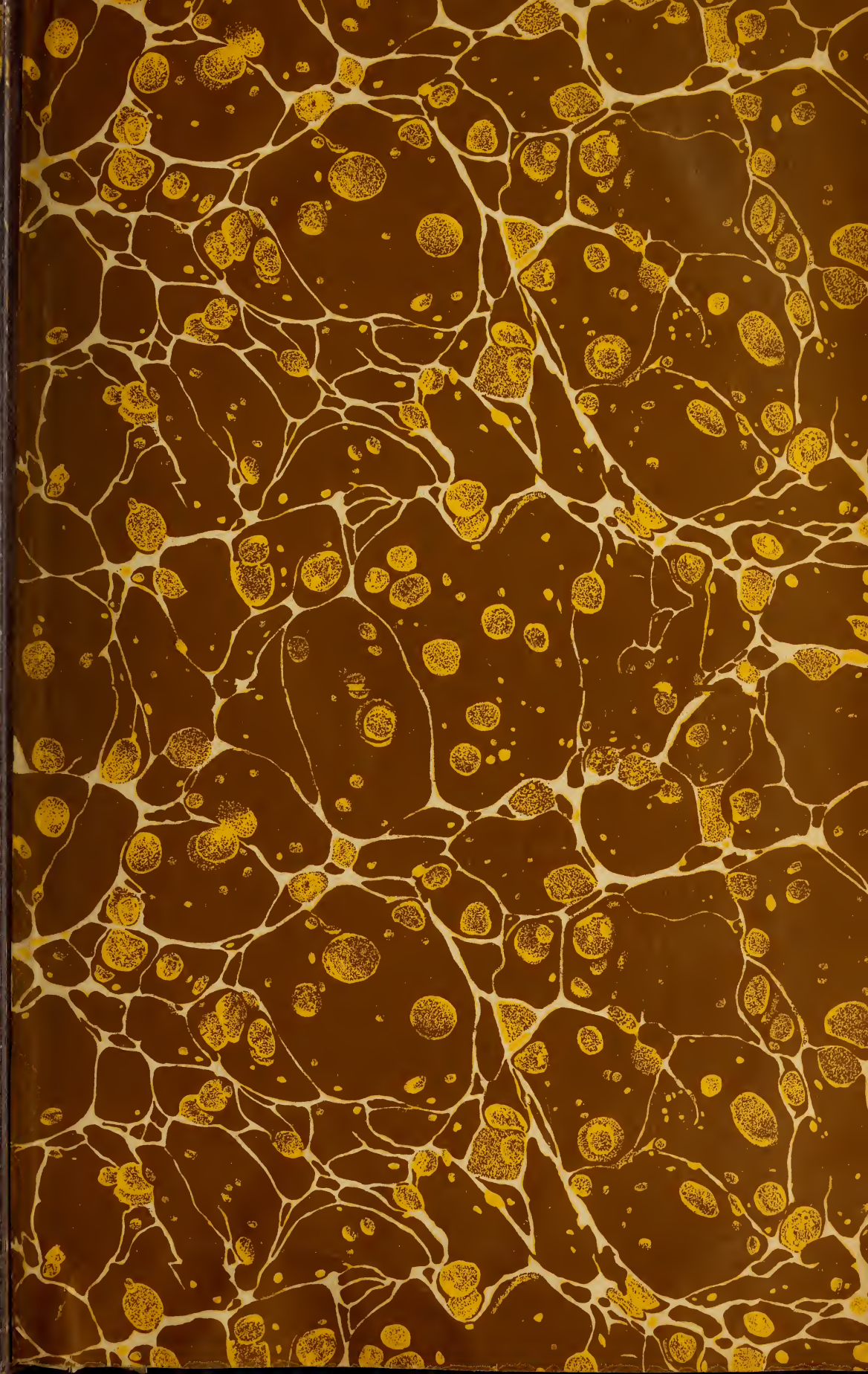


MISCELLANEOUS PUBLICATIONS
OF THE
BUREAU OF STANDARDS

NOS. 91-102





U. S. DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS

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

ATTENDED BY REPRESENTATIVES
FROM VARIOUS STATES

HELD AT THE BUREAU OF STANDARDS
WASHINGTON, D. C., JUNE 4, 5, 6, AND 7, 1929

MISCELLANEOUS PUBLICATIONS, BUREAU OF STANDARDS, No. 101

U. S. DEPARTMENT OF COMMERCE

R. P. LAMONT, Secretary

BUREAU OF STANDARDS

GEORGE K. BURGESS, Director

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1929

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I. L. MILLER, State commissioner of weights and measures, Indianapolis, Ind.

WILLIAM A. PAYNE, sealer of weights and measures of Monroe County, Rochester, N. Y.

B. W. RAGLAND, chief, bureau of weights and measures, Richmond, Va.

GEORGE M. ROBERTS, superintendent of weights, measures, and markets, Washington, D. C.

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HAROLD A. WEBSTER, State commissioner of weights and measures, Concord, N. H.

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A. W. SCHWARTZ, assistant State superintendent of weights and measures, Elizabeth, N. J.

I. L. MILLER, State commissioner of weights and measures, Indianapolis, Ind.

SPECIAL COMMITTEE ON UNIFORMITY IN WEIGHTS AND MEASURES
REQUIREMENTS

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V. A. BRADLEY, State superintendent of weights and measures, Nashville, Tenn.

WILLIAM F. CLUETT, chief deputy inspector of weights and measures, Chicago, Ill.

SEYMOUR JONES, State market agent, Salem, Oreg.

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

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

LIST OF PERSONS ATTENDING THE CONFERENCE

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City: Birmingham----- R. C. SHARP, inspector of weights and measures, 200 City Hall.

CALIFORNIA

City and county:
 Los Angeles----- CHARLES M. FULLER, sealer of weights and measures, 230 Court Street, Los Angeles.
 JOSEPH F. PARRISH, deputy sealer of weights and measures, 230 Court Street, Los Angeles.
 San Francisco----- THOMAS FLAHERTY, sealer of weights and measures, room 6, City Hall, San Francisco.

CONNECTICUT

State----- PHILIP T. PILON, deputy superintendent of weights and measures, 100 Washington Street, Hartford.
 City:
 Hartford----- LOUIS ELSNER, sealer of weights and measures, 550 Main Street.
 New Haven----- EDWARD J. MARONEY, sealer of weights and measures, City Hall.
 County:
 Fairfield----- WILLIAM H. BROWN, sealer of weights and measures, County Courthouse, Bridgeport.
 Hartford----- M. C. GRIFFIN, sealer of weights and measures, 225 Trumbull Street, Hartford.
 Middlesex----- G. ERNEST HUBBARD, sealer of weights and measures, county commissioners' office, Middletown.
 New Haven----- WILLIAM P. TYLER, sealer of weights and measures, County Courthouse, New Haven.

DELAWARE

County:
 New Castle----- HARRY F. NEWLIN, regulator of weights and measures, Wilmington.
 Sussex----- DALLAS M. ROGERS, regulator of weights and measures, Georgetown.

DISTRICT OF COLUMBIA

District----- GEORGE M. ROBERTS, superintendent of weights, measures, and markets, District Building, Washington.
 GEORGE A. HOWE, inspector of weights, measures, and markets, District Building, Washington.

FLORIDA

City: Miami----- W. H. GREEN, superintendent, division of weights and measures, 808 Courthouse.

GEORGIA

State----- S. H. WILSON, State oil chemist, room 37, State Capitol, Atlanta.

ILLINOIS

City: Chicago----- WILLIAM F. CLUETT, chief deputy inspector of weights and measures, room 608, City Hall.

INDIANA

State----- I. L. MILLER, commissioner of weights and measures, 201 Statehouse Annex, Indianapolis.

City:
 Fort Wayne----- C. B. TOLAN, inspector of weights and measures, City Hall.
 Indianapolis----- GROVER C. PARR, inspector of weights and measures, City Hall.

KENTUCKY

City: Louisville----- SAMUEL F. FOX, chief inspector of weights and measures, City Hall.

MAINE

State----- JOHN H. AUSTIN, deputy sealer of weights and measures, Augusta.

City:
 Portland----- C. V. FICKETT, sealer of weights and measures, City Building.
 Waterville----- WILLIAM A. JONES, sealer of weights and measures.

MARYLAND

State----- F. B. BOMBERGER, chief, department of markets, College Park.

S. B. SHAW, chief inspector, department of markets, College Park.

City: Baltimore----- S. T. GRIFFITH, chief, division of weights and measures, 1106 Municipal Building.

CHARLES G. CROCKETT, inspector of weights and measures, 1106 Municipal Building.

THOMAS J. NAFFEL, inspector of weights and measures, 1106 Municipal Building.

County: Washington----- D. FRANK MILLER, inspector of weights and measures, Boonsboro.

MASSACHUSETTS

State----- FRANCIS MEREDITH, director of standards, room 194, Statehouse, Boston.

ADELBERT L. JONES, inspector of standards, room 194, Statehouse, Boston.

JOHN P. MCBRIDE, inspector of standards, room 194, Statehouse, Boston.

City:
 Arlington----- ALLAN E. COWIE, sealer of weights and measures.
 Beverly----- ROBERT J. RAFFERTY, sealer of weights and measures.

Boston----- JAMES A. SWEENEY, sealer of weights and measures, City Hall Annex.

Cambridge----- FELIX C. MCBRIDE, sealer of weights and measures, City Building, Brattle Square.

Chicopee----- JAMES A. BAGLEY, sealer of weights and measures.

Feeding Hills----- EDWIN U. LEONARD, sealer of weights and measures.

Haverhill----- JOHN R. BOOTH, sealer of weights and measures.

Medford----- JOHN J. CAREW, sealer of weights and measures.

Springfield----- WILLIAM FOSTER, sealer of weights and measures, room 9, Administration Building.

Waltham----- FRED M. HAGGARTY, sealer of weights and measures, City Hall.

West Newton----- ANDREW PRIOR, sealer of weights and measures, City Hall.

MICHIGAN

| | |
|--------------------------|--|
| State----- | P. D. DUKESHERER, director, bureau of foods and standards, Lansing. |
| | L. P. STRONG, chief, division of weights and measures, Lansing. |
| City: | |
| Dearborn----- | CHARLES WEIMER, sealer of weights and measures. |
| Detroit----- | GEORGE F. AUSTIN, sealer of weights and measures, 1300 Beaubien Street. |
| | GEORGE F. AUSTIN, Jr., assistant supervisor, bureau of weights and measures, 1300 Beaubien Street. |
| | WILLIAM B. HEASLIP, investigator, bureau of weights and measures, 1300 Beaubien Street. |
| Flint----- | HENRY ECARIUS, sealer of weights and measures. |
| Hamtramck----- | FRANK STAWSKI, sealer of weights and measures, 2963 Dan Avenue. |
| Lansing----- | J. J. COOK, sealer of weights and measures. |
| City and County: Saginaw | GEORGE W. MAHN, sealer of weights and measures, City Hall. |

MINNESOTA

| | |
|------------|--|
| State----- | D. F. JURGENSEN, chief engineer, Railroad and Warehouse Commission, 20 New Capitol Building, St. Paul. |
|------------|--|

NEW HAMPSHIRE

| | |
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| State----- | H. A. WEBSTER, commissioner of weights and measures, Statehouse, Concord. |
| | E. P. JONES, inspector of weights and measures, Chester. |

NEW JERSEY

| | |
|------------------|---|
| State----- | J. HARRY FOLEY, superintendent of weights and measures, Trenton. |
| | ELLIOTT B. HOLTON, assistant superintendent of weights and measures, Trenton. |
| | HARRY S. PROVOST, assistant superintendent of weights and measures, Trenton. |
| | JOSEPH G. ROGERS, assistant superintendent of weights and measures, Trenton. |
| | A. W. SCHWARTZ, assistant superintendent of weights and measures, Elizabeth. |
| City: | |
| Bayonne----- | WALTER J. FLYNN, superintendent of weights and measures, Municipal Building. |
| Clifton----- | GARRET N. DEVRIES, superintendent of weights and measures. |
| Elizabeth----- | WILLIAM J. BENDER, superintendent of weights and measures, Harmonia Building. |
| Englewood----- | JAMES E. FITZGERALD, superintendent of weights and measures, City Hall. |
| Jersey City----- | JOHN S. BURKE, superintendent of weights and measures, City Hall. |
| Kearny----- | JOHN D. CASTLES, superintendent of weights and measures, Town Hall. |
| Newark----- | PATRICK J. CAUFIELD, superintendent of weights and measures, City Hall. |
| Trenton----- | FRANCIS J. BLACK, superintendent of weights and measures, City Hall. |

County:

| | |
|-----------------|--|
| Cape May----- | GILBERT S. SMITH, superintendent of weights and measures, Avalon. |
| Gloucester----- | WILLIAM P. ABDILL, superintendent of weights and measures, Woodbury. |
| Hudson----- | THOMAS J. WALDRON, superintendent of weights and measures, Courthouse, Jersey City. |
| Mercer----- | RALPH M. BODENWIESER, superintendent of weights and measures, Courthouse, Trenton. |
| Middlesex----- | JOSEPH FERTIG, superintendent of weights and measures, 184 Livingston Avenue, New Brunswick. |
| Monmouth----- | GLENN L. BERRY, superintendent of weights and measures, 706 Eighth Avenue, Asbury Park. ROBERT M. MARKS, assistant superintendent of weights and measures, Manasquan. |
| Morris----- | HENRY S. WORMAN, superintendent of weights and measures, Boonton. |
| Passaic----- | HARRY ROSENFELT, superintendent of weights and measures, Courthouse, Paterson. |
| Sussex----- | R. LEE SLATER, superintendent of weights and measures, Newton. |
| Union----- | ISAAC SEELEY, superintendent of weights and measures, Courthouse, Elizabeth. |

NEW YORK

City:

| | |
|-------------------|--|
| Rochester----- | M. J. MACK, assistant sealer of weights and measures, 34 Court Street. |
| White Plains----- | RICHARD HARDING, sealer of weights and measures, 19 Waldo Avenue. |

County:

| | |
|--------------|--|
| Albany----- | STANLEY WILLIAMS, sealer of weights and measures, Courthouse, Albany. |
| Monroe----- | J. E. DUNKLEE, deputy sealer of weights and measures, 305 Terminal Building, Rochester. RICHARD STANTON, deputy sealer of weights and measures, 305 Terminal Building, Rochester. |
| Steuben----- | E. CHARLES SMITH, sealer of weights and measures, Avoca. |
| Suffolk----- | C. P. SMITH, sealer of weights and measures, P. O. Box 981, Riverhead. |
| Warren----- | L. J. DEAN, sealer of weights and measures, 62 Elm Street, Glens Falls. |

NORTH CAROLINA

| | |
|------------|--|
| State----- | WILLIAM A. GRAHAM, commissioner of agriculture, Raleigh. |
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OHIO

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| City: Columbus----- | M. A. BRIDGE, sealer of weights and measures, 152 East Rich Street. |
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PENNSYLVANIA

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| State----- | ALBERT B. SMITH, director, bureau of standard weights and measures, Harrisburg. OSCAR B. BAKER, assistant director, bureau of standard weights and measures, Harrisburg. |
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City:

| | |
|-------------------|---|
| Allentown----- | B. FRANK RINN, inspector of weights and measures, City Hall. |
| Harrisburg----- | GEORGE B. NEBINGER, inspector of weights and measures, City Hall. |
| Philadelphia----- | THEO. A. SERAPHIN, district supervisor of weights and measures, 2017 Arch Street. |
| York----- | D. L. STOUCH, inspector of weights and measures, City Hall. |

County:

| | |
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| Allegheny----- | THOMAS L. HOWARD, chief inspector of weights and measures, Old Courthouse, Pittsburgh. |
| Franklin----- | G. W. BRYSON, inspector of weights and measures, Greencastle. |
| Lehigh----- | HARRY E. BIERY, inspector of weights and measures, Courthouse, Allentown. |
| Northampton----- | JOHN J. WEPPEL, inspector of weights and measures, Courthouse, Easton. |
| Pike----- | HARRY EAGER, inspector of weights and measures, Matamoras. |

TENNESSEE

| | |
|------------------------|--|
| State----- | V. A. BRADLEY, superintendent of weights and measures, Nashville. |
| City: Chattanooga----- | TOM F. MAHONEY, sealer of weights and measures, City Hall. |
| | HUGH EAGAR POWEL, assistant sealer of weights and measures, City Hall. |

VERMONT

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

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

WEST VIRGINIA

| | |
|------------|--|
| State----- | HOWARD S. JARRETT, commissioner of weights and measures, Charleston. |
| | P. R. EDLER, inspector of weights and measures, Charleston. |
| | P. T. SULLIVAN, inspector of weights and measures, Charleston. |

WISCONSIN

| | |
|----------------|---|
| City: | |
| Madison----- | H. L. THOMPSON, sealer of weights and measures, City Hall. |
| Milwaukee----- | WILLIAM F. STEINEL, sealer of weights and measures, 421 Fifth Street. |
| Racine----- | D. E. FITZGERALD, sealer of weights and measures, City Hall. |

OTHER DELEGATES, AND GUESTS APPEARING ON THE PROGRAM

| |
|--|
| ANDERSON, HERBERT L., chief examiner, Federal Trade Commission, Washington, D. C. |
| BEARCE, H. W., Bureau of Standards, Washington, D. C. |
| BEHRMANN, JOHN F., National Association of Retail Grocers, 78 Eton Road, Garden City, N. Y. |
| BURGESS, Dr. GEORGE K., Director, Bureau of Standards, Washington, D. C. |
| CAREY, L. C., marketing specialist, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C. |
| ELY, EDWIN W., Bureau of Standards, Washington, D. C. |
| GOULD, R. E., Bureau of Standards, Washington, D. C. |
| HOLBROOK, F. S., Bureau of Standards, Washington, D. C. |
| HOLMES, JOHN, vice president, Swift & Co., Chicago, Ill. |
| JUDSON, L. V., Bureau of Standards, Washington, D. C. |

KENNEDY, RIDGWAY, chairman, simplified practice committee, International Association of Ice Cream Manufacturers, 238 Lombard Street, Philadelphia, Pa.
 MILLER, D. R., Bureau of Standards, Washington, D. C.
 PARRY, WILLIAM, Bureau of Standards, Washington, D. C.
 PEPPER, E. L., Bureau of Standards, Washington, D. C.
 PIENKOWSKY, A. T., Bureau of Standards, Washington, D. C.
 RICHARD, C. L., United States Bureau of Standards Master Scale Depot, Clearing Station, Chicago, Ill.
 ROESER, H. M., United States Bureau of Standards Master Scale Depot, Clearing Station, Chicago, Ill.
 SCHMITZ, J. A., weighmaster, Chicago Board of Trade, Chicago, Ill.
 SENER, A. G., vice president, Sanitary Scale Co., 11 West Forty-second Street, New York, N. Y.
 SMITH, R. W., Bureau of Standards, Washington, D. C.
 SOUDER, WILMER, Bureau of Standards, Washington, D. C.
 STARR, M. H., consulting engineer, Howe Scale Co., 319 Woodward Avenue, Detroit, Mich.

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Allsteel Scale Co. (Inc.): HAROLD C. MITCHELL, president, 25 West Broadway, New York, N. Y.
 Becker, Christian (Inc.): C. A. BECKER, factory manager, 147 Eighth Street, Jersey City, N. J.
 Bennett Pumps Corporation: C. E. WEAVER, sales manager, gasoline pump division, Muskegon, Mich.
 Bowser, S. F., & Co. (Inc.):
 DAN. G. MILLIGAN, vice president, Fort Wayne, Ind.
 PAUL RENFREW, manager, research department, Fort Wayne, Ind.
 A. B. PAMPLIN, sales engineer, Fort Wayne, Ind.
 D. W. KINGSLEY, eastern manager, 67 West Forty-fourth Street, New York, N. Y.
 Buffalo Meter Co.: H. F. BARRETT, 2917 Main Street, Buffalo, N. Y.
 Buffalo Scale Co.: E. D. GORDON, chief engineer, 1200 Niagara Street, Buffalo, N. Y.
 Chatillon, John, & Sons:
 P. T. BORTELL, sales manager, 85 Cliff Street, New York, N. Y.
 J. GEORGE HUGEL, 85 Cliff Street, New York, N. Y.
 Columbia Scale Co.:
 CARL E. DARTT, president, 634 Whitlock Avenue, New York, N. Y.
 C. R. O'QUINN, Atlanta, Ga.
 Correct Measure Co.: JOHN R. FOSTER, president, Rochester, Pa.
 Erie Meter Systems (Inc.): G. W. MCDUGALL, sales manager, Erie, Pa.
 Exact Weight Scale Co.: JOHN G. SIMS, vice president, 265 West Spring Street, Columbus, Ohio.
 Fairbanks, E. & T., & Co.: A. BOUSFIELD, chief engineer, St. Johnsbury, Vt.
 Fairbanks, Morse & Co.:
 E. P. VROOME, sales engineer, 160 Varick Street, New York, N. Y.
 C. A. HENNIE, manager, scale department, 115 East Lombard Street, Baltimore, Md.
 Gilbert & Barker Manufacturing Co.:
 G. C. ROBERTS, general sales manager, Springfield, Mass.
 ALBERT L. GUTTERSON, assistant chief engineer, Springfield, Mass.
 W. A. WALKER, Springfield, Mass.
 Gurley, W. & L. E.: W. L. EGY, engineer, 514 Fulton Street, Troy, N. Y.
 Hollingshead, R. M., Co.:
 R. M. BAGLEY, vice president, Camden, N. J.
 A. B. GUSDORF, factory representative, Camden, N. J.
 Howe Scale Co.:
 M. H. STARR, consulting engineer, 319 Woodward Avenue, Detroit, Mich.
 C. A. LINDSAY, branch manager, 415 Arch Street, Philadelphia, Pa.
 International Business Machines Corporation:
 FRED J. BOUCHER, sales manager, Dayton Scale Co. division, New York, N. Y.
 HARRY S. EVANS, Washington manager, 816 Fourteenth Street NW., Washington, D. C.

Jacobs Bros. Co. (Inc.):

CHARLES RICHARD BRODY, assistant manager, 32 Walton Street, Brooklyn, N. Y.

R. W. CONNELL, southern representative, 615 Dunkirk Road, Baltimore, Md.
HARRY LIPPMAN, 32 Walton Street, Brooklyn, N. Y.

J. E. WOODLAND, sales manager, detectogram division, 32 Walton Street, Brooklyn, N. Y.

Measuregraph Co.: E. A. POWELL, service manager, 3905 Belle Avenue, Baltimore, Md.

Monumental Machine Co. (Inc.): FRANK L. SIMS, Baltimore, Md.

Moore & Kling (Inc.): ELMER M. KLING, treasurer, Boston, Mass.

National Meter Co.: JOHN J. MCKAGUE, 299 Broadway, New York, N. Y.

National Recording Pump Co.: J. P. HANNA, president, Dayton, Ohio.

Neptune Meter Co.: R. K. BLANCHARD, 50 East Forty-second Street, New York, N. Y.

Peerless Weighing Machine Co.: E. M. SCHIEMER, district manager, 245 Fifth Avenue, New York, N. Y.

Pennsylvania Pump Co.: F. P. RANDALL, sales manager, 240 West Walnut Lane, Philadelphia, Pa.

Pittsburgh Equitable Meter Co.:

ALLEN D. MACLEAN, chief engineer, 400 North Lexington Avenue, Pittsburgh, Pa.

HORACE CHRISMAN, engineer, Pittsburgh, Pa.

LYON McCANDLESS, research engineer, 400 North Lexington Avenue, Pittsburgh, Pa.

Repal Brass Manufacturing Co.:

T. E. HERLIHY, Los Angeles, Calif.

J. L. WINTER, salesman, 3107 Grove Avenue, Richmond, Va.

Sanitary Scale Co.: ANSON G. SENER, vice president, 11 West Forty-second Street, New York, N. Y.

Seederer-Kohlbusch (Inc.): EDWIN C. SMITH, sales manager, 149 New York Avenue, Jersey City, N. J.

Seraphin Manufacturing Co.: IDA U. SERAPHIN, secretary, Philadelphia, Pa.

Sexton Can Co.: FRANK A. JOHNSON, eastern sales manager, Drexel Hill, Pa.

Spotz Manufacturing Co.: C. A. SPOTZ, chief engineer, 100 Broadway, New York, N. Y.

Standard Computing Scale Co.: M. D. RIEBLE, supervisor of sales agencies, Detroit, Mich.

Streeter-Amet Weighing and Recording Co.: H. F. RECK, 4101 Ravenswood Avenue, Chicago, Ill.

Tokheim Oil Tank & Pump Co.:

M. B. MUXEN, president, Fort Wayne, Ind.

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

W. M. FRAZIER, district manager, 1007 Maryland Trust Building, Baltimore, Md.

Toledo Scale Co.:

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

FRANK J. DAVIS, salesman, 934 H Street NW., Washington, D. C.

H. E. ROONEY, salesman, 934 H Street NW., Washington, D. C.

Torsion Balance Co.: A. T. MILLROY, sales manager, 92 Reade Street, New York, N. Y.

Triner Scale & Manufacturing Co.: J. A. EDGERTON, Washington representative, 1395 National Press Building, Washington, D. C.

Troemner, Henry: LEON DIEFENDERFER, foreman, 911 Arch Street, Philadelphia, Pa.

Underwood-Meserve Co.: F. C. MESERVE, 110 Mount Vernon Street, South Boston, Mass.

Underwriters' Laboratories: EARL J. SMITH, engineer, gases and oils, 207 East Ohio Street, Chicago, Ill.

Veeder Root (Inc.): E. A. SLYE, chief engineer, Hartford, Conn.

Wayne Co.:

R. A. DEMPSEY, district manager, 1780 Broadway, New York, N. Y.

M. C. BROWN, 4831 Thirty-sixth Street NW., Washington, D. C.

W. L. KENNEDY, Fort Wayne, Ind.

Worthington Pump & Machinery Corporation:

H. P. MATTE, manager, meter department, Harrison, N. J.

ROBERT WARD, superintendent, meter shop, Harrison, N. J.

GUESTS REPRESENTING ASSOCIATIONS OF MANUFACTURERS

International Association of Ice Cream Manufacturers:

RIDGWAY KENNEDY, Jr., chairman, simplified practice committee, 238 Lombard Street, Philadelphia, Pa.

FRED RASMUSSEN, executive secretary, Harrisburg, Pa.

National Association of Retail Grocers: JOHN F. BEHRMANN, 78 Eton Road, Garden City, N. Y.

GUESTS REPRESENTING RAILROADS AND WEIGHING DEPARTMENTS

AUGE, J. N., supervisor of scales, Duluth, Missabe & Northern Railway, Proctor, Minn.

BRENTNALL, THOMAS E., general scale inspector, Union Pacific Railway, Denver, Colo.

BYLSMA, J. M., chief, weighing department, Western Weighing and Inspection Bureau, 1800 Transportation Building, Chicago, Ill.

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

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

ENWRIGHT, J. T., scale inspector, Pennsylvania Railroad, Pittsburgh, Pa.

EPRIGHT, A. W., supervisor scales and weighing, Pennsylvania Railroad, Altoona, Pa.

GOE, R. B., supervisor weighing and inspection, Illinois Central Railroad, Chicago, Ill.

HARRISON, M. J. J., general scale inspector, Pennsylvania Railroad, Chicago, Ill.
HOSFORD, C. C., general scale inspector, Pennsylvania Railroad, Room 1015 Pennsylvania Railroad Station, Pittsburgh, Pa.

KING, C. A., chief scale inspector, Western Weighing and Inspection Bureau, 1800 Transportation Building, Chicago, Ill.

KLOTZ, W. G., supervisor of scales, Missouri Pacific Lines, 1914 Yale Street, Houston, Tex.

LAWRENCE, E. KENT, general scale inspector, Baltimore & Ohio Railroad, Baltimore, Md.

MANN, C. H., superintendent of scales, Southern Railway, Washington, D. C.

MARCHANT, HARRY, scale inspector, Bethlehem Steel Co., Maryland Plant, Sparrows Point, Md.

MARNAN, T. H., superintendent of weights, Illinois Steel Co., South Chicago, Ill.

PETTIS, C., general scale inspector, New York Central Railroad, Rochester, N. Y.

PHERIGO, J. L., chief scale inspector, Southern Railway, Washington, D. C.

ROLLER, W. L., engineer, maintenance of way, Hocking Valley Railway Co., 912 Spahr Building, Columbus, Ohio.

SCHLINKERT, F. H., superintendent of scales, Missouri Pacific Lines, 1310 Missouri Pacific Building, St. Louis, Mo.

SCHMITZ, J. A., board of trade weighmaster, 453 South Clark Street, Chicago, Ill.

STODY, C. G., chief scale inspector, Chicago, Rock Island & Pacific Railroad, Des Moines, Iowa.

VOGEL, J. W., scale inspector, Hocking Valley Railway, 341 West Mound Street, Columbus, Ohio.

WELSH, R. C., general scale inspector, Pennsylvania Railroad, Harrisburg, Pa.

ZEIBEL, A. G., scale inspector, American Bridge Co., Ambridge, Pa.

GUESTS REPRESENTING GOVERNMENT DEPARTMENTS

ANDERSON, HERBERT L., chief examiner, Federal Trade Commission, Washington, D. C.

BIGGS, C. A., livestock weight supervisor, Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C.

CAREY, L. C., marketing specialist, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

FRISBIE, WALTER S., Food, Drug, and Insecticide Administration, United States Department of Agriculture, Washington, D. C.

MILLER, J. C., skilled draftsman, division of equipment and supplies, Post Office Department, Washington, D. C.

OTHER GUESTS

- ALER, J. STANLEY, installation and maintenance manager, Sherwood Bros. (Inc.), Continental Building, Baltimore, Md.
- ANDERSON, R. P., technologist, American Petroleum Institute, 250 Park Avenue, New York, N. Y.
- CHRISMAN, CHARLES S., engineer, 435 West Mines Street, West Chester, Pa.
- FRENCH, G., Sinclair Refining Co., 45 Nassau Street, New York, N. Y.
- GREGG, E. B., mechanical expert, 5000 Fourteenth Street NW., Washington, D. C.
- HASKELL, RAYMOND, industrial engineer, The Texas Co., 17 Battery Place, New York, N. Y.
- HOLMES, JOHN, vice president, Swift & Co., Union Stock Yards, Chicago Ill.
- HUSSEY, RICHARD, electrician, 228 North Race Street, Princeton, Ind.
- JACOBS, MRS. E. G., general manager, The Scale Journal, Chicago, Ill.
- JAY, LYMAN K., Sherwood Bros. (Inc.), Continental Building, Baltimore, Md.
- KERNS, F. C., superintendent, lubricating sales, The Texas Co., 17 Battery Place, New York, N. Y.
- MACDERMOTT, F. N., sales equipment, Atlantic Refining Co., 260 South Broad Street, Philadelphia, Pa.
- MORRIS, HOMER I., Sun Oil Co., 1428 South Penn Square, Philadelphia, Pa.
- PRYOR, JAMES M., 2619 Ruscombe Lane, Baltimore, Md.
- RIDDLE, P. H., special representative, Washington Petroleum Products (Inc.), South Washington, Va.
- SAYBOLT, J. W., manager, lubricating sales, Standard Oil Co. of New Jersey, 26 Broadway, New York, N. Y.
- STAATS, KENNETH A., Jones & Laughlin Steel Corporation, Jones & Laughlin Building, Pittsburgh, Pa.

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

HELD AT THE BUREAU OF STANDARDS, WASHINGTON, D. C., JUNE 4-7, 1929

FIRST SESSION (MORNING OF TUESDAY, JUNE 4, 1929)

The conference was called to order at 10.40 o'clock a. m. by Dr. George K. Burgess, president of the conference.

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

Ladies and gentlemen, the meeting will please be in order. I welcome the delegates to this Twenty-Second National Conference on Weights and Measures and feel assured that the program which has been arranged by your committee will result in a most successful meeting.

Our executive committee, you will remember, took a poll on the most desirable dates upon which to hold our conference, and it was decided for reasons of economy to hold the meetings this year at the beginning of June. Reduced fares from far western points and more advantageous hotel accommodations in Washington have thus been secured. I am very glad to say that we had our hot spell last week, and the promise for this week is comfortable weather; if this prediction is fulfilled, we will, of course, be very glad.

I notice among those present a considerable number of new faces, and during the week these newcomers will be able to get acquainted with the other members of the conference and learn our methods of procedure and practice. I am sure that not only the new members, but the old members as well will appreciate the opportunity of meeting together.

It has been customary in the past for me to give a brief résumé of bills introduced in Congress, of interest to this conference, and this course will again be followed.

At the last conference it was reported that a bill to fix standards for hampers, round stave baskets, and splint baskets for fruits and vegetables had passed both houses of Congress and was in the hands of the President for action. The bill became a law, and is known as the standard container act of 1928. A paper on this subject by H. A. Spilman, senior marketing specialist of the Bureau of Agricultural Economics, is scheduled for this afternoon.

The present session of Congress having been called for the consideration of certain special matters, it would not be expected that many bills relating to weights and measures would be introduced—consequently there are only a few to be mentioned.



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

H. R. 2 and S. 108 are bills to suppress unfair and fraudulent practices in the marketing of perishable agricultural products in interstate and foreign commerce. Among other prohibited practices, they provide that it shall be unlawful for any commission merchant to discard, dump, or destroy without reasonable cause any perishable agricultural commodity received by such commission merchant in interstate or foreign commerce, and prohibit the making of any false or misleading statements concerning the quantity of any agricultural commodity.

H. R. 8 is a bill to amend the national food and drugs act so as to prevent the slack filling of packages, and to prevent deceptions by means of the form or shape of the container. The package must be filled with the commodity it purports to contain. A similar bill was passed by the House in the last Congress but did not pass the Senate.

House Joint Resolutions Nos. 16 and 60 request the President to propose the calling of an international conference for the simplification of the calendar, or to accept, on behalf of the United States, an invitation to participate in such a conference.

H. R. 196 is a bill to require the use of net weights in interstate and foreign transactions in cotton, and to provide for the standardizing of bale covering for cotton.

H. R. 198 is a bill to regulate interstate shipments of cotton. Under this bill the Interstate Commerce Commission is authorized to establish preferential rates on shipments of cotton, based upon the cubic contents of the bale.

S. 914 is a bill to standardize bales of cotton for shipment in interstate or foreign commerce and to require sale of cotton by the true net weight of the bale. The weight of the standard square bale is fixed at 500 pounds, exclusive of bagging and ties. Reasonable variations in net weight shall be permitted, but not to exceed 100 pounds above or below the standard weight.

H. R. 730 is a bill to amend the national food and drugs act so as to require certain canned food to be of a standard quality, condition, and fill, in accordance with standards to be promulgated by the Secretary of Agriculture.

S. 902 is a bill to amend the national food and drugs act by adding a new paragraph relating to the marking of packages containing edible plant products. It would be required that the package indicate, under certain conditions, whether the product had been grown in a foreign country or in the United States and that the quantity by weight or volume of each foreign-grown product be stated.

H. R. 1013 and 2164, and S. 324 and 880, are bills to define fruit jams, preserves, and other products, to provide standards therefor, and to require the labeling thereof. This bill provides that the net weight, measure, or numerical count be stated on the package.

I have here copies of these various bills that are pending, also copies of the bill that became a law during the recent Congress, and a copy of the proposed calendar. If any of you are interested in the status of Federal legislation, you are at liberty to consult these copies for reference purposes. I have also additional copies of some of them.

It will doubtless be of interest to mention certain of the publications that the bureau has recently issued. For the benefit of the new members I refer first to a manual which I mentioned at the last conference, entitled "Weights and Measures Administration" and which is Handbook Series of the Bureau of Standards No. 11, 1927. This manual has been prepared primarily for the information and use of weights and measures officials. Another publication of interest has recently been issued, "Specifications and Tolerances for Commercial Weighing and Measuring Devices," Handbook M85, 1929, containing all the codes adopted by this conference. Still another is this chart which shows time for any location on the globe. I will again direct your attention to the annual publication known as the "Standards Yearbook." I have here a copy of the 1929 yearbook. We had the 1928 yearbook before you last year. The 1930 issue will appear shortly after next January 1. In the standards yearbooks are included a summary of the standardization activities carried on not only in this country, but in the world in general. These publications include a reference to the Federal and State weights and measures activities, this information being necessarily in brief form.

All of you have probably received the report of the Twenty-first National Conference on Weights and Measures, the minutes of our meeting last year. I am glad to say that this publication was issued in good time, well before this conference. Any of you who may not have received a copy can get one.

There is another publication which I would like to mention which will be inaugurated in July and will be known as the Commercial Standards Monthly. As its name implies it will be issued monthly, and the subscription is \$1 a year. It will consist of a current account of the standardization activities of what we call the "commercial standards group" of the bureau, which includes the specific work on commercial standards, and also the work of the division of simplified practice, the division of trade standards, the division of specifications, and the division of building and housing; it will also treat of other governmental standardization activities, and will contain news items and references to standardization and specifications throughout the country. Particular attention will be given to the relation of business to standardization.

This publication is not wholly new. The division of simplified practice started several years ago to issue in mimeographed form a statement of the progress of its work. The Bureau of the Budget has now approved putting this in printed form and amplifying it to cover the additional fields mentioned. If any of you have any items that you care to bring to our attention for inclusion in this journal, we will be glad to receive and consider them. So much for the new publications.

I will now go a little bit out of our usual course and consider some of the outstanding things that have been done recently by the International Conference on Weights and Measures.

The international conference is a body which, as its name implies, is supported by a considerable number of nations—31 at this time. It was set up by treaty and started operating in 1873. The conference meets normally every six years in Paris and in the interim

between the 6-year meetings the work is carried on by the International Committee on Weights and Measures. The conference maintains a laboratory in Sèvres just outside of Paris, which is known as the International Bureau of Weights and Measures.

Now this seventh conference held in 1927, did some very important things to which I shall refer briefly. In the first place there was set up an International Temperature Scale. The temperature scales throughout the world were not quite identical, and it was not practical absolutely to check work. The scale agreed upon is for universal adoption and this is now the official scale of the Bureau of Standards, and is in use here. It is not necessary to call attention to the importance of having a single scale, so that any scientific work anywhere can be strictly compared with work done elsewhere without any uncertainty from the point of view of the temperatures employed or obtained. Again, temperature-measuring instruments made anywhere in the world will also be adjusted to conform in their indications to the international scale.

Another matter which is of fundamental importance in metrology was the definition of a meter in terms of wave lengths of light. In the determination of length by optical means, it is possible to set up a length in terms of wave lengths of light to an accuracy of approximately 1 part in 100,000,000. For example, the length of the meter has been determined to be 1,553,164.13 wave lengths of the red cadmium line and is now so defined. The result is that if all our meter bars were destroyed we could nevertheless reproduce a meter at any time with as great accuracy as we now know it, and with that as a basis many other standards can be readily reproduced.

Another proposition which will probably be adopted this month in Paris by the international committee is the defining of the temperature at which industrial length standards shall have their nominal correct length. The proposition is to choose for industrial purposes, such as in the manufacture of repetitive parts, a temperature of 68° F. (20° C.) as the standard temperature at which all length standards used in manufacturing should have their correct value.

When you realize that it is necessary to produce parts accurate to 0.0001 inch and even better, and that this can only be successfully accomplished by the use of proper length measures, the desirability of having a uniform temperature at which these length measures shall be correct will be at once apparent. By light interference it is possible for us to construct and calibrate standards—and such have been constructed—so precise that subdivisions of an inch, the inch, and multiples of inches can be built up so that practically no errors in the desired lengths can be detected. In other words, the error would be a small fraction of a wave length of light, perhaps something of the order of one ten-millionth of an inch.

Another item which was presented before the international conference in 1927 and on which a report has been submitted to the international committee for adoption this month is with respect to the electrical units. Certain of you are concerned with these. For instance, we had last year a very interesting paper on the supervision of gas and electric meters in Texas, by Mr. Henrichson, who discussed the procedure followed in calibrating their instruments.

It is a fact that the electrical units do not conform with the mechanical and thermal units exactly. The desire is to bring all three of them into conformity. For example, at the present time there is a difference of something like 1 part in 2,000 as between the electrical watt and the mechanical or thermal watt. You will readily appreciate that it is necessary and desirable to bring all these units into complete conformity. It is expected that the suggestion which has been put up to the international committee will result in effecting this uniformity. I might note that the international program contemplates the addition of a laboratory so that it will be possible to do electrical work at the international bureau in addition to the weights and measures work which has been done heretofore.

I will now take occasion to mention two types of activity that the Bureau of Standards is carrying on, which while not strictly related to weights and measures yet nevertheless may have what we call a psychological bearing on certain matters that have been before this conference in the past.

I refer first to the set-up of what we are calling the Cement Reference Laboratory. The fact is that there are some 300 laboratories throughout the country testing cement. As you can readily realize, results obtained in those various laboratories may oftentimes not be in agreement. The object of this reference laboratory for cement is to bring uniformity into the cement-testing field, in so far as possible. The demand for this laboratory—and this is the thing that I would like to emphasize particularly—came from the cement industry itself and also from the American Society for Testing Materials, which is concerned with setting up specifications for commodities such as cement. This laboratory is to be supported half by the Government and half by contributions from the American Society for Testing Materials and the cement industry. We are getting this laboratory started at the present time, and it will be well under way by the 1st of July.

In the operations of this Cement Reference Laboratory to bring about uniformity in the testing of cement, various means will be employed. There will be the inspection of individual samples of cement; the inspection of the apparatus used and the testing and calibrating of that apparatus will be undertaken; eventually it is expected there will be sent out to the various laboratories cement whose characteristics we know, which we might call standard cement samples, with which they may check in their laboratory. As you know, we have at the present time a considerable number of chemical samples which can be sent out to industries to check their chemists or their methods. On account of the tremendous use of cement—if I remember correctly there were some 170,000,000 barrels manufactured last year—from the business point of view the securing of uniformity is extremely important, for when the manufacturer's tests and the receiver's tests do not agree business is charged with an unnecessary amount of overhead. We hope to eliminate a very great deal of that.

There is another type of inspection to which I would also like to refer at this time. As you know the aeronautics field is expanding beyond all bounds of reasonable expectation. We thought radio developed fast, but aeronautics is developing even more rapidly.

The Aeronautics Branch of the Department of Commerce is charged with the licensing of both pilots and planes, and it has been found necessary in the licensing of planes to have a demonstration of the effectiveness of the type of plane submitted.

The Bureau of Standards is charged with the testing of types of engines used in the planes. This testing is going on at the present time, and as many of you as are interested will have an opportunity to see it when you inspect the bureau on Wednesday. Some of that work is also done at College Park and at Arlington.

You remember that at our last conference I stated that the new master scale for the calibration of test cars used in the test of railway track scales had been put in operation at Clearing, just outside of Chicago, and the first calibrations had been made and reports issued. That station has been in very successful operation during the year, and no doubt will go on successfully. As you know we also have three railroad track-scale testing equipments which we utilize in the test and calibration of railroad and industry master scales and track scales in the various States for the benefit of both the shippers and the railroads. One of these equipments which has been in service some 15 years is virtually worn out and we hope to have it replaced through funds which we will request for this purpose from the forthcoming Congress. The cost of such an outfit will be about \$40,000.

Now a few words in relation to the program of this meeting. Last year we made a special effort to have representatives of business on our program, since we believed that cooperation between business and the officials was extremely desirable and conference program assignments seemed an excellent method of fostering this cooperation. Our business representation last year was a very interesting and valuable part of our program and encouraged us to continue the practice this year. We think our efforts will again be fruitful. John F. Behrmann, representing the National Association of Retail Grocers, will address you on Wednesday morning on the very timely subject of "The Irregular or Diversified Packing of Farm Products," and we are sure that he will be able to interest you very much. John Holmes, vice president of Swift & Co., will address you at the same session on the subject "Weighing in the Meat-Packing Industry," a subject in which I am certain you are all very vitally interested, and will enjoy. J. A. Schmitz, weighmaster, Chicago Board of Trade, who has for many years been working along the same lines as all of you, will tell you about "Developments in Terminal Weighing of Grain." Ridgway Kennedy, chairman of the simplified practice committee, International Association of Ice Cream Manufacturers, will describe the standardization program of the ice cream industry.

I can not take the time to tell you of all the good things on the program, but I might briefly mention that our new Secretary of Commerce, Hon. Robert P. Lamont, has kindly agreed to greet you at 11 o'clock Wednesday morning. Among other visitors whom we will be glad to welcome will be Herbert L. Anderson, chief examiner of the Federal Trade Commission, and Ernest N. Smith, general manager of the American Automobile Association.

That, ladies and gentlemen, concludes all that the chairman wishes to say at the present time in presenting first, a summary of Federal legislation, second, reference to publications of the Bureau of Stand-

ards since the last conference, third, a summary of some recent work being done through the International Conference on Weights and Measures, and fourth, the special references to our own work.

ABSTRACTS OF STATE REPORTS ¹

ALABAMA

By R. C. SHARP, *Inspector of Weights and Measures, Birmingham*

Mr. Sharp commented on the absence from the conference of H. L. Flurry, chief of the State division of weights and measures, who was unavoidably detained in Montgomery. He stated that he was not prepared to present a report for the State except to say that the division had shown remarkable progress since its organization only a few years ago.

CALIFORNIA ²

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

Mr. Casey remarked upon the increasing responsibilities and diversification of duties of the weights and measures official as a result of the rapid developments in all fields of business and industry. He spoke of the excellent assistance rendered by local officials in the solution of new problems. There was cited a statute passed by the legislature in 1929, designed to prevent fraud or misrepresentation in the distribution or sale of gasoline and oil.

CONNECTICUT

By PHILIP T. PILON, *Deputy State Superintendent of Weights and Measures*

Mr. Pilon reported an increase of six in the number of local weights and measures officials in the State as compared with the figures a year ago, making a present total of 54. He also reported an increase of over 20 per cent in the number of pieces of apparatus examined. The only new legislation along weights and measures lines was a statute effecting certain changes of personnel in the State department.

DELAWARE

(Officials were in attendance from Delaware, but no report from this State was presented to the conference.)

DISTRICT OF COLUMBIA

(Officials were in attendance from the District of Columbia, but no report from the District was presented to the conference.)

FLORIDA

By W. H. GREEN, *Superintendent, Division of Weights and Measures, Miami*

Mr. Green reported that there had been introduced into the current legislature a standardization bill and a bill to create a State department of weights and measures, both of which were still pend-

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

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

ing. He discussed briefly the activities of the Miami department, stating that efforts were being made to secure adequate equipment for the testing of large-capacity scales which it was hoped would be successful within the coming year.

GEORGIA

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

Mr. Wilson stated that the only weights and measures work now being carried on by the State is the testing of retail gasoline dispensing devices, under the supervision of his department. He said that a bill had been prepared for introduction into the next legislature to create a State department of weights and measures; this bill follows closely the model State law adopted by the conference. Vigorous efforts are to be made to secure the passage of this legislation.

ILLINOIS³

By FRED BENJAMIN, *State Superintendent of Standards*

Mr. Benjamin advised that no new weights and measures legislation had been enacted during the past year. Comparing the past and present conditions of commercial equipment in the State, he said that when the work of the State department was first started in the smaller cities and towns about 50 per cent of the apparatus in use was found incorrect, whereas now less than 10 per cent is found inaccurate.

INDIANA

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

Mr. Miller reported especial activity during the year on liquid-measuring devices; many obsolete units have been removed from service, and large numbers of others have been brought into compliance with the regulations through repairs and minor alterations. Two additional counties have appointed local sealers. The State department expects soon to acquire a special truck equipment for the testing of large-capacity scales.

KENTUCKY

By SAMUEL F. FOX, *Chief Inspector of Weights and Measures, Louisville*

Mr. Fox reported that there had been no new State legislation, but speaking for his own department he said that this had been very active during the past year. An increase in appropriations made possible increases in salaries throughout the department. A new taxicab ordinance was passed, requiring taximeters on all taxicabs. Dry measures have been eliminated from use in the city, commodities being now sold on a weight basis.

MAINE

By WILLIAM A. JONES, *Sealer of Weights and Measures, Waterville*

Mr. Jones reported three changes in the State law made by the last legislature. One of these was the repeal of a section which

³ This report was submitted through William F. Cluett and was read to the conference by him.

prohibited the sale of weighing and measuring devices until the type thereof had been approved by the National Bureau of Standards. Another was an amendment to the milk bottle law permitting the sale and use of the 10-ounce bottle. The third was an amendment to the fee schedule, increasing certain fees and adding fees for certain classes of apparatus.

MARYLAND

By S. B. SHAW, *Chief Inspector, State Department of Markets*, and S. T. GRIFFITH, *Chief, Division of Weights and Measures, Baltimore*

Mr. Shaw spoke of the handicap of lack of funds, which prevents the State department from undertaking much weights and measures work except such as pertains to fruits and vegetables and the shipment thereof, and the occasional testing of scales with the cooperation of the Baltimore department. Mr. Griffith mentioned the introduction into the last legislature of a bill for the creation of a State department of weights and measures; this bill died in committee, but efforts to secure its passage will be continued.

MASSACHUSETTS

By FRANCIS MEREDITH, *Director, State Division of Standards*

Mr. Meredith discussed briefly the work of supervising and licensing transient vendors and hawkers and peddlers which is carried on by the State and local weights and measures departments in addition to their weights and measures work; this has attracted state-wide attention. There were no unusual weights and measures activities during the past year, and there was no new legislation along this line.

MICHIGAN

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

Mr. Strong reported that no weights and measures statutes were enacted by the last legislature. The work of the State, county, and city departments is progressing in a satisfactory manner, with close cooperation among all of these elements.

MINNESOTA

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

Mr. Jurgensen spoke of the testing of large-capacity scales by the department, including the regular examination of railroad track scales with two specially constructed test cars. Automobile trucks are also provided for use in connection with the testing of wagon and truck scales and in carrying on the regular work of the department. He mentioned particularly that little difficulty was experienced in securing adequate funds for all necessary equipment.

NEW HAMPSHIRE

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

Mr. Webster gave a summary of the mechanical and supervisory work of his department for the past two years. Under statutory

authority a regulation has been issued declaring the $\frac{1}{3}$ -quart milk bottle to be in violation of the weights and measures law. Gasoline pump installations and wayside stores continue to increase in number and demand an increasingly greater share of the department's attention during the summer months.

NEW JERSEY

By J. HARRY FOLEY, *State Superintendent of Weights and Measures*

In addition to a discussion of certain general phases of his department's work, Mr. Foley outlined certain activities which had been receiving especial attention during the year, as follows: The testing of liquid-measuring devices, lubricating-oil bottles, and measures for type approval; checking violations of the net container law; correcting faulty practices in the sale of second-hand scales; measuring thread. In addition, many investigations were made covering a wide range of industries. There was no new legislation.

NEW YORK

(A number of officials were in attendance from New York, but no report from this State was presented to the conference.)

NORTH CAROLINA

By WILLIAM A. GRAHAM, *State Commissioner of Agriculture*

Mr. Graham reported that much valuable work had been accomplished by the weights and measures division, notwithstanding the handicap of the fee system, which was very unpopular. A new statute imposes a franchise tax upon those handling certain classes of weighing and measuring equipment in the State; the funds accruing from this tax, to be collected by the revenue department, are to constitute a weights and measures fund for the administration of the weights and measures laws; the former fees are abolished.

OHIO

By M. A. BRIDGE, *Sealer of Weights and Measures, Columbus*

Mr. Bridge commented upon changes in personnel in the State department, said that the district weights and measures associations continued to meet regularly, and reported the organization of a State association which held a successful meeting during the year. The bill to place all local weights and measures officials under civil service, which was sponsored by the State department, was passed by the legislature, but failed to receive the governor's approval. As to conditions in Columbus, Mr. Bridge noted particularly the need of an equipment for the testing of large-capacity scales.

PENNSYLVANIA

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

Mr. Smith reported that three weights and measures laws were enacted by the last legislature, one giving local inspectors jurisdiction over person and coin-operated weighing machines, another to make possible the elimination of odd-sized milk bottles, and the third authorizing the appointment of sworn private weighers. Bills

providing for standard-weight bread loaves, sales by weight, the testing and priming of gasoline pumps by the owners, meters on vehicle tanks, and specifying the frequency of weights and measures inspections failed of passage.

TENNESSEE

By V. A. BRADLEY, *State Superintendent of Weights and Measures*

Mr. Bradley reported a general improvement in the condition of the commercial weighing and measuring equipment in use in the State, as demonstrated by the reduced percentage of equipment found inaccurate upon test. A State weights and measures conference is in contemplation during the coming year. There has been no new weights and measures legislation.

VERMONT

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

Mr. Davis reported the addition of one full-time inspector to his field force, made possible through an increase of appropriation. The last legislature enacted a new law requiring the calibration of vehicle tanks under the supervision of the State department. A bill to require meters on vehicle tanks, and another providing for the licensing of gasoline pumps, failed of passage; the former bill was drawn to meet the demand of the retailers of gasoline, who complained of uncertainty in the amounts delivered to them.

VIRGINIA

(Several officials were in attendance from Virginia, but no report from this State was presented to the conference.)

WEST VIRGINIA

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

Mr. Jarrett stated that no alterations or additions had been made to the weights and measures law by the last legislature. He noted a decided increase during the past year in the number of chain stores in the State, particularly in the grocery and meat trades. Gasoline-pump installations continue to increase, keeping pace with the road-building program of the State. The coal business has been inactive, and coal scales have been tested only upon request.

WISCONSIN

(Several officials were in attendance from Wisconsin, but no report from this State was presented to the conference.)

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

MASSACHUSETTS ASSOCIATION OF SEALERS OF WEIGHTS AND MEASURES

By JAMES A. BAGLEY, *Sealer of Weights and Measures, Chicopee*

Mr. Bagley stated that the association membership includes the State inspectors of standards and the sealers and deputy sealers of 355 cities and towns of the State. The closest cooperation prevails

among all of these elements, and the State and local departments work in entire harmony.

MICHIGAN STATE, COUNTY, AND CITY SEALERS' ASSOCIATION

By GEORGE F. AUSTIN, JR., *Assistant Supervisor, Bureau of Weights and Measures, Detroit*

Mr. Austin mentioned the fact that the association was one of the two State associations which publishes a bulletin at regular intervals, and recommended this plan to other associations because of the beneficial results which have been noted in his State. He extended a general invitation to attend the next meeting of the association to be held in Detroit in June.

NEW JERSEY WEIGHTS AND MEASURES ASSOCIATION

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

Mr. Rogers stated that in addition to the regular annual meeting of the association, such as has been held for many years, a midwinter meeting has recently been inaugurated; this latter meeting is held just prior to the opening of the legislature, and is confined largely to the consideration of a legislative program. Mr. Rogers recommended pension legislation as a desirable goal for association activity. He issued an invitation to all to attend the next meeting of the New Jersey association.

The CHAIRMAN. Our time is not fully up and the chair would like to give opportunity for reports from counties and cities. Are there any such reports which delegates wish to present?

SELECTION OF OFFICIAL PHOTOGRAPHER

Mr. HOLBROOK. Mr. Chairman, I would like to bring up a matter at this time. F. A. Schutz has regularly been making the picture of this conference for a great many years. I think that you have been pleased with the pictures and the service which he has furnished in the past. It appears that it would be a good thing for this body to have an official photographer. I therefore move that Mr. Schutz be selected as the official photographer of the conference.

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

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

SECOND SESSION (AFTERNOON OF TUESDAY, JUNE 4, 1929)

The conference reassembled at 2.30 o'clock p. m., Francis Meredith, second vice president, in the chair.

THE FEDERAL STANDARD CONTAINER ACT OF 1928⁴

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

We have two Federal laws affecting the baskets used for fruits and vegetables. These are commonly known as the United States standard container act and the United States standard container act of 1928. The one known as the United States standard container act has been on the statute books since 1916 and became effective November 1, 1917. The name by which that act has been known is somewhat of a misnomer, since it is by no means as general in its scope as the name would signify. The main purpose of that law was to standardize the Climax baskets used for grapes and the small baskets or boxes used for berries. In fact, the law as passed was a combination of a bill for standardization of Climax baskets and one for the standardization of berry boxes. As put together, its wording was such as to standardize also what we call till baskets and to indirectly affect larger containers, such as hampers, round stave baskets, and splint baskets. This effect was secured by reason of the law's requirement that containers of fruits and vegetables be made in multiples of the dry quart.

The act of 1916 is an interstate commerce law and makes it unlawful to manufacture for shipment, sell for shipment, or to ship in interstate commerce baskets, filled or unfilled, which do not comply with the act. This brings about an unfortunate condition in that a manufacturer when making for sale within his own State is not under the law, but when making for sale in another State, or when shipping to another State, he does come under the law. Again, a manufacturer within a State can supply short baskets to a city within that State, while manufacturers nearer to the city, but in another State, can not supply such sizes. A case of this kind actually arose in connection with certain baskets sold in Chicago, one Illinois manufacturer getting all the business by supplying short baskets which Indiana manufacturers could not ship into Illinois.

Such an unfortunate state of affairs could be remedied by each State enacting the act of 1916 as a State law. So far but six States have seen fit to do so. These are Indiana, Iowa, Kansas, Michigan, Ohio, and Pennsylvania. It must be put down to the credit and good sense of the manufacturers that in most instances they have loyally supported the law in spirit as well as letter, and have refused to take advantage of this loophole.

⁴ In the absence of Mr. Spilman this paper was read to the conference by L. C. Carey, marketing specialist, United States Department of Agriculture.

This original standard container act reduced the number of Climax baskets from 31 to 3, the number of till baskets from 30 to 5, and the number of sizes of berry boxes from 17 to 3. These reductions represent the elimination of 93, 84, and 82 per cent, respectively, of the sizes formerly used.

Perhaps I should explain that by a till basket we mean rectangular baskets, the sides and bottoms of which are made of two or more pieces of veneer crossed at right angles, or of other material, used either for display purposes, or for shipment, when filled, as a sub-container within a crate. These are made in 1, 2, 3, 4, and 6 quart sizes. With the exception of the 3-quart size these are oblong in shape; the 3-quart is made in both the oblong and square shapes. The 1 and 2 quart sizes are used for display purposes at retail stores. The 3, 4, and 6 quart sizes, when filled, are packed in crates for shipment, the 3-quart size being shipped four to the crate, the 4-quart size 6 to the crate, and the 6-quart size two to the crate.

The results of this original standard container act proved so satisfactory to manufacturers that they requested the Department of Agriculture to undertake investigations looking toward the standardization of hampers, round stave baskets, and splint baskets.

These investigations demonstrated that there was as much need of standardization of these three types as there ever had been of the three types already standardized. Hampers were found to be made in the following sizes: 2, 4, 6, 8, 10, 12, 13, 13½, 14, 15, 16, 18, 20, 24, 27, 28, 30, 32, 40, 44, and 48 quart. Added to this great number of sizes was a great variation in dimensions, so that there were something like 75 capacities and dimensions for hampers. In the case of round stave baskets the condition was not so bad, as 25 or 30 would cover the number of different sizes made. So far as splint baskets are concerned, nobody has ever attempted to estimate the number of sizes and differences in dimensions which have existed during the past years.

As a result of the investigations made by the Department of Agriculture there was drawn up in the fall of 1919 a tentative form of the bill for the standardization of hampers, round stave baskets, and splint baskets. This was done for the purpose of discussion with manufacturers, and it was found that they wished rather rigid and definite restrictions set up. They wished the number of sizes cut down to a very small number; they wanted dimension specifications for each size and type made a matter of law; and also wished the law to define certain elements affecting the strength of containers, such as the number and thickness of staves and thickness of hoops. This bill was probably rewritten a good many times before it met the approval not only of the manufacturers of baskets, but of large organizations such as the American Farm Bureau Federation, the National League of Commission Merchants, the International Apple Shippers' Association, and the Western Fruit Jobbers Association. In the end, a bill along the lines indicated above was introduced in the House of Representatives in the early part of 1920 by Representative Vestal, of Indiana, at the request of the National League of Commission Merchants. This original bill prescribed as sizes for hampers the ¼, ½, 1, and 1½ bushel. The sizes

were the same for the round stave baskets except that the 2-bushel size was added to take care of certain farm baskets. For splint baskets the sizes specified were the 4, 8, 12, 16, and 24 quart.

At hearings which were held on the bill considerable sentiment developed from New Jersey, Delaware, and Maryland in favor of the retention of the 20-quart size of hamper. As a result of the representations made with some force before the committee this size was inserted as one of the standards both for the hamper and the round stave basket. In this shape the bill went before the House and was discussed in Committee of the Whole on two different days. One of the first things which the House did was to knock out all of the specifications affecting the strength of baskets. With the amendments made, the bill passed the House in Committee of the Whole, but was never reported into the House itself. This was the first skirmish on a piece of legislation which remained before Congress for eight years before finally achieving passage. During the eight years its form was modified to a considerable extent. Dimension specifications were dropped as well as strength specifications, and additions were made to the number of standards. As finally passed, section 1 provides as standards for hampers and round stave baskets the $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 bushel sizes. Section 2 sets up for splint baskets 4, 8, 12, 16, 24, and 32 quarts as the standard sizes. This is a reduction of 67 per cent in the number of sizes of hampers and of at least 50 per cent in the number of sizes of splint baskets. During the years the law was under discussion the makers of round stave baskets voluntarily cleaned house and its final passage makes but little difference to them.

Section 3 directs the Secretary of Agriculture to establish tolerances in the capacities of the baskets standardized, in order to take care of reasonable variations occurring in manufacturing or handling. Such tolerances have been established in regulation 5, section 2, paragraph 2.

In section 4 is embodied a somewhat unusual provision. It requires that manufacturers shall submit to the Secretary of Agriculture their specifications for hampers, round stave baskets, and splint baskets, and provides that no manufacturer shall make such containers until his specifications have been approved by the Secretary. The Secretary is required to approve specifications if they will make a basket of legal capacity and one which is not deceptive in appearance. Some will say that it would have been much better to have incorporated in the law definite dimension specifications for each container. This would have made the act much more easy to administer, but had such dimensions been rigid the door would have been closed to new developments. It would have been necessary to have incorporated a provision directing the Secretary of Agriculture to recognize sets of dimensions other than those set forth in the law and in view of the many changes which had been made in baskets in the last two or three years this would have resulted in practically the same conditions as those we now face.

This particular stipulation in the law has caused a great increase in our work and has been productive of a good deal of thought and trouble. However, we do believe when the matter has finally been

ironed out we shall have a great deal more uniformity in baskets than has ever before been the case, and that the result accomplished will have been found to have justified the trouble.

Section 5 is the penalty section of the law and makes it unlawful to manufacture for sale or shipment, to offer for sale, to sell, to offer for shipment, or to ship, containers which do not comply with the act, whether filled or unfilled. This section does not contain that little word "willful," the word which has been a stumbling block in the path of enforcing more than one law or ordinance. This section does, however, contain a provision under which any purchaser having a guaranty of capacity from the seller of baskets is absolved from prosecution if the baskets are of illegal size.

Section 6 gives us authority to proceed against illegal baskets themselves, whether filled or unfilled, or parts of such baskets, and provides for their seizure, condemnation, and destruction.

Section 7 authorizes the manufacture of baskets for foreign countries and also the making of banana hampers without complying with the standards set up in the law.

Section 8 provides for the handling by United States district attorneys of cases arising under the act, and section 9 places with the Secretary of Agriculture the duty of prescribing regulations and making necessary examinations and tests to determine whether baskets comply with the law.

Section 10 directs the Secretary to cooperate with State, county, and municipal authorities, manufacturers, dealers, and shippers in order to carry out the purposes of the act, and section 11 provides that sections 5 and 6 shall become effective on November 1, 1929.

To distinguish between the two acts affecting fruit and vegetable baskets we are designating one of them as the United States standard container act of 1916 and the second as the United States standard container act of 1928.

The new law differs from the standard container act of 1916 in that it is based on the weights and measures clause of the Constitution instead of the interstate commerce clause. This puts it on the same basis as the standard barrel law and makes its provisions effective in intrastate as well as interstate commerce. I wish to emphasize this fact because in spite of the publicity which we have endeavored to give to this law and to its provisions we still receive questions indicating that there is a misunderstanding as to the local application of the law. Please bear in mind that, Congress having exercised its constitutional prerogative in passing this act, all State laws and city ordinances which conflict with it become inoperative.

As one example of this let me cite the effect of this law on the weight-per-bushel laws still on many State statute books. The solicitor of the Department of Agriculture has expressed the opinion that the United States standard container act of 1928, in establishing the capacity of the bushel as 2,150.42 cubic inches, makes inoperative all State laws establishing weights per bushel so far as they affect fruits and vegetables packed in the containers standardized by that law. To put it in another way, this means that when a farmer sells any fruit or vegetables in a hamper, round stave or straight-side basket, or a splint basket, then the State laws requiring that he deliver a certain weight per bushel do not apply.

Again, some States and cities have laws or regulations as to the marking of fruit and vegetable baskets. The regulations under the new law provide for a method of marking to show compliance with the law if the manufacturer desires. It has been held that if this method of marking is adopted the local requirements are inoperative. Nor can a State or city forbid the use of a basket of a size established as standard by the law or set up for baskets dimensions differing from those approved by the Secretary of Agriculture.

I referred to the regulations prescribing a style of marking containers under the law. The law contains no provision requiring manufacturers to stamp their baskets as to capacity. It was felt, however, that a manufacturer who had had his specifications approved by the department should be allowed to mark his baskets in such a way as to indicate that approval had been received. Accordingly, in the regulations issued under the law we have provided a method by which a manufacturer may mark his baskets if he wishes to do so. Each manufacturer has been assigned a number, and the approved method of marking shows the number, below it the letters "U. S.," then the capacity. We are suggesting that these letters and figures be at least three-eighths of an inch high. We are inclined to think that most of the manufacturers will take advantage of this method of marking. When specifications of all manufacturers have been approved and numbers issued we expect to publish a list showing each manufacturer's number so that it will be possible for local officials to secure a copy of such a list, and thereby identify the manufacturer of baskets they may pick up. We hope also to issue a circular giving in detail the specifications approved so as to make it comparatively easy to check each manufacturer's basket. Of course, such a circular can not be issued until we have been able to work out dimension tolerances for each type and size of basket. Capacity tolerances have been in existence ever since the issuance of regulations under the standard container act of 1916 and have been promulgated in the regulations under the act of 1928. Dimension tolerances on hampers, round stave baskets, and splint baskets represent an entirely new field and will not be worked out and published until we have been able to approve specifications of practically all manufacturers.

Our policy in the enforcement of the standard container act of 1916, and the one which we expect to follow in the administration of the new law is that of maintaining a service organization rather than a regulatory one. By this I mean that we feel that manufacturers have nothing to gain by making a container of improper size, that it is, in fact, to their interest to make them of standard size, and that deviations from the standard are generally the result either of carelessness or ignorance. Consequently, we feel it our duty to advise manufacturers not only whether or not their containers are satisfactory as to capacity, but if they are unsatisfactory to tell them, so far as possible, why they are unsatisfactory and what they should do to correct them. We are more interested in having baskets right than we are in securing convictions. However, under this new law we have a sufficient amount of authority to take drastic action if it is necessary. Let me state again that the penalty clause makes it

unlawful to manufacture for sale or shipment, to offer to sell, to sell, to offer for shipment, or to ship hampers, round stave baskets, or splint baskets, either filled or unfilled, or parts of such baskets, that do not comply with this act, and that we do not have to prove willful violation. Furthermore, as we have authority to proceed against unlawful baskets as well as against persons who violate the act, we believe that we have ample authority to make things uncomfortable for anyone who shows a disposition to evade the act. However, if we secure from the manufacturers the cooperation which we have had in the past, we do not expect to have to take drastic action.

In conclusion, I wish to say we are directed by the act to cooperate with State, county, and municipal authorities and that we stand ready at any time to assist such authorities in any way possible in matters pertaining to baskets for fruits or vegetables. In turn, we desire to have the cooperation of State, county, and municipal authorities in bringing their laws and ordinances in line with the Federal law, thus placing themselves in such a position that we may be mutually helpful in our efforts to safeguard producers and consumers.

DISCUSSION OF ABOVE PAPER

The ACTING CHAIRMAN. There are several copies of the act here and any one interested can get one of them.

Mr. ROGERS. Do I understand that the solicitor of the Department of Agriculture says that the United States standard container act of 1928, in establishing the capacity of a bushel at 2,150.42 cubic inches, makes inoperative all State laws establishing weights per bushel in so far as they affect fruits and vegetables packed in the containers standardized by this law?

Mr. CAREY. Yes.

Mr. ROGERS. We would like to know whether or not the manufacturers can manufacture containers of other sizes for use in the State of New Jersey?

Mr. CAREY. If the container is a hamper, a round stave basket, or a splint basket, it would be illegal to do so.

Mr. ROGERS. You also made reference to laws requiring sales by weight. In New Jersey we have a sale-by-weight law, regardless of the size of the basket. Can you step in and interfere with that law, when we are enforcing it without reference to the character of the basket?

Mr. CAREY. Hampers, round stave baskets, and splint baskets must be of one of the several standard sizes. That is all that we are interested in. If that basket is of a standard size we do not care how you mark it, but if we come along and find it is not a standard size, we will condemn it.

Mr. ROGERS. If a man sells a basket of potatoes he is required by our law to sell a certain number of pounds, and not a certain number of quarts of potatoes. Should we ignore the fact that he is not selling the product by weight if it is in a standard size basket?

Mr. CAREY. If the grower is using a 16-quart hamper, round stave basket, or splint basket, he can not be stopped from selling it for a half-bushel, by any State law requiring weights per bushel.

Mr. ROGERS. We could not stop him?

Mr. CAREY. I think that question is answered directly by the opinion given by the solicitor that this law makes inoperative all State laws requiring certain weights per bushel.

Mr. FOLEY. Then our law is of no use?

Mr. CAREY. The facts of the case are that there are a number of laws that are rendered inoperative under this act.

Mr. FOLEY. We fought for years to get this, and now, if a man buys a barrel of potatoes and sells 16 quarts for a half-bushel, we can not make him sell by weight? If he breaks the original package we can step in then, can we not?

Mr. CAREY. If he is using standard containers, I believe you would have a hard time under this act.

Mr. SWEENEY. It strikes me that a man selling directly by weight is not violating any law and is not amenable to this law as you read it. For instance, a grocer may put up 25, or 27 or 30 pounds of potatoes in a basket, and, even though that has somewhat the aspect of a hamper, if he advertises it at the exact weight contained, I do not think that this act can interfere with him.

Mr. CAREY. I believe that is so, but when a grower uses hampers, round stave baskets, or splint baskets of the standard sizes under this law, the States can not compel him to sell for a half-bushel a certain number of pounds. The standard container act of 1928 fixes the sizes of hampers, round stave baskets, and splint baskets. Sizes other than those standards are illegal and can not be made, sold, or shipped, or offered for sale or shipment, filled or unfilled.

The act, in establishing the standard bushel at 2,150.42 cubic inches, makes inoperative State laws requiring a certain number of pounds per bushel in so far as they pertain to fruits and vegetables packed in such standard containers. In other words, a State may not require a certain number of pounds of fruits or vegetables for a bushel if such fruits or vegetables are packed in standard containers established by the act.

Mr. SCHWARTZ. We have a law which standardizes the sizes of baskets, known as Chapter 248. Now, if I may be permitted, I would like to read Section 1 of Chapter 248 [reading:]

No person shall sell or deliver, or have in possession with intent to sell or deliver, any fruit or fruits, berries or vegetables, contained in any basket, box, or other container, unless such basket, box, or other container shall be of capacity, in standard dry measure, of thirty-two, twenty, sixteen, eight, four or two quarts, or one quart or one pint; *provided, however*, that nothing in this act contained shall be construed to apply to the sale or delivery, or the possession with intent to sell or deliver, of any fruit or fruits, berries or vegetables contained in any sealed can, jar, or bottle, or which are sold by the barrel, except cranberries, which may be sold in standard crates or barrels, of the standard measure as provided by the act to which this act is a further supplement.

Now the question is, does that new law practically vitiate and put this in the discard?

Mr. CAREY. It does as regards the 20-quart splint basket and the 2-quart size of hampers, round stave baskets, and splint baskets.

Mr. SCHWARTZ. May I ask another question? Under the sale-by-weight law, can we compel sales by weight or must we accept the standards as prescribed by the United States Government?

Mr. CAREY. I do not think we should confuse sales by weight with sales involving a specified number of pounds per bushel—if you get

the distinction. We believe sale by weight is absolutely the most satisfactory and most scientific method of sale; but I believe, and Mr. Spilman believes, that to require a certain number of pounds per bushel is utterly unscientific and untenable. We understand that Massachusetts, New Jersey, and Indiana are three States that have laws requiring sales by weight. In Massachusetts the retail sales of fruit and vegetables must be by weight or numerical count unless those sales are made in the original unbroken container, and that we feel is just as near right as it can be gotten.

Mr. FOLEY. Then the Department of Agriculture acquits the State of New Jersey, doesn't it? Under the law, is the maker to put his name or mark on the containers?

Mr. CAREY. This law requires no markings.

Mr. FOLEY. How will you find the man who manufactures the containers?

Mr. CAREY. Of course, the net-weight amendment to the food and drugs act requires certain markings on containers, but that is distinct from this standard container act, and is enforced by an entirely different office.

Mr. BEHRMANN. You have to put it on, under the food and drugs act.

Mr. FOLEY. Suppose I find some slack packages not in accordance with the label at a retail establishment. A package is labeled 30 pounds, but I find but 25 pounds. How will I find the original shipper of that package?

Mr. CAREY. As the net-weight amendment to the food and drugs act requires only that the net contents be shown on the container, if the shipment originated outside of your State I do not know how you can find out. If the shipment originated in your State, there is no reason why your State can not require that marking, and most States do.

Mr. BEHRMANN. Under the present law the way some packages are marked is intolerable. However, most of them are marked, although there are exceptions to the rule which are annoying.

Mr. MILLER. Is it not a principle of law that a State can not pass or enforce a law which is in conflict with a Federal law, but that the State can enforce additional restrictions?

Mr. CAREY. We know that in New York they require certain markings on containers for stuff packed in New York, and the same is true elsewhere. The States can go far but not in contravention to a Federal act.

Mr. MILLER. This Federal act does not require markings of any sort?

Mr. CAREY. It does not.

Mr. MILLER. But a State law requiring markings on a package would still hold?

Mr. CAREY. I believe it would, as far as intrastate transactions are concerned. The net-weight amendment regulates marking in interstate commerce.

Mr. MILLER. Our law permits fruits and vegetables to be sold in standard containers, but requires them to be marked to show the contents either by volume, weight, or numerical count. That is exactly in line with the Federal food law.

Mr. RAGLAND. We asked the question whether or not the State of Virginia could require a certain marking, "U. S. 1 Standard Bushel," on bushel baskets; and the opinion came back that inasmuch as this act required no marking in interstate commerce we could not require that. Our law requires dry commodities to be sold by weight. We also have a provision for original packages, which requires a statement of the net contents of the package. Now, suppose South Carolina ships into Virginia some snap beans, and they come in the individual containers from the grower. Do I understand you to say no markings are required as to the contents?

Mr. CAREY. Only in terms of capacity under the Federal food and drugs act—even the capacity is not required under the standard container act.

Mr. RAGLAND. There is no objection down my way as to the statutory weight. Some large concern may go to the eastern shore of Virginia and buy the potato crop. It is delivered to the various stores by weight and it is then sold by weight. Even if it is bought and sold on the basis of 60 pounds to a bushel, weight is required all the time. The part of the standard container act is to take care of the commission merchant, when these snap beans vary, perhaps, as much as 10 pounds in a hamper.

Mr. CAREY. I am certainly very glad to see the amount of interest shown here this afternoon. I do not mind saying, frankly, we have been so occupied working with manufacturers in the attempt to get them straightened out as to the capacity of containers, that there has been little opportunity for delving into the contingencies that may arise after the law becomes effective and practiced. Some of these questions have, however, arisen. The fact that the Federal act apparently nullifies or renders inoperative the State weight-per-bushel laws seems to be the most probable cause of future difficulty. It seems to us from the compass of the State laws and the local ordinances, that eventually some serious questions will arise, and that this is a matter that might very well engage the attention of weights and measures officials. Under this law, fruits and vegetables when packed in standard containers are perfectly legal; then I am wondering, Mr. Austin, whether in Detroit a seller can be required to give 2,200 cubic inches instead of 2,150.42 cubic inches for a bushel of potatoes. Some such questions are bound to arise one of these days and I think it would be well to give the whole matter some consideration. We will work with you.

We have a law to enforce and that is the way it reads, and those are the premises on which we will conduct ourselves. If you can do us any good or if we can do you any good, do not hesitate to address us.

Mr. FOSTER. Mr. Chairman, I would like to know if it is possible for the Federal authorities to require a mark as to capacity under the provisions of this law.

Mr. CAREY. No, it is not. We have not that authority. However, I believe a majority of the manufacturers are taking advantage of the provision for marking, and in that way a large number of containers will be marked with their identification mark and their capacity.

Mr. ROGERS. Just one more question. I believe that 90 per cent of dry commodities are sold by the pound, and that it is unfair to sell them by measure. We think things should be sold by the pound, by weight, and that it would be well to mark the net contents by weight rather than volume.

Mr. CAREY. It is a good argument and in my opinion the method would be perfectly workable for local products; but for fruits and vegetables coming from a distance—a great part of them now do—it would be impracticable. For example, snap beans, which one gentleman referred to, when picked and packed in hampers may have a net weight of 30 pounds. They are put in refrigerator cars—sometimes when hot—and when they get to their destination the hampers are mostly not full. A certain amount of evaporation has taken place and you have a net weight of something less than 30 pounds—it may be 25 pounds. A reduction in weight is bound to occur with almost any perishable product, so, even if the packer originally puts overweight in a hamper, there is no assurance when the container reaches the retailer that it contains a certain number of pounds. The packer could not always put in enough to offset that shrinkage. Thus there is no assurance that when containers of fruits or vegetables arrive at the retailer's door they will hold the same net weight as they did several days previously when they were packed.

Mr. SWEENEY. I understand you to state that there will be a shrinkage due to atmospheric conditions, and that this necessarily affects the weight?

Mr. CAREY. Yes.

Mr. SWEENEY. Then in establishing a bushel as 2,150.42 cubic inches, if there is a shrinkage the buyer does not get what the shipper claims?

Mr. CAREY. No; but he has a uniform method of comparing what is in that hamper.

Mr. SWEENEY. How about the retailer? You consider only the manufacturer. The retailer buys 25, 30, or 40 bushels put up in these standard hampers. He has to break them open and sell them at retail—he must determine their weight.

Mr. CAREY. Yes; his side must be considered.

Mr. SWEENEY. I think the real objection to establishing weights per bushel was that these varied considerably. One bushel of potatoes might weigh 65 pounds, and from some other State it might weigh only 55 pounds. Consequently, the retailer who subsequently sold by dry measure was getting the worst of the bargain.

Mr. CAREY. That is the point I was going to make—that the weights of fruits and vegetables vary with the variety, with the size, the point of origin, season of the year, and other conditions. The weight of a bushel of potatoes varies materially, and almost everything else has a variable weight depending upon various conditions. It is an impracticable thing, as has been determined by the State of Massachusetts, to set up and prescribe definite weights for fruits and vegetables.

Mr. WEBSTER. Mr. Chairman, would it be possible for you to have your office mimeograph copies of this address so that members of

this conference might have them? I am sure I voice the sentiments of many members.

Mr. HOLBROOK. We can arrange to do that.

Mr. C. P. SMITH. If there are 2,150.42 cubic inches in a standard hamper, is there anything that could be done to prevent the use of that as a standard measure? Could the State prevent that?

Mr. CAREY. I can not answer that.

Mr. C. P. SMITH. That is a proposition that we now face. Can a man use that hamper and sell the contents as a bushel, and thus fail to deliver 60 pounds to a bushel of potatoes, for instance?

Mr. CAREY. Under the law he would be able to sell that hamper for a bushel of potatoes. In certain places they require a bushel and a quarter by volume as a bushel, but under the act it is provided that 2,150.42 cubic inches constitutes a bushel. If a man sells a hamper full of potatoes for a bushel, my understanding is that he is perfectly within his rights in doing so.

Mr. C. P. SMITH. The State has said that for a bushel or half-bushel there must be a certain weight, but that is ruled out?

Mr. CAREY. I would think so. I do not know. I want to make this suggestion before I forget it because there might be answers made here extemporaneously that are erroneous—when you have a question pertaining to this law write in to us and we can get for you an opinion from the solicitor which will be unequivocal. I believe you have questions which should be answered in this way rather than to take my personal opinion, which may be far from being a legalistic one.

Mr. SWEENEY. I notice that in this pamphlet containing the standard container act you have put a slip which reads:

The solicitor of the department (of Agriculture) has expressed the opinion that the United States standard container act of 1928 in establishing the capacity of a bushel as 2,150.42 cubic inches (section 1 of the act), makes inoperative all State laws establishing weights per bushel so far as they affect fruits and vegetables packed in the containers standardized by that law.

That just applies to these standard containers for fruits and vegetables, and does not apply to the containers standardized by the 1916 act?

Mr. CAREY. It applies to fruits and vegetables packed in standard containers as specified in the standard container act of 1928.

Mr. DAVIS. In our State a bushel box for apples contains 2,173.50 cubic inches; we have established weights per bushel, and the law requires for a bushel of apples, 48 pounds.

Mr. CAREY. One answer to your question is that your requirement of 2,173.50 cubic inches for a bushel may be all right for a box or tub, but for hampers and round stave baskets or splint baskets that statute would be inoperative because the Federal law expressly specifies 2,150.42. Now, if containers other than standard containers are used they must not be in the form of hampers, round stave baskets, or splint baskets, since these must be of the sizes enumerated in this law. Containers other than these are not affected by this law.

Mr. RAGLAND. Did I understand you to say that there may be shrinkage and it did not make any difference whether the container was filled or not? In my section we ship lots of turnip tops—they shrink, and the hamper will not be full at destination. I judge from

your interpretation that the fact that it is a standard container destroys any interest that I may have as to whether it was filled or not.

Mr. CAREY. You can not get away from the fact that fruits and vegetables do shrink after packing and that is the reason why in a very great many instances, the commodity is heaped above the top of the basket when the container is originally packed. The shipper tries to put enough in, in addition to a bushel, so that it will take care of the shrinkage that will naturally occur.

Mr. RAGLAND. Is it the intention of the Department of Agriculture to make any tolerances in respect to these hampers and baskets? Can tolerances on filling the containers be established or how can we control partial filling?

Mr. CAREY. There are no tolerances except for the capacity of the container. In the case of a bushel the tolerances are 25 cubic inches in deficiency and 50 cubic inches in excess, when filled to the top.

Mr. BEHRMANN. Do I understand that you can ship in other containers than the standard?

Mr. CAREY. You can if you use containers of other types.

Mr. BEHRMANN. Then why the law?

The ACTING CHAIRMAN. This interesting discussion has brought out that it will be incumbent on weights and measures officials to study the law before it becomes operative, so as to foresee some of the difficulties and enjoy that privilege indicated by the speaker of writing to the Department of Agriculture for some official determination.

STANDARDIZATION OF ICE-CREAM CANS, BRICK MOLDS, AND CARTONS

By RIDGWAY KENNEDY, *Chairman, Simplified Practice Committee, International Association of Ice Cream Manufacturers*

Mr. Chairman and gentlemen, the Simplified Practice Committee of the International Association of Ice Cream Manufacturers, during 1928, conducted a survey of the number of bulk ice-cream cans of standard capacities in use throughout the country.

We found there were as many as—

Eleven 5-gallon cans of different dimensions.

Thirteen 3-gallon cans of different dimensions.

Ten 2-gallon cans of different dimensions.

Eight 1-gallon cans of different dimensions.

Now, as the general use of mechanically refrigerated cabinets throughout the industry has, to a large extent, standardized the use of the 5-gallon cans, we felt it unnecessary to consider the 2 and 3 gallon cans, as most of us are no longer placing orders for these sizes and are merely using those we have until they are worn out and can be discarded.

Replacements are almost entirely made with the 5-gallon size, and as 1-gallon ones are used largely for home orders, we decided to confine our attention to these two capacities. We found in the 5-gallon cans two general types, commonly known as the tall and squat

types. We decided upon a set of standard dimensions for these two classes, so that those who have cabinets to fit the tall or squat size would not have to change their cabinets. A set of dimensions for the 1-gallon can was also decided upon.

At this point the advantages of using a 2½-gallon can, two of which can be placed, one on top of the other, in the same cabinet hole that was designed for a 5-gallon can, were then discussed. The advantages of this can were of sufficient importance that we decided to recommend sets of dimensions for them to fit the squat and tall 5-gallon cabinet holes.

At this time I would like to read the report of the chairman of the Simplified Practice Committee, during 1928, F. J. Bridges, of the Hydrox Ice Cream Co., Chicago, to the international association, presented at the Cleveland convention:

When the Simplified Practice Committee was appointed by your officers, it was done with the feeling and definite knowledge that the application of simplified practice to the business of the members of the International Association of Ice Cream Manufacturers would be as beneficial as its application has been to many other lines of business throughout the country.

The idea, of course, is not new. It has been a definite part of the program of activities of the division of simplified practice of the Bureau of Standards at Washington for several years. While it may not be possible to show as large savings to the ice-cream industry as has been possible in other industries, the history of which, no doubt, you are familiar with through bulletins sent out by the Department of Commerce, as well as the attention accorded simplified practice by various trade papers and magazines, we are confident that satisfactory savings can be assured to the ice-cream industry by accepting simplified practice as a principle and adopting those changes in our procedure and equipment that from time to time are shown to be of definite value to the industry.

The first subject this committee has applied itself to is ice-cream cans. The work that we have done in this connection may have appeared to some of our members more like standardization than simplification. However, the thought actuating our activities in the can situation was, first, the simplification of manufacture as we felt them, and our feeling was borne out by the can manufacturers, that definite savings might be accomplished in the manufacture of ice-cream cans if all of the can manufacturers adopted the same dimensions for the various size cans.

In our meetings with the representatives of the can manufacturers we found them wholeheartedly for such a reform, and at one of our meetings attended by all of the larger can manufacturers, samples of the various sizes manufactured were submitted by each manufacturer and compared as to dimensions, weight, type, and general desirability. The variations in dimensions were even more marked than we had expected, it being a fact that no two can manufacturers were manufacturing cans of exactly the same dimensions. After some time spent in comparing the cans and discussing the different dimensions, in all of which discussions the can manufacturers showed a splendid spirit of cooperation and give-and-take, we arrived at our conclusions which were made the basis of the preliminary report which was sent to the members of the international association.

There is very little for your committee to add to the report and recommendations which were sent to you. We believe if this report is approved by the membership, it will mark a definite step in the progress of this industry, which is rapidly taking its place as one of the major industries of the world. We presume that this committee will be continued, and that it will apply itself this coming year to other subjects affecting our industry and within its scope, which we hope will meet with your continued support and approval.

The conclusions arrived at by your committee as to can sizes are as follows:

I will not read the dimensions agreed upon for each size, but state that we recommended two sets of dimensions for 5-gallon cans; two

sets of dimensions for 2½-gallon cans, namely, the high type and the squat type; and one set of dimensions for 1-gallon cans.

In conclusion, Mr. Bridges stated:

This report and the recommendations of can dimensions were adopted by the unanimous vote of those present. I trust that you will give careful consideration to this matter and adopt the sizes of cans as recommended by this committee. You, of course, will continue to use the present sizes that you have in use in your business until they are worn out, and then you can put the new sizes into effect on all the new cans you are ordering for replacement, and as time goes on these sizes will come into 100 per cent use.

Now, the advantage of this simplification will result in less investment in dies and equipment and in stock of so many sizes for the can manufacturer and in his being able to get greater economies into production on larger runs of each standard size, with the result that the cost of cans should be reduced to the ice-cream manufacturers. For this reason, your Committee on Simplified Practice trusts that you will adopt the standard dimension cans that they have submitted and were adopted by the international association.

A motion was then presented adopting the recommendations and sizes proposed in the report, and was passed by a unanimous vote. The effect of this will be that all new cans ordered for replacement in the future will be of standard dimensions.

Now at this point I would like to present to you the advantages of the 10-quart or 2½-gallon can, which have led to its adoption very largely in connection with the mechanically refrigerated cabinet.

As the advantages of the 2½-gallon can are dependent upon its use in mechanically refrigerated cabinets, I would like to give you a brief history of what took place in our business in the period of changing from ice and salt cabinets to the mechanically refrigerated ones.

I would like to explain at this point that we use what is known as the "order system" in the delivery of ice cream in Philadelphia, against what we know as the peddling system, that is in general practice in most other cities. Our ice-cream dealers are called on the telephone by our telephone order clerks between the hours of 8 and 12 in the evening to receive their orders for ice cream to be delivered the following day, while in most cities the ice cream delivery man loads his truck with the amount of ice cream which he expects his dealers will need when he arrives at their stores. The result is that with our order system the dealer must anticipate the amount of ice cream of each flavor that he will sell from the time he is called by our order clerk until the driver arrives the following day. With the peddling system the dealer does not have to do any more than look into his cabinet when the driver arrives and then order enough cream to fill up the cabinet.

Under the old system of using ice and salt cabinets our dealers were in the habit of placing from 8 to 10 cans of 2, 3, or 5 gallon size in what we call a 6-hole cabinet. They did this in order to take care of the partly empty cans and to replenish their supply and make room for the full ones. It was possible to do this in our ice and salt cabinets, because we did not use any metal cylinders or partitions, which make a separate space for each can to sit in, so that the dealer by putting the cans closer together, or staggering them, could put a greater number of cans in an ice and salt cabinet than its rated capacity.

When mechanically refrigerated cabinets came into the field, the problem had to be faced as to how the dealer could put a full can of ice cream in the cabinet holes when from 1 to 10 quarts were still left in the 5-gallon can already in the cabinet. We decided to copy the system in use in Milwaukee of using $2\frac{1}{2}$ -gallon cans that were equal in diameter to the 5-gallon cans and one-half their height, which will allow two of them to be placed in each 5-gallon hole. By doing this the dealer could order $2\frac{1}{2}$ gallons of each flavor and place the full can in the bottom of the cabinet hole and the partly filled can on top of it.

This has the advantage of increasing the number of gallons of ice cream the dealer can keep in a cabinet of a given number of holes, under regular operating conditions, because if he uses 5-gallon cans and has 2, 3, or 8 quarts left in each one, he can not put a full one into the hole until the 5-gallon cans are empty.

The dealer appreciates the value of the increased storage capacity and the ease with which the cream may be dipped from the top can, with less reaching down into the bottom of the cabinet hole. When the top can is empty the full one can be lifted up from the bottom of the hole and the empty one placed in the bottom and the full one placed on top and the cream is still in the upper part of the cabinet hole in more convenient dipping position.

This arrangement has the added advantage of keeping the ice cream fresher, as the dealer can order twice as often in the $2\frac{1}{2}$ -gallon size as he would in 5-gallon cans. We consider this a very important matter in the sale of ice cream. That ice cream, like all dairy products (other than cheese) does not improve with age and is better flavored and smoother when fresh made, is generally understood by every one in the industry.

This is the reason I want to stress this important advantage of using $2\frac{1}{2}$ -gallon cans over 5-gallon ones. Many small customers, such as restaurants, cafeterias, etc., if they are purchasing ice cream in 5-gallon cans, are serving your product a week or 10 days old, while if it were possible for them to buy in $2\frac{1}{2}$ -gallon cans they would have their supply replenished just twice as often, and consequently, the public will eat your product in fresher condition.

The $2\frac{1}{2}$ -gallon can, on account of it only being one-half the height of the 5-gallon can, can be, and is, made out of one piece of metal, drawn in dies in such a way that there is no joint at the intersection of the side wall and bottom, making it practically impossible to leak or for the solder in the joint to open up and leave an unsanitary place for dirt or ice cream to accumulate and contaminate your product. Being made of one piece, there is no side seam either, as there are in some types of 5-gallon cans.

The $2\frac{1}{2}$ -gallon cans with flat lids and no handles on them lend themselves to perfect stacking in the hardening room and in the ice cream truck. We find that we can stack nine $2\frac{1}{2}$ -gallon cans, one on top of the other, in the same height in a hardening room as four 5-gallon cans. This is due to the 5-gallon can having the bottom set up to allow for the bottom rim. The one-piece $2\frac{1}{2}$ -gallon cans are $9\frac{1}{4}$ inches in height and the 5-gallon cans are $18\frac{3}{4}$ inches in height. The top $2\frac{1}{2}$ -gallon can in a pile nine high is easier to lift down than a 5-gallon can on top of a pile four high, because of

the lighter weight. I might also add that we use flat lids with the edge flared out so the dealer can catch hold of them to remove them easily.

In the filling of 2½-gallon cans our freezer men, when drawing the cream, have been taught to open the freezer gate and fill the 100-quart runs of cream without shutting the gate. This is done by quick manipulation of the cans under the stream of ice cream flowing out of the freezer. With a little practice, the freezer man has become trained to fill each can with the proper amount and not spill any of the ice cream over the sides of the can or on the floor.

It usually takes 1 minute and 15 or 20 seconds to fill 100 quarts of ice cream into 10-quart cans. The same time is used to draw 100 quarts into 5-gallon cans as the gate of the freezer is closed after filling each can of this size, because the 5-gallon can of cream being twice as heavy can not be readily moved over with one hand, and the next empty one moved into position, under the flowing stream of cream discharging from the freezer. We have tried to get our freezer man to fill the 5-gallon cans without closing the gate on filling each can, but find that he must use two hands to lift the 5-gallon can, as it is entirely too heavy for one.

The last advantage we found in using the 2½-gallon can was a greater freedom given to each dealer to order the proper quantities of each flavor in proportion to his sales. If he sells more vanilla or chocolate than peach or pineapple, he can carry an extra can of vanilla or chocolate and put it in the cabinet under the can of the slower selling flavors.

Now, I understand there are laws in force in several States that were adopted to protect the public against fraud and short measure that prevent the use of this size can because it is not of even gallon capacity. This size can is not adapted for use on orders delivered to private homes, and is only designed for use in connection with iceless cabinets. Its advantages, which I have just indicated, are so apparent to those in the industry who are using them that we hope we may have your cooperation and support in doing whatever is necessary to make it legal to use these cans in territories where they are now unable to do so on account of regulations in force.

You will notice by examining the cans that I have here that the 2½-gallon can is of the same diameter as the 5-gallon one, and only one-half its height. Two of them—one on top of the other—occupy the same space as the 5-gallon one, and so both fit in the same cabinet hole as the 5-gallon one. Note the difference in general dimensions from the old 2 and 3 gallon cans so there can not be any deception to the eye or mistaking one for the other; thus there can be no objection to the 2½-gallon can from this standpoint.

This year the committee has devoted its attention to a study of the 2-gallon brick mold dimensions and cartons for hand-packed quarts and pints, and the quart and pint machine-filled cartons. Our investigation discloses the same condition exists with molds and cartons as with the can sizes, and many different molds and cartons having the same capacity, but of widely varying dimensions are being used.

We held our preliminary meeting at the office of the Dairy and Ice Cream Machinery and Supply Association (Inc.), in New York City,

on April 3, 1929. A questionnaire was prepared and sent to the membership on the sizes of cartons and molds, and gallonage handled in each size. The result of this questionnaire will indicate the important sizes for us to consider. Our next meeting will be held in Washington, at the division of simplified practice, of the Bureau of Standards. We have had the cooperation of W. E. Braithwaite, of the bureau, in our work during 1928, and again this year. F. S. Holbrook, of the Bureau of Standards, is also lending us great help in the matter of checking the proper capacity of these containers. We want publicly to thank those gentlemen for their splendid cooperation in our work.

We decided not to take up the subject of smaller retail packages than the pint size at the present time, as there are three or four types in use by the industry at present—rectangular, cup-shaped, and cylindrical. The use of these in 5, 10, and 15 cent sizes is a recent development in connection with merchandising ice cream, and their practicability and the public preference has as yet not been clearly enough indicated to warrant our taking them up with a view of simplifying shapes or sizes. This matter will be left for future consideration of this committee.

In conclusion, I sincerely hope that I have been able to present to you a clear picture of the work that is being done by the International Association of Ice Cream Manufacturers to standardize and simplify the number and size of containers through which our product is handled, and to assure you that you may expect from us, as individuals, complete cooperation in matters of mutual interest.

RAISING THE STANDARD FOR LOCAL WEIGHTS AND MEASURES OFFICIALS

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

Mr. President, members of the National Conference, and guests, the subject assigned to me is a very delicate one—one I will endeavor to present to you from two different angles. First, conditions as I have seen them during my brief two-year connection with weights and measures work in jurisdictions wherein the State controls and has exclusive jurisdiction over all inspectors within that Commonwealth—I refer to those States wherein the inspectors are appointed and their salaries paid by the one State agency in control of the work; and second, conditions in jurisdictions throughout the United States wherein the inspectors are appointed and their salaries paid by the several municipal subdivisions thereof and where the State government, through its department of weights and measures, has nothing but cooperative jurisdiction over the local inspector, but has concurrent jurisdiction as well in the enforcement of the law.

As to the first classification under consideration, I need not call the attention of any one here present to-day to the vital importance to the public generally of weights and measures supervision. That question is well settled and is paramount in the minds of everyone of you here present to-day. From information which I have been able to gather, the efficiency of the inspectors in the class now under discussion is of a high type. The personnel of this class are well

paid for their services and they are generally conscientious, hard working, and well qualified for the work to which they are appointed. In some jurisdictions, civil service, state-wide, prevails so that these men have no apprehensions as to their tenure of office. This condition alone is such as to create an interest in the work of the inspector, which is highly commendatory. Where civil service does not prevail the appointments are tinged with considerations of political preferment and there is the likelihood of an inefficient man receiving an appointment as an inspector of weights and measures, whose tenure is safe during the political life of the appointing power. Generally, where such conditions prevail the appointee is interested only in drawing his salary and in serving in a political way the power to which he owes his appointment. The question then arises as to how this condition can be met or overcome, and I take it that this only can be done under conditions where high-class, nonpartisan civil service prevails. Under conditions which I have just described, the superintendent of weights and measures of the State can scarcely control the activities of that appointee.

Now, as to the second classification heretofore referred to, namely, in jurisdictions where the inspectors are appointed and paid for their services by the local municipalities employing them and where the State authorities have concurrent and cooperative jurisdiction only, a different condition arises and prevails, and what I am about to say now will refer to conditions as they will be found in the State which I have the honor to represent here to-day.

In Pennsylvania there are two classes of inspectors, namely, those who are appointed by the county commissioners of the several counties within our Commonwealth, and, secondly, those who are appointed by the mayors of first, second, and third class cities. It is quite true that the inspectors appointed by the cities are very well compensated for the work which they do, and any lack of efficiency which might arise amongst that class of inspectors could not be attributed to insufficient compensation. If there is any inefficiency amongst this class, it can be attributed to the fact that some of them have other interests which engage their attention and to the further fact of their allegiance to the political power which appointed them. This condition does prevail in some parts of our State.

On the other hand, in most of the counties of our great State, the county commissioners, in their anxiety and zeal to keep the cost of county government as low as possible, try to get the work done as cheaply as possible, and I am sorry to say that the commissioners in some of our counties have no interest whatever in serving their constituents along the line of protecting them from false weights and measures. Some of them advertise for bids for the work in an effort to keep down the cost. Some commissioners advertise for bids annually in order to secure men who will do the work cheapest, although the political tenure of office of said commissioners is for four years. By this system a county will have four inspectors in four years and if the successful bidder attempts to deliver any *quid pro quo* for the amount of his bid, he only begins to learn the work when he is supplanted by another inspector appointed

for the next year, and so on, and so on. I leave it to every gentleman here to-day to judge as to the efficiency of that method of administering weights and measures work. It can be seen from this angle that the commissioners, by the method of annual appointment and a different appointee annually, are able to reward politically four of their constituency who were active in securing the election of these commissioners. I have in mind one of our counties advertising for bids, and receiving a tender of service for \$218.14 per annum. This stipend was not even sufficient to enable this gentleman to cover his county once a year, he paying his own expenses, if you please, and I am positive that when that appointee, if interested next year in the work, is permitted to bid for the job his figure will be very, very much higher than the one under which he received his initial appointment. What is the remedy? Is there any remedy?

It would in the first place, be impossible to pass any legislation in our State placing local inspectors absolutely under State control—I mean by that, the appointment made by the State, the work supervised by the State and the salaries paid by the State. So that phase of the matter is entirely eliminated from this discussion.

On the question of civil service, the constitution of our State prohibits civil service with respect to counties and the situation along this line can not be considered from this angle. However, civil service does prevail in cities of our State of first, second, and third classes, and conditions such as I have described could be remedied and cured if civil service were strictly adhered to. Is there, therefore, any way out of our dilemma? That was the problem which confronted me when I entered the State service under the bureau of standard weights and measures at Harrisburg two years ago. The matter gave me a very great concern and I set about to relieve the situation as best I could.

The bureau over which I have charge *inter alia* has 12 deputies, and I personally assigned a certain number of counties to each deputy with instructions to form a personal contact with each inspector within his territorial limits.

These deputies go along with the local inspectors and instruct them in the work in which they are engaged and have been able in some instances to get the local inspector to submit to the deputy, a monthly report of his activities. Furthermore, each deputy calls an annual conference of the men in his district at a point as central as possible, in the respective territories, at which conferences I attend and matters relating to all phases of the work are there and then discussed. The local men, indeed, have taken such an interest in these conferences—always accompanied by a nice luncheon—that I have no hesitancy whatever in recommending to every State weights and measures official here to-day the adopting of this method of getting in close personal contact with every man in the field and of endeavoring to interest him in his work. I am able to learn at these conferences all of the troubles of the inspectors and notes are made thereof; afterwards I personally use my best efforts to iron out the troubles which the local men have. For instance, a number of them are dissatisfied with the salaries they receive and appeal to me to use my best efforts to have same raised if possible.

I get in touch with the local authorities and endeavor to impress upon them the great importance of the work which these men do and that the laborer is worthy of his hire. I am happy to say I have been able to help some of our local inspectors along the lines just noted. The sole question of efficiency as I take it, depends upon the interest which the local man takes in his work and if personal touch with the inspector can be had and he is properly handled, his work will grow better and better and his efficiency therefore is increased.

Another phase of interest I find, to get the local men interested is to have an annual State convention, and use every endeavor to have each one of these inspectors present at at least a 3-day session with a high-class program—and an entertainment on the side—which we have found greatly increases the interest of the inspector in his work. Of course, you can not get them all to these conferences because either they personally can not afford the expense or their employers will not advance or reimburse them for their expenses incident to such a convention. But I am happy to say that contact with the commissioners in a proper manner will go a long way toward this end. I have been very successful along these lines.

Efficiency, as I stated before, consists of the interest which an inspector will take in his work, and the interest which he will take in his work is governed largely by the compensation which he receives therefor. We have a provision in our law by which a county and a city can jointly employ an inspector, subject to the approval of our department and each paying part of the salary of the inspector. I have been instrumental in bringing about such a condition within the last year in four or five counties in our State where the city man was not fully compensated for his work and where the county man was compensated even to a less degree. I was able to make those two subdivisions come together and employ one man at a salary which was satisfactory to everybody in interest. I have also been able within the last year to persuade four or five third-class cities in our Commonwealth which did not appoint inspectors of weights and measures, and whose jurisdictions were not supervised by the county inspectors, to appoint men to do this work at salaries which were more or less attractive, and in this way we are getting results from those third-class cities from which results had not been obtained before.

The whole question is most important and difficult of solution and is one which will have to be handled by each of you gentlemen here present from the several States of the Union according to the conditions as you find them locally.

Summing up, we have: First, States where the work is in full control of the superintendent of weights and measures of that State, where efficiency generally prevails amongst the inspectors, and where, if there is laxity, relief I take it can be had only under State civil service.

Second, States where conditions prevail as they do in Pennsylvania and which I have just attempted to describe, wherein the relief lies in personal contact with each local inspector, along the lines which I have just mentioned, namely, by endeavoring to get, through the local officials, the salaries of the men increased at least to a

comfortable living wage; by such contact with the various municipal subdivisions whereby additional men can be put to work at fair wages in some cases; and in other cases by doubling up or consolidating, as it were, eliminating the services of one man and combining the work of two.

Personally, I favor and recommend complete State control and would advise you representatives here to-day to endeavor to get your legislators so to place this work in the interests of efficiency, which is so much desired and which the public is commencing to demand.

I trust I have been able to make myself clear on the subject under discussion and would be very glad, indeed, to answer any questions which any gentleman here present may propound.

Mr. President, members of the conference, I thank you.

NATIONAL SCALE MEN'S ASSOCIATION BULLETIN NO. 1, ON REPAIR OF HEAVY-CAPACITY SCALES⁵

By C. F. HAWKINSON, *President, National Scale Men's Association*

The subject of this paper concerns a matter handled at the last annual meeting of the association at Milwaukee, April 9 to 11, 1929, of first-ranking importance in weights and measures work.

The National Scale Men's Association might be said to differ from this conference in one major respect. Some editorial writers on matters pertaining to human intercourse would have us believe that for reasons which need not be mentioned here the American public consists of two principal divisions—one division whose business it is to catch somebody doing something, and the other division trying to keep from being caught.

Such a writer viewing with a cynical eye the activities of these two organizations might classify the national conference as a group of individuals organized to improve their facilities for catching somebody, and the National Scale Men's Association as a group organized to develop avenues of escaping the machinations of the former.

To be sure, the underlying motives of the respective organizations are not those just outlined. Certain it is, that each organization with its own interests in mind and with the facilities at its command endeavors to attain the same end, namely, insuring the confidence of the public in commercial transactions in which weights and measures service is involved.

Thus, it happens that the National Scale Men's Association, an organization of practical workers in the manufacture, distribution, operation, and maintenance of weighing machinery, found itself in a situation demanding self-discipline of a sort, and regulation of business peculiarly its own, and with which the subject of this paper is concerned, namely, the trade practices in the repair and overhauling of heavy-capacity scales. I think it unnecessary to outline the past deficiencies in those trade practices. Certainly they must have been obvious to all who have had anything like intimate contact

⁵ In the absence of Mr. Hawkinson, this paper was read to the conference by Harry M. Roeser.

with weights and measures control. Perhaps we have been remiss in not swinging the mailed fist sooner; however, be that as it may, we have swung it now. If our hopes only approximate consummation the comfort with which members of the conference pursue their daily official affairs should be materially improved. We, therefore, bring the subject here in order that you be not deprived of whatever joy may be found in such anticipation, and also because we desire to leave it with you as a monument to our sincerity of purpose.

By action of the association at its annual meeting held in Chicago, March 6 to 8, 1928, a committee was formed and instructed to prepare a set of specifications covering the repair and overhauling of heavy-capacity scales for presentation at the 1929 meeting. This was done, and the specifications adopted. The unanimity of opinion was not striking, but the approval was obtained after some rather adroit parliamentary procedure. The committee was continued and instructed to act on criticisms received, the purpose being to offer revisions that may seem advisable at the next meeting.

These specifications, reprinted from the current number of the Scale Journal, have been distributed among you. I will not read them in detail, since, if interested, each of you can do that. I would like, however, to point out what might be considered some striking innovations in scale specifications.

First, Section II, paragraph 6, which prescribes the accuracy of setting pivots in terms of lever multiple.

Second, Section IV, paragraph 1, which prescribes that worn beams shall be repaired only by milling.

Third, Section VIII, which prescribes tolerances on the performance of repaired scales. This section is considered unsatisfactory as regards the sensibility reciprocal. I do not agree with the criticism that has been made of it, but will probably have to defer to the judgment of my colleagues.

We would like the conference to take official notice of these specifications. We intend to eliminate practices obviously incompetent, surviving the wooden weighbridge and bottle-weight days. Further, to be more ambitious, our intention in this and similar future publications is to establish creditable trade standards that will attract capable and intelligent personnel into this field of activity.

Perhaps your policies do not permit you to become over enthusiastic about matters of this kind. Cooperation is a thing much spoken of by many who have scant conception of what it means. We do not ask particularly for cooperation because we feel that, perhaps, we are not in position to do as much for you as you may be able to do for us. We prefer, then, to ask you outright to give us something, namely, an expression of formal opinion by resolution or otherwise concerning this line of effort. Such will serve a useful purpose in our foundation of the work, and if, in addition, you can see fit to give us the benefit of your counsel, that will be appreciated greatly. We hope, therefore, that you give us this consideration, in return for which we can at least offer you the assurance of our sincerity in seeking, by mutual assistance, the successful culmination of mutual lines of effort.

ANNOUNCEMENT

Mr. HOLBROOK. Mr. Chairman, if I may make an announcement at this time I will say that four reports of the Committee on Specifications and Tolerances are now in mimeographed form and are available on the desk in the hall, and if you will pick those up on your way out and study them before they come up in the conference it may expedite the action on them. One is the report on modification of specifications for liquid-measuring devices and another the report of the Committee on Specifications and Tolerances on grease-measuring devices, both of which will come up Thursday. Then there are two other reports, one upon liquid capacity measures and another upon milk bottles, which are also available.

(At this point, at 4.17 o'clock p. m., the conference adjourned to meet at 10 o'clock a. m., Wednesday, June 5, 1929.)

THIRD SESSION (MORNING OF WEDNESDAY, JUNE 5, 1929)

The conference reassembled at 10.15 o'clock a. m., at the Bureau of Standards, Dr. George K. Burgess, president, in the chair.

REPORT OF THE SECRETARY OF THE CONFERENCE, F. S. HOLBROOK

Mr. Chairman and gentlemen, it has been several years since the secretary of the conference has made a report as such, although he has been under the necessity of making a very great many reports upon other matters. However, it seems advisable this year to present briefly a résumé of the State legislation that was introduced throughout the United States during the year last passed. Each of you is, of course, familiar with the bills introduced in your own State, but the opportunity is not given you to get a picture of what the weights and measures officials of the country, and others interested in weights and measures, are thinking about collectively, as pictured by the legislation which is introduced in the various legislatures. The subject is a dry one at best. Especially would this be the case were we simply to make an alphabetical list of the States and outline the provisions of the bills introduced in each. Perhaps it will be of somewhat more interest if we group these bills under headings indicating their general purport and thus indicate to you, very briefly, what States have proposed bills of the types described. A few bills of strictly local interest will be omitted from the discussion.

Administrative Matters

Establishment of Departments of Weights and Measures.

Effort was made on the part of three States, namely, Delaware, Maryland, and North Dakota, to establish State supervision of weights and measures, and thus bring themselves into line with those States which are now directing the weights and measures work within their borders. Unfortunately, only one of these bills, that of North Dakota, was successful.

This new law in North Dakota creates a department of weights and measures under the jurisdiction of the State food commissioner. The law provides that this official shall have supervision and control over all weights, weighing devices, and measures in the State, provides for the employment of an expert scaleman, deputies, and other employees, and abolishes the duties imposed by former law on the sheriffs of the various counties in relation to the inspection of weights and measures. A fee system is provided, and the intention is expressed in the law that the department shall be self-supporting from the fees imposed. The main sections of the law defining the powers and duties for carrying on the inspection work follow, in general, similar provisions of the model law adopted by this conference; but the law as enacted, together with existing laws relating

to weights and measures, is not as broad in its scope as the model law. For instance, the sections of the model law relating to the sale of thread, coal, butter and oleomargarine, to bottles for the sale of milk and cream, and to the standard barrel, are not included.

The proposed law in Delaware was a comprehensive one, following, in general, the model law adopted by this conference. The testing engineer of the State highways department was designated in the bill as the State superintendent of weights and measures. The proposed law authorized him to employ not more than three inspectors at a salary not to exceed \$1,800 each.

In Maryland, the bill proposed to create supervision of weights and measures throughout the State, except in the city of Baltimore, where the existing system was to be retained. The bill provided for a State superintendent of weights and measures, a deputy superintendent, and 12 inspectors. The provisions of the old law requiring the county commissioners of the various counties to appoint county inspectors was to be repealed. The new personnel was to be appointed by the State board of agriculture from eligible lists prepared by the State employment commissioner. The sections of the proposed law followed, in general, corresponding sections of the model law adopted by this conference, but not all subjects were covered.

Consolidation with Other Departments.

Two bills were introduced in the Wisconsin Legislature for the purpose of consolidating several departments, including that of weights and measures, but we are not informed as to the final outcome of these proposed measures. Under one of these bills the department of weights and measures would be included in the department of agriculture, and under the other in the bureau of public safety. By the terms of the latter bill all of the inspectors of the weights and measures department would be State police officers. Their primary functions would be that of policemen, but when not so engaged, they would perform other duties, including weights and measures work.

Licensing.

The law in North Carolina prescribing fees for the test of individual pieces of apparatus was replaced by a law levying an annual license tax upon the business of selling or delivering weighing or measuring devices. It is provided that before any franchise or license is issued to any manufacturer or jobber, he shall file with the State department of revenue a statement from the commissioner of agriculture that his device or apparatus has been examined and approved by some duly authorized State inspector of weights and measures in accordance with the general rules applying to such devices.

A bill considered in the Texas Legislature, provided for the giving of correct measure in the sale of gasoline and oil, and the licensing of operators of gasoline pumps and charging fees therefor. The fees were to be credited to a special fund which the commissioner of agriculture was authorized to use for the purchase of equipment for the weights and measures division and for salaries and expenses.

Penalties were provided for the giving of short measure, and for the third offense the penalty was to be cancellation of the license which could not again be renewed. This bill failed to pass.

A bill was introduced in Michigan for the regulation and licensing of dispensers of gasoline, but this failed of passage.

A bill was introduced in Vermont requiring the owner of a pump or other device used for the purpose of dispensing gasoline or oil, to obtain an annual permit. This measure failed to become a law.

Testing of Apparatus.

A section of the New York law in regard to the sealing of weights and measures, was amended so as to require the annual sealing of weights and measures belonging to all pressers of hay and straw for market, and to hucksters, peddlers, and junk dealers.

Another section was added to the New York law which requires gasoline pumps hereafter installed to be inspected and sealed before being put into use.

A law was passed in Vermont requiring all tank vehicles used in the delivery of motor fuels to be calibrated under the supervision of the commissioner of weights and measures and under such regulations as the commissioner may prescribe.

In relation to the repeal by Maine of an act passed in 1919 making it unlawful to sell a scale or measuring device until a scale or measuring device of the same manufacture, type, and kind had been approved by the National Bureau of Standards, it may be mentioned that it was evident that this law was bound to be inoperative. No authority has been conferred upon the Bureau of Standards to pass upon types of apparatus, and the bureau did not desire to proceed along these lines without special authorization—even at the request of a State government.

The law in Pennsylvania relating to the inspection of weighing and measuring devices was amended so as to include the inspection and test of weighing machines and scales installed in places frequented by the public, which are intended to indicate the weight of any person or object upon depositing a coin.

A bill was introduced in Pennsylvania, but failed to pass, which provided for the checking and testing of liquid-measuring devices, machines, and meters used for measuring motor fuels. This bill provided that the operator of a liquid-measuring device should test the accuracy of delivery and report the same upon official charts provided for the purpose. Weights and measures inspectors would have been permitted to examine the charts and to make such tests as they deemed necessary.

A bill to require tank wagons and tank vehicles, used for liquid fuels usable in internal-combustion engines, to be equipped with meters or measuring devices, was introduced in the Pennsylvania Legislature, but failed to pass. Tolerances would have been established by rules and regulations.

A bill was introduced in Vermont to require the distributor of motor fuels to equip all his delivery wagons with meters and to measure with such meters at the time of delivery the amount of motor fuel sold. He was also to be required to keep a record of all sales and deliver to the purchaser with every consignment a written

statement containing the date and the number of gallons. This bill failed to pass.

Weighmasters.

An act was passed in Pennsylvania providing for the appointment of sworn weighers to serve without compensation, and to perform certain duties in connection with the manufacturing company, transportation company, merchant, or dealer who requests the appointment of such weighers. These weighers are authorized to weigh for the company or firm by whom they are employed, and required to take oath to report true and correct weights. A penalty is provided for violations on the part of the weighers.

A bill was introduced in the Legislature of Washington for the appointment of State weighmasters, but it failed to be reported out of committee.

A proposed bill in Texas, which failed to pass, provided for the amendment of various sections of the existing law relating to public weighers. Under the present law the appointment of public weighers by the governor is based upon the quantity of cotton, grain, rice, wool, sugar, and other products handled, while under the proposed legislation the governor was authorized to appoint in each port of the State and in some other cities as many public weighers as he thought necessary. Weighers in counties were also provided for.

Duties of Inspectors.

An amendment was proposed, but failed to pass, in the Pennsylvania assembly, to change the law relating to the duties of the inspectors so as to require that each inspector furnish to the authority appointing him a list of the owners of all scales, weights, and measures inspected by him; the period of inspection was intended to be changed from an indefinite one to at least once in each year.

Civil Service.

A bill dealing with some of the principal sections of the weights and measures law of Ohio provided, among other things, for the placing of the deputy county sealers of weights and measures under civil service. This bill passed both branches of the legislature, but was vetoed by the governor and thus failed to become a law.

Retirement.

Bills were presented in New Jersey for the retirement of county and municipal superintendents and assistant superintendents of weights and measures at one-half pay, who had reached the age of 60 years and served for a continuous period of 20 years. Provision was also made for retirement on account of incapacity. A contribution on the part of the employees of 3 per cent of the salary was provided for.

Fees.

In Maine the fee schedule was amended by increasing the fees on certain types of apparatus, and prescribing fees for the test of certain apparatus which was not previously included in the schedule of fees.

Changes were proposed in the Nebraska law relating to fees, providing, among other things, for the confiscation and sale of scales on which the license fee had not been paid.

SALE OF COMMODITIES

Bread.

A bill to require the sale of bread in units of 1 pound, 1½ pounds, and multiples of 1 pound was introduced in Pennsylvania, but failed to pass. The weights specified were required to be net not more than 12 hours after baking, and they were to be determined by taking the average weight of not less than 6 loaves, or 12 loaves when that number was available. Variations of 1 ounce per pound under the standard weights were provided for, but no tolerance in excess was stated.

A bill to regulate the sale of bread was introduced in Michigan, but failed to pass. This bill required loaves of standard weights, to be net at any time within eight hours after baking. Weights were to be determined by averaging the weight of not less than 25 loaves of the same unit, when available. A tolerance of 1 ounce in excess and the same in deficiency was provided.

A bill was introduced in New Jersey to fix standard weights for bread. Tolerances of 1 ounce per pound in excess or deficiency were provided on individual loaves, and the average of 12 loaves of any unit was required to be not less than the weight prescribed for such unit. This bill failed of passage.

Dairy Products.

A law was passed in Montana providing standards of weight and measure for dairy products, and fixing definitions and standards of quality. All packages of butter weighing less than 16 ounces are required to be binary subdivisions of the pound, net weight.

A bill in regard to the sale of milk and cream by the butter-fat test was introduced in Ohio, but failed to pass. It was the purpose of this bill to add a supplemental section to the code in regard to the sale of milk and cream, providing that the vendor might obtain a check on the correctness of the vendee's results by applying to the sealer of weights and measures for a test. It was further proposed that the results obtained by the sealer should, under certain conditions, be conclusively presumed to show that the vendee's results were incorrect.

Other Food Products.

Two bills relating to weights and measures were introduced in Missouri, one to change the weight of sacks of flour from 48 and 24 pounds to 49 and 24½ pounds, and the other to repeal the law requiring every sale of grain, seed, hay, or coal to be on the basis of actual weight. We are not informed as to the outcome of these bills.

A bill was introduced in Pennsylvania to require articles of food, other than liquids, which are capable of being sold by dry measure, to be sold by net weight, except when sold in containers fixed by law of the State or by the United States. This bill was passed by both houses of the assembly, but was reconsidered by the senate and referred to the committee on agriculture where it died.

A bill was introduced in New Jersey to replace the present law in regard to the sale of commodities in package form, requiring the net quantity of the contents to be marked in terms of weight, measure, or numerical count. The proposed bill aimed to make enforce-

ment easier than under the existing law, and the tolerances and exemptions as to small packages were not required to follow those fixed under the national food and drugs act as at present. This bill was unsuccessful.

Another bill introduced in New Jersey was designed to regulate the sale of ice cream, ices, and kindred frozen products, and to require the sale of such products by weight. It might be noted in this connection, that while this bill is similar to the one introduced several years ago by the department of weights and measures of New Jersey, that department did not sponsor the present bill owing to the fact that they are awaiting developments and information in regard to the sale of such products by weight. This bill also failed of passage.

Commodities in Containers.

The milk bottle law of Maine was amended so as to permit the use of the $\frac{5}{8}$ -pint bottle.

An amendment was made to the Iowa law so as to recognize, in the sale of commodities for which bushel weights are established, the use of United States standard containers. This amendment was recommended by the weights and measures department of Iowa after the passage of the Federal container act of 1928.

The only act relating to weights and measures passed by the legislature of New Jersey during the recent session, was one amending the law in regard to the marking of fruits and vegetables in crates, baskets, and carriers so as to require the marking of sacks or other containers when used for such commodities.

A bill was introduced in Ohio which was designed, among other things, to amend the sections relating to hampers, round stave baskets, and splint baskets for fruits and vegetables so as to conform to the sizes fixed by the Federal standard container act of 1928. Although this bill was given approval by both branches of the legislature, it was vetoed by the governor and failed to become a law.

In Wisconsin a bill was introduced to amend the milk-bottle law by striking out the words, "purchased after this law takes effect," so that the intent of the law with the proposed amendment would be to subject all milk bottles in use to the requirements of the law. We are not informed as to the disposition of this bill.

Baled Hay or Straw.

The law in New York in regard to marking the weight on baled hay or straw was amended so as to omit the part allowing a deduction for wood of 20 pounds to the bale on bales weighing 200 pounds and 10 pounds on bales weighing less than 200 pounds.

Timber.

A bill adopting the international log rule was passed by both houses of the New York legislature, but was vetoed by the governor, and thus failed to become a law.

Wood for Fuel.

A new section was proposed to the Wisconsin laws to require wood sold for fuel by weight to be seasoned and kept under roof for at least three months prior to sale. In the case of any other wood sold

for fuel, it was provided that it be sold by the cord. We are not informed as to whether this bill was passed.

In conclusion I desire to express my sincere appreciation to all the weights and measures officials, and others, who by their cooperation in furnishing copies of bills, have made this survey possible.

DISCUSSION OF ABOVE REPORT

The CHAIRMAN. Are there any comments on the report of the secretary, or does anyone wish to ask him any questions?

Mr. MILLER. May I say a word in the way of correction. Indiana was not included among the States that had legislation proposed relating to weights and measures. We did have one bill introduced, which would have affected gasoline-measuring devices. Its author stated that its purpose was to require visible gauges on certain pumps. As a matter of fact, it was so drawn that its purpose was not clear. One group of manufacturers said it would eliminate all visible pumps and another that it would eliminate all blind pumps. It was a very indefinite bill, and never received serious consideration. It was lost in the senate where it was introduced.

Mr. HOLBROOK. I am sorry the bill did not come to our attention.

Mr. MILLER. It was not sponsored, of course, by the department.

WORK OF THE FEDERAL TRADE COMMISSION RELATING TO WEIGHTS AND MEASURES

By HERBERT L. ANDERSON, *Chief Examiner, Federal Trade Commission*

Mr. Chairman and members of the conference, the Federal Trade Commission was created in 1914. Its chief corrective powers arise under the first paragraph of section 5 of the organic act, which reads as follows: "That unfair methods of competition in commerce are hereby declared unlawful." In a preceding section the word "commerce" is given its common Federal definition, viz, that commerce among the several States, or with foreign nations, or commerce in any Territory, or the District of Columbia is included in the act. The law further provides for the issuance of a complaint if the commission has reason to believe that an unfair method of competition is being used, and after hearing, of an order to cease and desist. Such action may be reviewed by the courts, the commission enforcing its orders by a proceeding in the United States Circuit Courts of Appeals and the party respondent having the right to petition such Federal court for review if it is not satisfied with the order issued by the commission. The act contains no criminal provisions except for the falsification of documentary evidence.

Congress did not attempt to define unfair methods of competition. It is, therefore, for the commission, and in the last instance the courts, to decide what practices constitute unfair methods of competition. Among the first practices considered were false and misleading advertising and misbranding, such practices being characterized by deception, bad faith, and in many cases by actual fraud. The second case decided by the Supreme Court involving an order of the commission was one of misbranding. This was the Winsted Hosiery case (reported in 258 U. S. 483) decided in 1922 and is important since it clearly established the commission's jurisdiction in

this class of cases. The case involved the use of such terms as "merino," "natural wool," "Australian wool," and "natural worsted," as applied to underwear composed largely of cotton. The lower court, in vacating the order of the commission, had said, "conscientious manufacturers may prefer not to use a label which is capable of misleading, and it may be that it will be desirable to prevent the use of the particular labels, but it is, in our opinion, not within the province of the Federal Trade Commission to do so." This action was reversed by the Supreme Court. In upholding the order of the commission the court said in part as follows:

The fact that misrepresentation and misdescription have become so common in the knit-underwear trade that most dealers no longer accept labels at their face value does not prevent their use being an unfair method of competition. A method inherently unfair does not cease to be so because those competed against have become aware of the wrongful practice. Nor does it cease to be unfair because the falsity of the manufacturer's representation has become so well known to the trade that dealers as distinguished from consumers are no longer deceived.

The honest manufacturer's business may suffer, not merely through a competitor's deceiving his direct customer, the retailer, but also through the competitor's putting into the hands of the retailer an unlawful instrument, which enables the retailer to increase his own sales of the dishonest goods, thereby lessening the market for the honest product. That a person is a wrongdoer who so furnishes another with the means of consummating a fraud has long been a part of the law of unfair competition. And trade-marks which deceive the public are denied protection although members of the trade are not misled thereby. As a substantial part of the public was still misled by the use of the labels which the Winsted Co. employed, the public had an interest in stopping the practice as wrongful; and since the business of its trade rivals who marked their goods truthfully was necessarily affected by that practice, the commission was justified in its conclusion that the practice constituted an unfair method of competition; and it was authorized to order that the practice be discontinued.

Since the above decision the correction of misbranding and false and misleading advertising in its many forms has formed an important part of the commission's work.

All of the work of the commission along these lines is probably of interest to most of you. I will, however, confine this paper to a review of the cases relating directly or indirectly to the weight or measure of products. These are the same in principle and may be condemned either because the weight or measure is incorrectly stated on the label or in the advertisement, or is misleading. It is not often that cases of this character are contested in the courts as definite proof of the charge is usually available, and if the party is engaged in interstate commerce the commission's jurisdiction is clear.

Misrepresentation of paint and kindred products has formed the basis of many applications considered by the commission. This includes the adulteration of paint, the sale of turpentine and a low-grade mineral oil as "second run" turpentine, the sale of paint as "strictly pure" which, in fact, contained a large percentage of calcium carbonate and distillates of petroleum, the sale of a product termed "gold seal combination white lead," when in fact said product contained no sulphate or carbonate of lead in amount greater than 1 per cent of the total ingredients, the sale of paint as "United States marine paint" and "United States quality paint" which were not made for or according to any specification of the United States Government, or the United States Navy, and the sale of a varnish

termed "Navy architectural spar and interior varnish," which, in fact, contained no turpentine, etc., all of which were condemned. None of these matters were reviewed by the courts with the exception of one of the Combination White Lead cases, Commission's Docket 1166. There the respondent was ordered to cease using the term "combination white lead" unless lead to the extent of 50 per cent by weight appeared in the product. The order of the commission was affirmed by the United States Circuit Court of Appeals for the Second Circuit in 1926. A later investigation disclosed further evidence of violation which was submitted to the court and the respondent was fined \$500 for contempt. In another case the paint of respondent was found to be short measure. Tests of a large number of samples showed an average shortage of more than 5 per cent or nearly 2 gills per gallon. As a result, the respondent, among other things, was ordered to cease and desist "from advertising, branding, labeling, or representing in any other manner whatsoever, the paint content of any of said cans or other containers to be full standard liquid measure of 1 gallon, one-half gallon, or 1 quart, when, in truth and in fact, the paint content of such cans or other containers is less than the respective full standard liquid measure so represented." (Docket 1293.)

In the shellac industry there have been many cases similar in nature to those in the paint and varnish industries. One of the first cases considered involved the use of the name "American shellac" as applied to a product containing no shellac gum. The product was in fact a shellac substitute. The order issued was in effect that if the word "shellac" was used without qualification the product must be pure shellac. The use of the word "shellac" accompanied by the word "combination" was permitted when shellac gum was the principal and predominant element and providing the word "combination" was in equally conspicuous type as the word "shellac." When the principal and predominant element of the product was not shellac gum the term "shellac substitute" was permitted. (Docket 924.)

Increasing the weight of a product by the addition of foreign matter has been held by the commission to be an unfair method of competition. This practice at one time was common in the sponge industry, and as a result of the inquiry orders to cease and desist were issued against 25 concerns. Sponges are sold on a weight basis and it was found that substances, such as glucose, sand, molasses, Epsom salts, and lead were being used to load or dope the natural product. Of the same nature was the sale of No. 3 white oats, to which had been added screenings. According to the rules under Federal grain standards act (U. S. Comp. Stats., secs. 8747½-8747½K) No. 3 white oats may contain not more than 10 per cent of other than sound cultivated oats, but this, of course, applies only to natural mixtures. In the case considered the mixtures were artificial and contained screenings to an average amount of 17½ per cent. The respondent was also charged with increasing the weight of oats by the addition of water, but the complaint on this charge was dismissed for failure of proof.

Misrepresentation in connection with the sale of dairy feeds has also been involved in numerous proceedings. A typical case is where

a concern was using the trade name "puraflax" and represented in its advertising matter that the product was a flaxseed product, consisting of selected flaxseed screenings, testing 8 per cent fat content, and finely ground to eliminate seed germination. It was found that the product was made from screenings consisting largely of weed seeds with a considerable amount of chaff, and yielded only a small percentage of flaxseed. The fat content was also much less than that stated. The party signed a stipulation agreeing to discontinue the use of such labels and advertising.

It is interesting to note that even though the weight of the contents of a package may be correctly stated it may be so misleading to the purchaser as to be deceptive. This is illustrated by the commission's action against several creameries selling butter in odd-size cartons. Butter was being sold in cartons correctly labeled as to weight containing 15 ounces, $7\frac{1}{2}$ ounces, and $3\frac{3}{4}$ ounces. It was shown that the dealer sold such goods as one pound, one-half pound, and one-fourth pound, respectively, and the practice was, therefore, condemned. Although the practice appeared to be limited to certain Southwestern States it was considered of enough importance for the creameries doing business in that section to hold a trade practice conference under the auspices of the commission and to adopt resolutions condemning the use of the practice. The macaroni industry, at a trade practice conference, also took notice of this practice, declaring it to be the sense of the industry that a package of macaroni or spaghetti containing less than 8 ounces was uneconomical, contrary to the public interest, and an instrument of unfair competition.

At the trade practice conference with the macaroni industry just referred to, the use of slack-filled containers was also condemned. Applications were pending against some of the leading manufacturers in which it was alleged that the practice constituted an unfair method of competition. These were dismissed when all in the industry voluntarily agreed to discontinue the practice. It was the opinion of the trade that "slack filled" should apply to the package with cubic contents for the bulkiest product so great as to enable it to contain from $1\frac{1}{2}$ to 2 ounces more, net weight, than is actually placed in it. This practice was also condemned recently by the grocery industry at a trade practice conference. The resolution adopted was as follows: "Resolved, that the use of deceptively slack-filled or deceptively shaped containers is an unfair method of business." The resolution was placed in Group I and, therefore, approved by the commission. The edible oil industry at a conference also condemned the use of slack-filled containers whether the net content is or is not marked on the container. This industry also condemned the use of odd-size containers by adopting the following resolution: "Resolved, that the packing of edible oil for resale in odd-size containers simulating in size or shape standard-size containers designed to hold quantities of 5 full gallons, single full gallons, full half-gallons, full quarts or pints, results in deception of the purchasing public and constitutes the use of a method of unfair competition." Both resolutions were approved by the commission.

That there is a decided tendency on the part of business to rid itself of such manifestly unfair practices is indicated by the large

number of industries who at trade practice conferences have adopted resolutions condemning in some manner the use of practices peculiar to their own business. For example, the creamery industry has condemned the overtesting or undertesting of dairy products; the mending cotton industry, the labeling and branding of the yardage of mending cotton, except as it comes off the spool or package; the millwork industry, the false marking or misbranding of products as to quantity, quality, substances, or size; the cottonseed industry, the sale of products not plainly or accurately described or branded; the flat glass industry, misbranding as to quantity, quality, substance, or size, and the failure to mark products according to accepted standards as to thickness and quality; the paint and varnish industries, the branding or labeling of products for the purpose of misleading or deceiving purchasers with respect to the quantity, quality, grade, or substance of the goods; and in the paperboard industry, the misrepresentation of paperboard or boxes in respect to size, style, caliber, bursting strength, substance, or quality has been declared to be unfair competition. These have been very helpful to the commission in its attempt to eliminate the use of these practices.

Many cases similar in character to those I have reviewed could be cited. I have attempted only to give you briefly an idea of the work being done by the Federal Trade Commission in this direction. This phase of our work is very interesting, and while much less difficult than many of the practices presented to the commission, such as those involving restraint of trade, in which the legality or illegality of the practice depends on the effect and manner in which it is used, some puzzling questions arise. A question now under consideration by the commission might be mentioned in this connection. In the blanket and underwear industries the term "part wool" has been used by some manufacturers without much regard for the actual wool content. The fairness of such use of the term has been questioned, it being contended that the term should only be used when an appreciable amount of wool is used in the blanket or garment. In other words, the term conveys to the purchaser the idea that there is enough wool used to give the product added warmth. Since the commission proceeds primarily in the interest of the public it follows that the understanding of the public as to the meaning of the term will be given careful consideration.

On the whole it is believed that the commission's efforts to correct misrepresentation in its many forms have been effective. Every effort to make it more so is being exerted. Recently the commission, in an effort to prevent fraudulent advertising, has taken the publisher and advertising agency into account. By this method it is believed that much of this kind of advertising may be prevented. This is illustrative of the commission's desire to accomplish results.

Just how our work in connection with the correction of the use of false weights and measures can be made more effective is problematical. We have had 100 per cent cooperation from the United States Bureau of Standards. Maybe there is a possibility of closer cooperation between the commission and State and city officials who are enforcing the laws on this subject, as we have no jurisdiction over practices not used in interstate commerce. In any event, I would like to leave this thought with those of you who are directly charged with such

matters as I can assure you that the commission would be glad to cooperate more closely if it is practical to do so.

The CHAIRMAN. I am sure that all of the conference appreciate Mr. Anderson's presentation of the work of the Federal Trade Commission, and we will all look forward to reading his account in our proceedings.

In the past our conferences have almost always been honored by an address by the Secretary of Commerce. As most of you recall, Mr. Hoover, when he was Secretary of Commerce, addressed the conference nearly every time he was in Washington, which was six of the eight years he was Secretary. Mr. Lamont, the present Secretary, desires to carry on the present tradition.

I can say for you, Mr. Secretary, you have before you the executives of 25 of the States and they will listen with interest to what you have to say to them. The Secretary of Commerce.

ADDRESS BY THE SECRETARY OF COMMERCE, HON. ROBERT P. LAMONT

I am very glad to attend this twenty-second annual meeting of the National Conference on Weights and Measures, and to extend to you the welcome and greetings of the Department of Commerce. To this official welcome I wish to add my personal congratulations upon the constructive accomplishments of your organization.

Doctor Burgess has given me an outline of the history of your conference and the record of its activities. He has told me about its organization in 1905 by a mere handful of officials, and its steady growth to its present proportions. The sincere desire on the part of those participating in your meetings throughout these years to improve their own knowledge of their chosen profession so that they might the better serve their communities and to extend a helping hand to other jurisdictions not so far advanced in this very vital field of governmental supervision is highly commendable.

With the avowed objects of increasing the efficiency of existing weights and measures officials; of promoting uniformity among the several States in the matter of basic laws, rules and regulations, and those technical codes which you find necessary for the proper control of commercial weighing and measuring devices; of developing the most effective methods of testing and general supervision; of encouraging the extension of comprehensive weights and measures supervision to all communities; and of pooling, as it were, all available information on your work so that everyone interested may profit by the advances made by each individual, it is small wonder that the National Conference on Weights and Measures has shown a rapid and healthy growth.

When we also consider that your methods of organization and procedure are such as to bring together all of the various elements which are involved in the regulation of weights and measures, and to make it possible for all of these elements to have a voice in your deliberations; when it is recalled that your actions are predicated upon careful advance study by selected groups of experienced men, full discussion in your regular meetings, and the lapse of a sufficient interval between your preliminary or tentative decisions and your

final action to guard against hasty or ill-considered conclusions, there is again no cause for speculation as to how or why you have achieved, as an organization, the enviable reputation which you enjoy as a body whose recommendations represent the best thought available on the subjects with which you are concerned.

These objects and these methods of procedure must carry the hearty approval of the Commerce Department. Weights and measures regulation is an economic necessity for the orderly conduct of commercial transactions and for the reasonable protection of those who buy and sell. Such regulation can only be effective when carried on as a function of government, so that as State and local government officers you have a proper and vastly important service to perform. For you to carry on your duties with the greatest practicable amount of cooperation and with the least practicable exercise of the police power, and for you to proceed always upon the basis of information gathered from all available sources, are surely creditable lines of conduct. I congratulate you, therefore, upon the sound principles which you are following.

Doctor Burgess has told me of the representation at this meeting from all parts of the United States, and it is indeed gratifying to know that so many States and local jurisdictions have a proper appreciation of the character of the conference and of the very real benefits which accrue from the attendance at its sessions of their weights and measures officers. I believe that there is coming to be a much better national appreciation of the value of regular conferences such as this. Not alone are these meetings of value by reason of the practical information presented by the program speakers, by the ideas developed in discussions, and by the constructive actions decided upon by the organization. These factors are of primary importance, it is true, in instructing the less informed, in widening the vision of the experienced, and in advising all of the latest thought and developments in particular fields. But there is another advantage, more or less intangible, of course, but one which should not be overlooked; I refer to the opportunity which everyone present at a national meeting has for personal contacts with other men having similar interests and engaged in similar or allied lines of work. To get the viewpoint of "the other fellow" is always a broadening experience.

I am sure as the good work goes on and becomes better known, more and more States will participate. It seems to me that attendance at a meeting of this conference could not fail to impress most strongly upon proper State authorities that here is a field in which the State can and should render service to its people. Your efforts to secure national representation in bringing about more nearly universal weights and measures protection throughout this great country of ours, I am sure meets with general approval.

From your long and intimate contact with the Bureau of Standards you know that you can always expect from it the closest co-operation, and that the bureau will always render to you all assistance in its power in reaching the solution to any problems which may come up, or in supplying you with information in its possession which will help you in any way. Your contacts with the Department of Commerce as such have naturally been more infrequent

and less intimate, but I wish to assure you that the department is interested in your aims and accomplishments, and stands ready to be of such service at any time as will increase the effectiveness of this conference or further the attainment of its purposes.

It will be my pleasure to be with you again next year if circumstances permit. At that time I hope that your splendid attendance of this year may not only be equaled but even increased, particularly in the direction which I have previously mentioned.

In conclusion, I wish to extend to you my best wishes for your success, individually and collectively, in the discharge of your official duties during the coming year, and I trust that when this meeting of your conference adjourns on the day after to-morrow, you will leave better informed than when you came, encouraged to carry on with enthusiasm for the next 12 months, and resolved to return in 1930 for even greater accomplishments. I thank you.

IDENTIFICATION BY PRECISION METHODS OF COMPARISON AND MEASUREMENT

By WILMER SOUDER, *Bureau of Standards*

Introduction

Identifications by comparisons have been made with more or less success for centuries. The application of precision-measurement methods for these purposes is of recent origin and is not generally understood. This lack of understanding of the principles upon which the science is based is responsible for the confusion so often resulting from evidence introduced in courts of law.

Usual Methods

We are so accustomed to the usual methods of description, which are only approximate and by virtue of these approximations are susceptible of no precise interpretations, that we fail to recognize the extreme accuracy of indentifications made by precision measurements.

When we say we are looking for a man 6 feet tall of rather heavy build, with dark hair, with a scar on one hand and with some gold teeth in his mouth we should not be surprised to find several hundred citizens of the United States who meet the description. If we increase the precision of the description to a man $72\frac{1}{2}$ inches tall, weighing 207 pounds, index finger of left hand amputated at the second joint, and with gold crowns on left cuspid and right bicus-pids, we may feel sure there is not more than one man in the entire country who will meet the specifications, and having found this one, further search can not be justified without the introduction of some unusual condition.

Justification from Probability

The justification for this definite conclusion of positive identification is based on the "law of probability." Briefly, and in non-technical terms, this law is interpreted from the fraction which represents the ratio of the number of times a specific characteristic appears divided by the maximum number of appearances possible,

and for two or more characteristics appearing simultaneously the probability ratio is represented by the product of the individual fractions.

Interest in Standards

The bureau has taken up the problems of identification of written and typewritten documents, signatures, guns, bullets, etc., in an effort to establish standards for this class of work. The bureau does not undertake to prepare individual cases for presentation in court, and wishes to concentrate its efforts in this field on the one phase—standards for identification.

There are, now available, a few experts who make identifications in a logical and precise manner, but there are many so-called experts who recognize no limitations, no standards, and no equipment as essential in this field.

The instruments which are now generally recognized as essential for satisfactory work in these fields are the results of years of effort on the part of men who have been actively engaged in this work, and who have recognized the value of increased precision in making comparisons of data available for identifications.

In each instance, the positiveness of identification increases with the increase in number of agreeing characteristics, the narrower limits of measurement, and the increase in precision of measurements. When, if ever, these ideal conditions are established there will be fewer conflicting expert opinions.

Identification of Documents

Typewritten Documents.

Precision measurements are the primary standards for identifications of questioned documents. The typewritten page may, at first glance, appear to be a perfect piece of work and not susceptible to an analysis of numerous individual characteristics which will prove it to be beyond question of doubt the product of one and only one certain machine. Type styles and characteristics distinguish one make of machine from another. Manufacturers using similar styles of type usually differ in dimensional proportions of the individual letters. For example, the *i* is given the same space as the *w* in the typewritten document, and it is the problem of the artist to design these and other letters in such manner as to minimize what could easily appear to be excessive crowding or isolation of type in the printed work. The modification of letters to avoid these defects gives the first opportunity for precision measurements.

For type made from the same model, or formed against the same die, we may look for defects or lack of all details of perfection over the lines of the letter face. The process of plating and polishing may add defects. The more sure source for identification, however, lies in the adjustments of the type on the bars after the machine has been completely assembled. Some letters will be placed high and some low in the line; some will be rotated, and some will make contact on one portion of the face before the other portion hits the paper. Adjustments for minimizing these discrepancies are made by inspectors, who usually reduce these to apparent uniformity in so far as the unaided eye is able to judge.

These variations are all susceptible to precision measurements, and when these are made and compared with measurements from other machines it will usually be found that 5 to 10 characteristics are sufficient to establish the identity of the machine which produced the document. The product of probability fractions rapidly reduces the probability of two machines existing which will produce documents having the characteristics specified. For the number of agreements given above, and in the absence of unexplained disagreement, the ratio usually reduces below the ratio for the number of machines in existence and therefore justifies the conclusion of identity.

The excellence of this type of evidence arises from the consistency of the variations; the evidence speaks from every line of the document; and barring a few readily explainable variations, there are no contradictions. Attempts at destroying these "beacon lights of evidence" through mutilation are seldom successful, as to do so would require a perfect analysis of all defects in the machine, and facilities for this type of analysis are limited.

Some of the special types of instruments used for comparing typewritten documents are shown in the slides which will be thrown on the screen at the conclusion of this paper. These are designs suggested and used by Albert S. Osborn, New York City examiner in questioned documents. Here, as in all fields of metrology, the value of the measurement depends upon the precision of the instrument and the ability of the user. Inaccuracies in either render the results of little value. Experts in this field usually design their own types of measuring instruments and assemble numerous specimens of typewriting from which they draw conclusions as to what constitutes proof of identity.

Handwritten Documents.

The identification of handwriting has many points of similarity to the identification of typewriting, to which may or may not be added the feature of attempted disguise. The style of script, the slope, size, and relations of parts of letters, the methods of handling the pen or pencil, are important. The absence of consistency and the glaring discrepancies in attempted disguise are readily separated from the parts which show the true handwriting features characteristic of the individual.

Expertness in this field necessitates the acquisition of many qualities of art which are difficult, if not impossible, of specification as belonging to any one particular phase of precision measurement. Experts develop an art which can not be transmitted by instruction. It may be acquired by those who have talents in this field and who are willing to put forth the efforts necessary to master the fundamentals. The author has witnessed methods of procedure and displays of results by experts and is convinced of the correctness of these conclusions.

Ballistic Identifications

Ballistic identifications have for their purpose the answer to the question: From what gun was a certain bullet fired? There is often a further question of identifying a case or shell as having been fired in the same gun. Evidence from measurements of guns, bullets,

and shells have at present, in many instances, relatively little weight in courts of law except in their general confusion of juries, and the development of "a reasonable doubt." This is to a large measure due to the amateurish and incomplete methods pursued by many so-called experts. Properly prepared data on guns and bullets are often unique in the conclusiveness of identifications and often possess definite superiority over what is classed as direct visual evidence.

The points of superiority consist of the following:

(a) The markings are definite and can not make false or perjured statements.

(b) There is no limit to the time available for studying the case.

(c) The mental state of the observer need not be confused as is so often the case in visual observations of murders, etc.

(d) The findings are available to all parties interested and wishing to verify the conclusions.

The make of a gun is sometimes available from the gross markings on the bullet. Measurements of the land and groove widths, and depths, diameters, and twist markings of the barrel give data which may assist in the identification of make of gun. Further progress must be made from the characteristic markings which arise from imperfections in manufacture of barrel or breech mechanism. Rifling cutters, boring, and reaming tools do not have smooth edges. These tools wear with each cut and the small saw-tooth-like projections along the cutting edge produce constantly changing patterns in the barrel. Bullets pressed against these surfaces will take markings and retain them to a remarkable degree even after the penetration of many relatively hard materials. Rust spots and injuries to the inner surface of the barrel provide additional marks of identification. Firing pin and breech markings on shells are equally positive when the shells are available for comparison.

Briefly, the method of identification consists in comparing these characteristic markings on the questioned bullet or shell with the markings on a test bullet or shell fired through the gun in test. These tests are most satisfactory when made through a comparison microscope of the type perfected by the late Charles E. Waite and by Col. Calvin Goddard, of New York City. Images of the questioned and test bullets, or shells, from two microscopes, each focussed on a bullet or shell, are combined in a single eyepiece. These images may be caused to make contact with each other at corresponding positions over the surfaces being examined.

Usually there will be a few lines on one surface which do not have their counterparts on the other. These correspond to fouling marks, pieces of metal or powder, rust cavities, etc., which have developed between the two shots in question. Experience shows these to be not contradictory, but properly regarded as further proof of the constant changes taking place with use. Incidentally, these accidental changes should not be expected to render two guns more nearly uniform, but rather, by virtue of their promiscuity, to render them more divergent and individualistic in their markings. The identity is established through the agreement of the numerous fine markings present, the agreement of all major markings, and the absence of disagreements beyond those which may be ignored from the conditions mentioned above.

Bullets deformed by impacts with bones or other substances require special study, as the dimensions of markings can not be expected to agree precisely with dimensions taken from the gun or from undistorted test bullets.

Skill in this field requires ability in the use of the microscope and in the ability to make precision measurements of diameter, angle, and width of markings. Visual and photographic evidence must be complete and readily understood if it is to be of value in evidence.

Eventually, it is predicted that this method of identification will be standardized and will furnish one of our most reliable means of identification.

Conclusions

In all cases listed in this paper the laboratory findings should be of highest value, whether eventually accepted in court as admissible evidence or rejected as inadmissible.

The prosecutor or officer in charge can be sure he has the correct lead and is thereby enabled to develop the case in the most efficient manner. He may safely concentrate his efforts in the one direction indicated by the precise comparisons and measurements established in the laboratory.

(During the presentation of the above paper Doctor Souder illustrated by means of lantern slides a number of the matters discussed.)

THE IRREGULAR OR DIVERSIFIED PACKING OF FARM PRODUCTS

By JOHN F. BEHRMANN, *Representing the National Association of Retail Grocers*

Mr. Chairman and members of this conference, on behalf of the National Association of Retail Grocers, whom I have the honor to represent, I want to thank you, Mr. Chairman, for your invitation to take part in this conference. We always welcome such invitations from any of the Government agencies, whether local, State, or Federal, as we believe that we should be given an opportunity to present our side on all matters affecting our business. We are firmly convinced that the greatest good will come from such conferences between the Government agencies and all trade bodies, to eliminate abuses or unfair trade practices, by mutual agreements, rather than by process of law.

Mr. Jenssen, our secretary, suggested to me that I speak on the "Relation between the Weights and Measures Department and the Grocers," but, unfortunately, I had already decided on another subject. But I will briefly say: Our association does not tolerate any member who is not square with his customers in giving them honest weight or measure, or who employs unfair or questionable practices in connection with weight or measure or other unfair or questionable methods in his business. I will say that any dealer who uses such methods, usually does not last long in business, as the up-to-date housewife has scales in her kitchen, and I am sure will soon quit dealing with any merchant whom she detects giving her short weight or measure.

From personal experience in our local association in Brooklyn, I do not recall ever hearing of a fellow member being in trouble

with our local bureau of weights and measures and I have been a member for over 20 years. However, we expect the weights and measures officials to enforce the law, to make rigid inspection, and to prosecute any merchant who willfully short weights the public.

My reason for choosing "The Irregular or Diversified Packing of Farm Products" as my subject, is my belief that there is a large amount of unnecessary waste in packing and handling these products that could, and should, be eliminated. Having had 20 years' experience in buying and selling fruits and vegetables, I feel qualified in speaking on this subject.

As you know, at the present date, you can buy fresh fruits and vegetables all the year around, coming from every State in the Union, packed in all kinds of conceivable containers. I will briefly try and point out to you, the different and, in very many cases, expensive way this is done. I will also point out to you, the way these containers are marked as to weight or measure of contents, if at all.

I may say at this time that most of the up-to-date retail dealers sell all bulk goods by weight and other goods by numerical count, and that this, in my opinion, is the only accurate way. Knowing that selling fresh fruits and vegetables by the pound or by numerical count is the most efficient and economical way, we feel that we should be able to buy these articles in the same way—by the pound or by count. But at present we buy some articles by the pound, some by measure, and most others by containers. In the last two instances we have no definite information as to the weight of the contents, and must either guess at this or determine it for ourselves. This makes it necessary for the dealer to weigh each such container when it arrives at his store, in order to find out how many pounds he has bought. Very often he has not sufficient time to do this and has to guess at the number of pounds in said containers.

We feel a good many articles could easily be packed in containers by the producers and sold by weight, such as potatoes, carrots, turnips, onions, and so forth. These articles adapt themselves very readily for shipment in bags or sacks, preferably in 100-pound units. Other articles, such as beans, peas, and so forth, could be shipped in hampers with the weight of contents plainly marked on containers. Natural shrinkage in these articles could be ascertained by test and a tolerance made for same. Vegetables sold in bunches, such as carrots, beets, and so forth, should be sold by numerical count and packed in crates or boxes for shipment only.

Lettuce of all kinds should be sold by numerical count and shipped in crates or boxes only. The standard New York State lettuce crate is the ideal and most efficient crate for this purpose. However, from the South—Florida, Louisiana, and Texas—we receive most of the lettuce in baskets. Florida ships lettuce in 48-quart baskets. Now, the dealer buys these 48-quart baskets of lettuce, but it does not mean anything because we can not sell it by the quart—we must sell it by the head. We feel lettuce should be packed so that the purchaser knows just exactly how many heads he buys. The New York crate, which I just mentioned, provides for two dozen heads, or when they run very small, 32 heads can be packed

in this crate very readily. Packing lettuce in such a way results in a big saving, as it comes to us in much better shape. I know that the Florida lettuce coming to the New York market very often is sold by the railroad company for the freight bill, since the receiver refused to take it on account of more than 30 per cent being waste; consequently it had to be sold by the railroad to recover freight, and the farmer does not get anything out of his shipment. Now, to speak about another commodity, beans—these are sent up in 22 and 20 pound baskets. I believe the farmer could save money if he used 35-pound baskets, resulting in a saving in freight.

After studying the 1928 container act, I was very much disappointed and surprised to find that this act only applied to certain kinds of baskets. It does not apply to other containers, such as barrels, bags, etc., and it even permits the use of other than standard baskets if made in a different way than the baskets mentioned in this law, or if made from other material. The law also makes it optional to maker, producer, or shipper to mark net contents on container, which, in my opinion, is wrong—this should be a mandatory requirement.

Again, the law does not make allowance for natural shrinkage, which, in my opinion, is absolutely necessary, and could be worked out by actual test in a very simple way. I will try and point out to you how I think that could be arrived at.

Sample containers could be packed with any of these farm products, and the date and hour of packing marked on them. Then said full container could be submitted to the most severe shipping conditions for a given period of time. Following this the contents could be measured and the shrinkage per hour or per day thus determined. The tests could be made for 24, 48, 72 hours, or more, if necessary.

Here again I would like to point out to you how simple it would be if everybody were obliged to sell by weight, and how easy it would make the enforcement of law for the men in your departments. Take as an example, a basket of string beans. The figures I will give are, naturally, only for illustration. Suppose this basket had a net weight at time of packing of 35 pounds and there was an allowance for shrinkage in 48 hours of 3 pounds, and an additional allowance for error of weighing of one-half pound. Then the basket should weigh net not less than $31\frac{1}{2}$ pounds at time of arrival after two days on the road.

We believe that each shipper of produce should be required to mark his name and address on each container, and I want to point out to you the importance of this. Suppose a dealer goes to market to buy some string beans and other things, and finds most of the containers offered for sale slack packed; he is compelled by the nature of his business to buy same. Now if said containers are marked with producer's or shipper's name and address, he could make a complaint to the weights and measures department in his district, and they in turn could investigate this shipper at his place of shipment. If it was found that he habitually packed short, action could be taken against him at once. The effect of such a procedure would be at once noticeable in shipments from that community.

Let me again say that selling by weight or numerical count is, in my opinion, the only accurate way to sell fresh fruit and vegetables. I thank you.

The CHAIRMAN. The conference, I am sure, appreciates the point of view of the representative of the National Association of Retail Grocers on the subject of the packing of farm products.

APPOINTMENT OF COMMITTEES

The CHAIRMAN. It is in order for the chairman to appoint two committees, one on resolutions, and one on nominations.

The Chair asks, therefore, the permission of the conference to appoint the following:

As the committee on resolutions: P. D. Dukesherer, of Michigan, chairman; H. A. Webster, of New Hampshire; S. B. Shaw, of Maryland; V. A. Bradley, of Tennessee; William F. Steinel, of Milwaukee, Wis.; Richard Harding, of White Plains, N. Y.; and W. H. Green, of Miami, Fla.

As the committee on nominations: William F. Cluett, of Chicago, chairman; J. H. Foley, of New Jersey; Howard S. Jarrett, of West Virginia; I. L. Miller, of Indiana; and George B. Nebinger, of Harrisburg, Pa.

WEIGHING IN THE MEAT-PACKING INDUSTRY

By JOHN HOLMES, *Vice President, Swift & Co.*

Mr. Chairman and members of the conference, scales and weighing machines are of great importance in the operations of the meat-packing business. The purchase of livestock to be slaughtered for meat food is on a weight basis, and the scale plays an important part through all the channels of production and distribution of finished products.

If, for example, through inaccuracy of scales or of weighing, an average overweight error of, say $1\frac{1}{2}$ per cent, should occur, it would be sufficient to wipe out our average profit. To develop this more clearly, let me state that Swift & Co.'s profit for 1928 was \$14,813,000, on a volume of about \$970,000,000 of business, or a return of $1\frac{1}{2}$ per cent on sale. Of course, the reverse may be argued, namely, that $1\frac{1}{2}$ per cent short weight would double our profit, but I presume it will be readily admitted, aside from all ethical considerations, that no concern the size of Swift & Co. could long survive if it did not give honest weight. Short weights are always complained of, but overweights are rarely ever heard from.

Before presenting specific information on the types, characteristics, and operating features of scales used by meat packers, it might be well to outline briefly the various channels through which the meat passes from point of production to point of distribution to the ultimate consumer.

The commercial livestock supply of the United States is marketed: By the farmer or feeder shipping his animals either to a central market or direct to the packer; or through the cooperative livestock shipping association. The shipping association ships either to a central market or direct to the packer; or by the country buyer who buys from the producer and in turn sells on the central market or direct to the packer.

Producers, shipping associations, and country buyers sell their animals on the central market or direct to the packer according to their opinion of which method of marketing will give them the greatest net return.

After being purchased by the packer, the stock is graded according to quality and weight, and in some cases combined with other lots of similar grade. The various lots are then sent to the packing plant for slaughter. After cattle have been slaughtered, the beef is chilled, cut into quarters, and distributed to the consumers through our branch houses and car routes. A portion of the chilled beef is, however, divided into the smaller cuts before distribution.

The beef carcass is composed largely of lean meat and is commonly shipped, and even delivered to the retailer, as whole quarters. This is not true in the case of pork products. The various parts of the hog carcass differ more from each other in composition; parts of the carcass are composed almost entirely of fat; other parts carry a large proportion of lean. In order to satisfy consumer demand, there has grown up the general practice of cutting the hog carcass into a number of pork cuts and selling each in the market to which it is particularly adapted, instead of selling the entire carcass as is done in the case of beef.

Pork may be cured without sacrificing palatability; and, in fact, it can be so cured that the palatability of the product is improved. Therefore, the greater quantity of pork is consumed as a cured product of less perishable nature, while practically all of the beef is consumed as a fresh product of highly perishable nature. Since the cured pork is less perishable, it may be stored longer, shipped farther, and handled with less refrigeration than beef. Of course, cuts, such as the pork loin and shoulder and some others, that are usually sold fresh are of a perishable nature and must be handled accordingly.

Mutton and veal are handled in a manner similar to beef, and are usually distributed either in the halves or quarters.

Other products of the industry, such as hides, grease, glue, stock food, etc., are each passed through distinct methods of processing before marketing either as units or as small containers.

Each division of our business stands on its own feet and is on a profit and loss basis; therefore, in separating the original purchases into the various cuts of meats and kinds of by-products it is fundamentally necessary that we have accurate weighing at all points of manufacture and distribution.

Our weighing equipment must be selected to contend with varying operating conditions. Moist and damp atmospheric conditions and the corrosive effects of salt must be encountered. These factors, along with the variety of products handled, result in the use of scales of several different types. Many of the scales we use are in common use in other industries. Others are modifications of different types of scales to produce a scale of sufficient physical strength to withstand the severity of our service.

The packing industry is so varied in its operation that we find use for nearly every type of scale, including the following: Even balance, beam, spring, automatic, and scales equipped with the weightograph attachment, also displacement-type fillers for liquid

and semiliquid product, and the so-called pneumatic-type filling machines, operated in conjunction with check-weighing scales. We use for special conditions such scales as the four poster or suspension scale, special beam scales, and rail scales.

Scales are classified naturally into three groups.

Group No. 1.—Those scales used for the weighing of purchased product as exemplified by cattle scales, hog scales, railroad scales, and truck scales.

Group No. 2.—Scales used for the transfer of product from one department to another, and for use in determination of yields, grading, and department operating costs.

Group No. 3.—All scales that are used for weighing and check weighing product as it leaves our plant for distribution and consumption.

I have with me a few slides for projection on the screen showing illustrations of the operation of our scales. These illustrations, of course, do not cover all of our conditions, but are examples of some of the more important phases. For simplification and to portray their relative importance, they will be shown by groups as we have just classified.

Taking first, Group No. 1, or scales used for weighing of purchased product, Figure 1 shows an illustration of the operation of weighing cattle in the Union Stock Yards, Chicago. The scale shown here is used for determining the weights of small lots of cattle, and was used in this illustration because it was more easily photographed than the scales used to weigh larger lots of stock. These are weighed on a similar scale, having capacity for 60 to 70 cattle, according to size, or a capacity of about 100,000 pounds.

The gate in the foreground, of course, is closed, and stock is driven onto the scale from the opposite side. After the weight is obtained by the scaler, he notifies the man you see in the small house to the left of the illustration, who opens the gate, allowing the stock to pass off the scale. It is the duty of this man to obtain the count of the stock as they pass in front of him, and he verifies this count with the scaler. We also have a man at the scale for the purpose of verifying the weight of the stock purchased by our buyers. The same type scale is used for the purpose of weighing hogs as is used for obtaining the weights of cattle.

The scales used for weighing cattle and hogs are of the platform type, using a recording type beam. A record of the transaction is made on a weight ticket. After the stock have been driven on to the scales and the beam balanced, this ticket is inserted in the beam, and the weight stamped on the ticket. The important factors in connection with this are avoiding the possibility of error due to the putting down of incorrect figures, and the inability of other people to read the figures set down by the scale man.

After stock has been purchased, weighed, and counted as it comes off the scale it is inspected by the weight taker, who makes note of the number of animals for which, according to the rules of trading, it is permissible to deduct a weight allowance.

Should the allowance on weight be disputed by either the buyer or seller, the stock is then inspected by the chief inspector, who is employed by the Live Stock Exchange. A final appeal can be made



FIGURE 1.—Scale used for weighing small lots of cattle

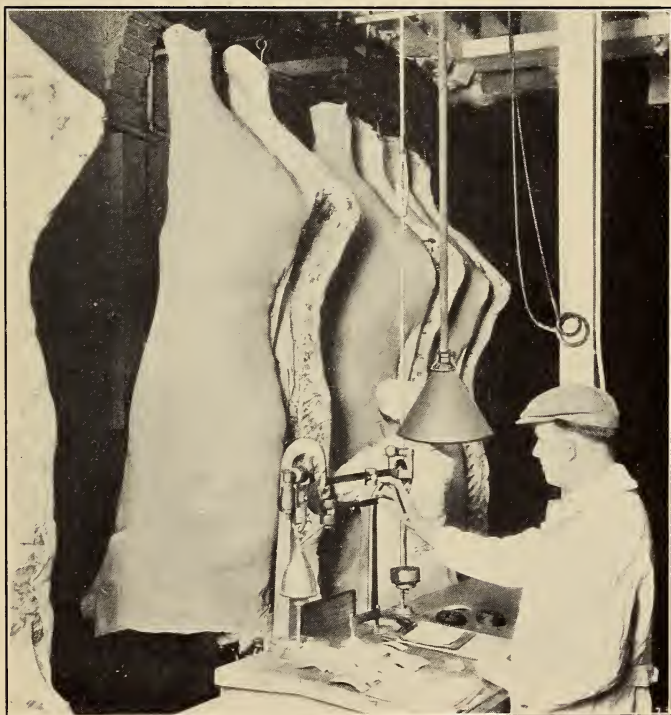


FIGURE 2.—Scale with conveyor rail used in weighing dressed beef



FIGURE 3.—*Scale used for grading hams*

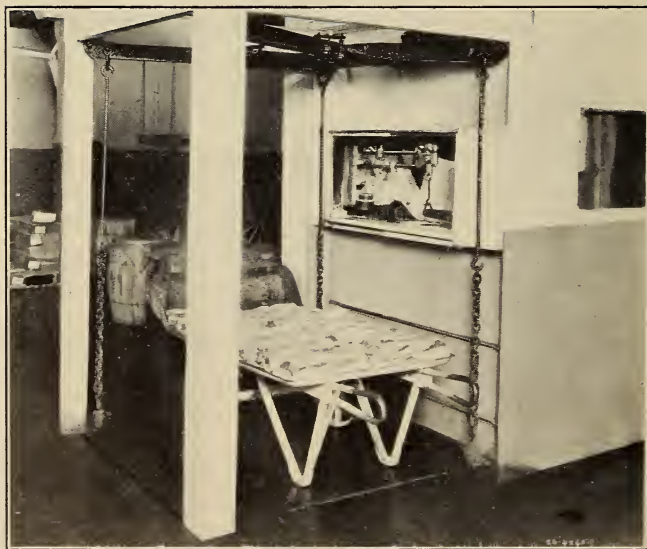


FIGURE 4.—*Scale used to weigh products in barrels or on trucks*

to a standing committee. The committee is appointed by the Live Stock Exchange, and a nominal charge is made for service rendered.

Railroad scales are used to a small extent for the weighing of such products as coal, feeds, and oils; and truck or wagon scales are used for weighing small lots of feed and building and mechanical materials. In weighing of product in railroad cars, some discrepancy may result due to such complications as the changing of atmospheric conditions, causing gain or loss in the weight of product, or losses of product in transit. These discrepancies are taken into account by weight allowances that have been agreed upon by the buyer and seller of the product.

Our cars are weighed light for tare weight at stated intervals, and if there is a discrepancy in the stenciled weight on the car, it is immediately corrected. When handling all railroad cars during bad weather conditions, the cars are carefully cleaned and cleared of snow before obtaining weights.

We pass now to Group No. 2. This group, as explained, consists of those scales used for interdepartmental work. Even though these weights are not applied to finished product, it is highly important from the standpoint of department costs, yields, etc., that weights be accurate. However, those scales used for the purpose of separating product by weight merely for internal convenience need not be accurate to the last degree, but should be adaptable to rapid weighing. All time spent by the operator in waiting for the scale to balance represents a direct labor loss, and we are, therefore, interested in obtaining scales for this purpose that will balance as quickly as possible.

Figure 2 shows the operation of weighing dressed beef on a moving conveyor rail. The two halves of beef are weighed together as shown, and a weight ticket, along with the lot number are attached to the beef just before it passes into the cooler. Weights at this point serve both as a check on the carcass yield obtained and on the grading of the buyer. You will note that the beef carcass is wrapped in a cloth. This cloth when saturated with moisture weighs about $11\frac{1}{2}$ pounds and is used for keeping the surfaces of the beef smooth during chilling. It is understood, of course, weights obtained at this point are not shipping weights.

The weighing of hogs after dressing is very similar to the weighing of beef after dressing, and the weights again serve as a means for checking both the carcass yield, and the accuracy of grading on the part of the hog buyers. Again, the product is weighed on a conveyor rail. It is essential that scales used for this purpose respond rapidly and give accurate weights. Scales must be so installed as to not be influenced by the vibration of the rail along which the carcass passes.

For this purpose we are using an automatic type of beam scale for showing the weight of product, and the operator records this weight on a slip of paper by means of an adding machine. Thus, he has at all times the total weight of product that has passed the scales and at the close of each lot, has figures immediately available on total dressed weights.

For grading hams we use a temperature-compensating spring scale that responds rapidly and gives fairly accurate weights, illus-

trated in Figure 3. This type of scale is particularly adaptable to service in coolers. Hams are graded according to weight and quality in order to obtain uniform curing results. The weight differential between two grades is about 2 pounds and an error of less than one-fourth pound would not be serious.

The hog cutting floor is located directly above this floor, and hams are sent down the chute to the left of the illustration where they are deposited on a moving table. This particular table is equipped with about six scales of temperature-compensating type, and may be fitted with additional scales in case of increased volume. The trucks shown in the background receive the various grades of hams after they are weighed and graded for quality.

The type of scale used for weighing beef cuts is the result of experimentation by our scale organization, and is adaptable to the needs of a number of departments of our plant. This scale, shown in Figure 4, is used where it is necessary to weigh product either in barrel containers or on trucks. The weights may be used either for product coming into the department, or product being shipped from the department. Understand, of course, that all product shipped from our plants is check weighed at some point, and in this particular case the check weighing is done on our loading docks.

These scales are very sturdy in construction and will withstand considerable heavy duty and may be used in moist and damp places with very good results.

Group No. 3 consists of those scales used for weighing and check weighing of finished product, preparatory to distribution to the ultimate consumer. Naturally, it is very essential that we have accurate weighing at this point. We, therefore, make it a policy to check weigh every article before shipment to the points of distribution.

Figure 5 shows four operators who are weighing out exactly 1 pound net weight sliced bacon, by using an over-and-under even-balance scale. You will note that this product is not touched by the hands of the operators. The product is sliced in the room to the rear of the illustration, passed through the opening in the wall on to the lower moving conveyor preparatory to weighing. The pans used for holding the sliced bacon all weigh exactly the same, the weight having been adjusted in the construction of the pans. Pans are checked periodically to assure accuracy in their weight.

This type of scale serves as an excellent means for weighing this kind of product due to its sensitivity and the large distance through which the indicator passes for a slight increase or decrease in the weight of the product in the pan.

We use the automatic no-spring type scale for weighing of various pieces of sausage preparatory to shipment, as illustrated in Figure 6. You will notice that the wooden container is resting on a platform beside the scale, and that the order is pasted on the front side of the container. The man then refers to his order, selects the proper sausage from the adjoining pans, weighs the product, and packs the same into the box.

Figure 7 illustrates the use of a portable beam scale for weighing tierces. This scale is not expensive. It is simple, easily repaired, and being movable is adaptable to service at various points in our

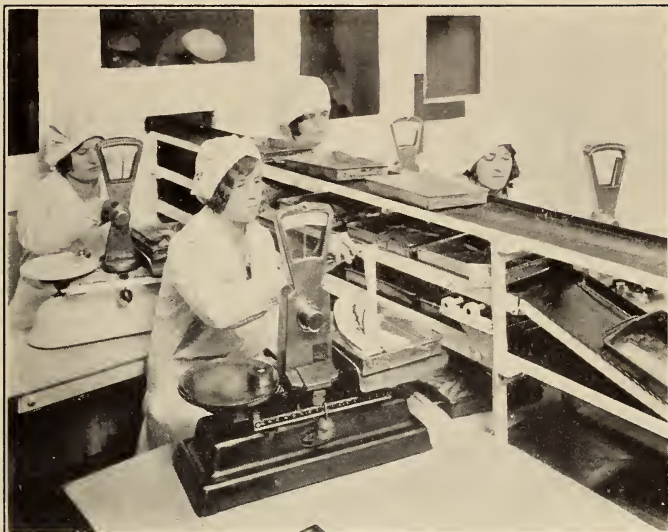


FIGURE 5.—Scales used for weighing sliced bacon for packaging



FIGURE 6.—Scale used for weighing sausage

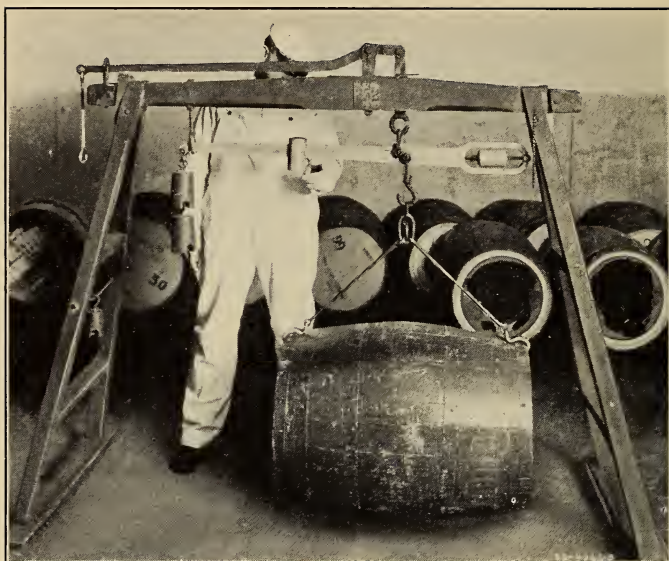


FIGURE 7.—Scale used for weighing tiorces



FIGURE 8.—Equipment for filling and check weighing cartons of cheese

plant where tierces or barrels are shipped. This is an old type scale with which you are all familiar, but just serves to illustrate the continued use and adaptability of such simple equipment to our weighing requirements.

Figure 8 shows the process of filling containers of cheese and weighing by volume or displacement. This operation is performed by the machine. The product is fed over to the adjoining roller conveyor where a sufficient percentage is check weighed to assure accuracy. This method of filling and weighing cartons is used on similar products, not only in our industry but in a number of industries where product is handled either partly or wholly by automatic machinery.

Lard cartons are made by automatic machinery and are fed down to a filling head. By controlling the rate of flow of lard through the filling head and correlating the opening and closing of the valve with the speed of the conveyor, it is possible to accurately "weigh" 1 pound of product into the container. This operation is then checked by use of an over-and-under even-balance scale. The 1-pound carton containing product is balanced against an empty 1-pound carton and a 1-pound weight on the opposite pan of the scale.

The depreciation we experience in our weighing apparatus is largely due to the conditions under which we operate. On the killing floors, for example, our scales are subjected to excessive conditions of moisture, and close supervision is necessary. Those scales that are used in salt cellars, curing rooms, or hide cellars are subjected to conditions causing rapid corrosion of the metallic parts. Such conditions also affect the accuracy of the scales, necessitating continual checking and maintenance of this equipment.

We estimate that about 24,000 scales are in service in all of our plants and branches

The Chicago plant alone maintains an organization of 12 men who devote their entire time to maintenance and testing of scales. Scales are tested in accordance with the requirements of the particular service to which the scales are subjected. Such scales as the sliced-bacon scale, and the lard-check-weighing scale are checked for accuracy hourly. It is necessary that we check the accuracy of a large number of scales daily. These scales relate primarily to those departments dealing with the selling. Scales used for weighing smoke meats, sausage, fresh pork, canned hams, dried beef, butterine, lard, and cheese are tested daily. Scales used for weighing dressed beef, pork, sheep, and calves, are also tested daily. Scales used for interdepartment work are tested weekly. Railroad track scales are tested monthly. Some branch-house scales are tested daily, and all branch-house scales are tested at least twice each week.

Scales that are subjected to adverse conditions are tested as often as the condition requires. The scales we use in our salt and hide cellars practically require daily attention in order to prevent excessive corrosion and to maintain accuracy in the weighing operation.

In order to insure accurate weighing and check weighing, we have in use in our Chicago plant a test balance which is used for calibrating our test weights. It is necessary that a balance of this type be absolutely free from all vibration. It is mounted on a special base consisting of a concrete footing 15 feet in depth. The

scale is also inclosed in a small house as additional protection from atmospheric conditions.

The nature of the products we handle is such that the question of shrinkage is a matter of considerable importance. When live animals are weighed and immediately reweighed a shrinkage in weight is shown to have occurred. The same thing holds true through practically all operations, due of course, to the natural evaporation of moisture from the meat.

Our practice is to consider as an element of cost such shrinkage as occurs up to the time of weighing for final shipment. The merchant who buys from us must, of course, also take into account in his costs such shrinkage as occurs between the time the meat leaves our hands and the time it leaves his hands. This is the only practicable way of handling. The shrinkage which will occur under any given set of circumstances can not be anticipated, although on the average it will be found to run fairly uniform.

Of course, in the case of articles, such as D. S. meats, allowances are made for the salt adhering to the product at the time of shipment.

Allowances are also made for the amount of pickle present in S. P. meats. These allowances are based on tests, taking into account the time allowed for drainage, and the figuring is done according to the rules of the Chicago Board of Trade.

As to personnel, we are continually developing men in our scale department for the duty of testing and maintenance work on scales. Such training work requires considerable time and experience, and is carried out under the supervision of competent scale men.

The training of personnel in the operations of weighing product is carried out under a similar plan. The newly appointed operators are instructed by a competent person in the department. All of the factors in connection with the particular scale are explained and illustrated, and the actual work of the new operators carefully supervised until they become proficient in the duty.

I presume it is understood that these remarks have had to do with the subject as it is handled within Swift & Co., but no doubt our practices are fairly representative of the industry.

(During the reading of the above paper, Mr. Holmes illustrated by means of lantern slides a number of the matters discussed. Some of these illustrations have been reproduced herein.)

The CHAIRMAN. It is very evident from Mr. Holmes's paper that weights and measures are the basis of the packing industry. Mr. Holmes, we certainly appreciate your coming to the conference and giving us the benefit of this description of your practice.

SEASONAL ASPECTS OF COUNTY WEIGHTS AND MEASURES ADMINISTRATION

By GLENN L. BERRY, *Superintendent of Weights and Measures, County of Monmouth, N. J.*

Mr. Chairman, invited guests, and weights and measures officials, whatever success may have met our efforts, I wish to give full credit to our State superintendent, J. Harry Foley, and his staff for their ever-willing helpfulness, to our county governing body, the board of freeholders, and, last but not least, to my assistants for their never-ending loyalty which has carried out our planning.

Monmouth County, in the State of New Jersey, is one of the foremost counties of the United States in production of truck commodities. In addition to this, with the Atlantic Ocean gracing its eastern boundaries, it is part of the world's playground. With its agricultural interests, shore resorts, and home resources this county presents particular problems of seasonal work in connection with weights and measures work. In the first place, let me say that this particular phase of weights and measures activity requires constant supervision to keep pace with its growth.

In New Jersey we have adopted a sale-by-weight law, and the farmer is the hardest man in the world to convince of beneficial changes where it affects his practices of years standing. The potato crop, our largest product, is mostly dug and sold on the ground. Shipments are sorted by machinery in the field, bagged in 150-pound sacks, and shipped by truck or railroad to many markets. During the season we are continually in the farming districts, checking weights in the field, at the railroad shipping stations, or holding up trucks on the road to supervise the sale by weight. After years of education, we are now able to get by a season without a single prosecution for short weight. We have used the county agricultural agent and his office for the purpose of educating the farmer to our requirements, and by personal talks at their meetings have secured beneficial results. We have always found the agricultural department ready and willing to cooperate, and gratefully acknowledge the assistance rendered us in our undertaking. This not only applies to potatoes but to all the commodities raised and disposed of through commission men or houses.

The advent of the roadside stand, catering to automobile trade from near and far, has become a factor in the distribution of food-stuffs. Through their cooperative association we have worked to advantage, with results that are gratifying to producer and consumer alike. These stands, with their products fresh from grower to consumer, have become an important institution, much sought after by people from the metropolitan district around New York City, and we look with favor upon their endeavors. In all our relations with these new retail merchants we try to keep uppermost in our minds the human element in our dealings with them. In every human body there is a small amount of gold, but there is also a fair percentage of jackass. It is our pleasure to endeavor to refine the gold in preference to developing the jackass. With an average of 90 per cent who wish to be honest and comply with our regulations, we are left with 10 per cent that furnish a problem. Deduct another 5 per cent for the foreign born, who till the soil in honest labor but without proper understanding of weights and measures laws, and you have a very small number left. These are comprised of the inveterate trickster, shyster, and fly-by-night dealers who make up our black list, and it takes constant supervision to keep up with them.

Our dealings also embrace the other side of the equation, the buyer. The buyer oftentimes thinks that 17 ounces make a pound, as well as the seller considering 15 ounces the correct amount. Within the range of these 2 ounces lies the ethics of modern business and the reason for the weights and measures department.

Through the medium of the newspapers, we are constantly striving to educate the buying public, and, aside from the crank, we welcome constructive criticism and honest complaints. We find a wholesome respect for our work, as a result of the campaigns carried out, which encourages us to keep trying to render a real public service. The buyer in seeking the best results for the least amount of money, has encouraged the farmer to incorporate into cooperative market associations. By such an arrangement, the producers are the stockholders, and have their own booths for the sale of their produce, as well as renting space to outsiders. Through their good will and confidence, we have not only secured their cooperation in furthering our own interests, but they demand that outsiders selling goods in their market meet all requirements in every respect. This idea has passed the experimental stage and has been paying good dividends in dollars and cents to the stockholders of the companies. If your communities have not tried it, I heartily recommend the plan and pass it on to you as a chance to benefit your farming interests.

Turning to the resort side of our life, which caters to the pleasure seeking, vacation crowds that make the North Jersey coast their summer Mecca, we find the board walk and beach activities that demand seasonal attention. Salt-water taffy, candy of all kinds, and confections are put up in package form, for shipment to all parts of the country. Since the difference in quality is slight, the margin of profit may depend upon some slight infraction of our regulations that would permit of a small advantage in quantity or weight. It is obvious that supervision at regular periods is the only sure way of keeping informed.

The ever-increasing motorist has presented us another field of labor that was only a by-word a short time ago. With the oil companies erecting their own service stations, we find ourselves confronted with between 1,200 and 1,400 gasoline-dispensing pumps for inspection. In addition, there are as many oil pumps, liquid measures, and oil bottles that make of this a real chore in itself. Only daily tests, mandatory on the owner, can place the burden where it belongs, and our work is to educate the owners to see that these daily tests are made. We solicit the oil companies to keep us informed of all new installations and repairs made, so that we can follow up their work in keeping the stations in repair, and our efforts are fairly successful. As Monmouth County is nearly 60 miles across from the southwestern to the northeastern corner, you can appreciate how highly we prize cooperation. We have no city departments, and must cover the entire territory. Ours is the story of every department, opportunity goes around disguised as work, and every weights and measure man is acquainted with it. I fear sometimes we place our goal too far ahead, hoping for too much, and think we must reach the rainbow's end to find our pot of gold. In the main we hope to find success at the end of the journey, but there is no end—no more than death ends the usefulness of a worth-while life. God sends the sun to lift the soul of that lost identity back to the high heavens, and on the wings of His clouds carries the purified parts back to that ancient Indian "spirit land," and again feeds that ever running stream that is forever flowing on.

From a little Indian lake called Itasca, out in the mist and marsh land of Minnesota, runs a little creek. This is the headwater of the Mississippi River. From frosty, star-lit nights of the great Northwest to the warm waters of the Gulf of Mexico, from little lake to the Gulf. This stretch of imagination will save time and now that you are with the Father of Waters on his way south where he dumps his great body into the great Gulf that mingles with the ocean and obviates himself, you see there is no end. That little stream steals through the woods of Minnesota on its way and finally by following the course of least resistance loses its identity, but never its usefulness.

The big thought I want to leave with you is this: That all along the course of the mighty Mississippi, cities and towns dump their defilings. All along the course of the great river, discolored creeks and muddy streams are mingling with the Mississippi. Should the mighty river try to stop, it would soon be a dead sea of filth. It must go on, for it grows great by moving on. By its activity it clarifies and purifies its life. Finally, it becomes part and parcel of one of the world's great natural blessings, that carries health, happiness, and a boon to humanity, to everything that it comes in contact with. We can't stop, we can't pause in our work begun, but by our own activity must enlarge our service. Let it finally mingle with the gulf stream of public service that carries a boon to all that it comes in contact with.

Mr. FOLEY. Mr. Chairman, I want to say those are the kind of men we have in New Jersey.

The CHAIRMAN. I was just going to remark that Mr. Berry has shown that there is a wonderful opportunity for human interest in the administration of weights and measures, at least in Monmouth County, N. J.

DEVELOPMENTS IN TERMINAL WEIGHING OF GRAIN

By J. A. SCHMITZ, *Weighmaster, Chicago Board of Trade*

Mr. Chairman, delegates, and guests, accurate determination of quantity is essential to those engaged in commerce; and as grain ranks high in our commercial transactions, the accurate determination of its quantity is especially important. For centuries measures of volume were used in measuring grain, but not so to-day. Weight measurements have supplanted measures of capacity. The commercial bushel of wheat is not an amount equivalent to a volume of 2,150.42 cubic inches, but it is always 60 pounds, avoirdupois.

When you consider the fact that the densities of grains vary as much as 30 per cent, and that the food value of grain is determined by the quantity of solids contained in the kernels, rather than by their bulk, you can readily see that a measure of capacity would not truly determine the real quantity of "grain" contained in a bushel. Density is an important factor in determining the "quality" of grain, but it has no bearing on the quantity referred to as a bushel. For where a bushel of wheat is the basis of a trade, 60 pounds of wheat, by weight, is the unit involved, regardless of its specific gravity. While the method of determining the quantity of grain

by weighing is now generally accepted by those engaged in the grain business, it is not so many years ago since the transition took place. For instance, the quantity of wheat that made up the first cargo shipped from Chicago, was determined by a 4-bushel measure. The measure was filled on the deck of the vessel, and then emptied into the hold. It is a coincidence that the first hopper scale used at Chicago was also of 4-bushels capacity.

The progress of weighing grain during the early days in the Middle West was slow, and dependent, to a large degree, upon the advancement made in scale construction. As the flow of golden grain from the Mississippi Valley to the terminals increased in volume the matter of determining accurately the quantities of the many parcels arriving became of greater and greater importance. Much of this grain had left the point of origin without being weighed; in fact, the shipper in many cases had a very indefinite idea of the quantity he started to market. His inability, or failure, to determine the specific gravity of his grain often caused him to estimate erroneously the quantity shipped; and where the outturn weight at the terminal ran under his "estimate" much dissatisfaction resulted.

This was a period of many controversies between shippers and receivers of grain over the matter of weights. Charges of inefficiency and dishonesty were made on both sides. The shippers charged the terminals with inaccurate scales, wasteful methods, and dishonesty; the terminals, on the other hand, called attention to the poor equipment, or lack of equipment, at country points, and to the unsystematic manner in which the little weighing that was done was performed.

At that time much of the weighing at terminal markets was performed by employees of the grain elevators and mills. In some cases the grain was weighed by railroad employees on railroad track scales, for in those days much grain was transferred from car to car, in railroad yards, by man power. The weighing facilities, generally, were crude and often inaccurate; and, as stated, much of the weighing was performed by men interested in the transactions, and wasteful practices were common. Now the country shipper, in large part, had no facilities for weighing the grain loaded into cars; hence often depended upon estimates to determine the quantities loaded. Frequently, such estimates were little better than guesses.

In the late seventies the Chicago Board of Trade found it expedient to appoint a weighmaster who was independent of both the buyer and the seller of grain. It was his duty to supervise grain weighing and to aid in the adjustment of disputes. However, since his employment was optional both with the buyer and the seller, only a small portion of the grain arriving in Chicago was officially weighed. Nor was there any systematic supervision in the weighing of grain aboard vessels at Chicago or other lake port terminals. What little supervision was given was by self-appointed, itinerant weighmasters employed by the vessel people. These men were, for the most part, irresponsible, inefficient, and without authority to enforce reasonable regulations.

From the foregoing you can plainly see that there was much to be desired in the matter of weighing grain to and from cars and

boats. Also, the ever-increasing flow of grain to the terminal markets made necessary not only improved weighing conditions, but more and better facilities for handling and storing grain. In consequence, the number of elevators increased rapidly, and many improvements were made in the equipment used to load and unload cars and boats. As a result, the handling of grain was expedited until where formerly scores of cars were unloaded in a day, hundreds were unloaded. At country points, too, more grain was being loaded into cars from a constantly increasing number of elevators. Machinery supplanted man power in the unloading of grain from wagons and also in the loading of grain into cars. Competition among country buyers increased, and margins of profits were reduced. Consequently, because of smaller profits, more attention was given to every possible economy. Losses due to discrepancies in weights came in for their share of attention; and variations in weights that formerly were accepted as normal, were considered large. Hence, the number of discrepancies considered excessive increased alarmingly. Many of these complaints represented actual discrepancies that were due, no doubt, to poor scales, bad weighing, and wasteful practices at terminals, or to inaccurate scales, and poor weighing methods at country loading stations, but the poor condition of grain cars in use during this period was also responsible for many of such weight variations. Plainly, this period was one of general dissatisfaction. Inaccurate scales, bad weighing, and losses of grain from cars in transit were topics of discussion whenever grain men met. While this agitation for better weights brought about some improvement in weighing methods and practices, comparatively little progress was made until the late nineties when the demand for better weighing became insistent. Chicago was probably the first to recognize this demand, and to act thereon. To begin with, better men were selected for the positions of deputy weighmaster; attention was also given to wasteful practices, and to the recording of data relative to the weighing and handling of shipments; the capacities of hopper scales were increased, requiring fewer drafts per carload, reducing the hazard of error accordingly. The campaign for better weights was also carried to country grain shipping points by the various State grain dealers' associations. This resulted in many grain dealers installing shipping scales; and the improvement in grain weighing conditions became marked.

Also, about this time, there was a concerted attack upon the "leaking car box." The Chicago Board of Trade was particularly aggressive in seeking the betterment of car boxes used to transport grain, for the reason that many of the discrepancies, that were due to losses in transit, were charged to terminal weighing. A systematic study was made of the defects inherent in the various types of car boxes in use to the end that carriers would improve their box cars and shippers would cooper them more effectively. This, in turn, resulted in a movement for more comprehensive records in order better to substantiate claims for loss of grain in transit.

The Chicago Board of Trade's campaign for better weights and conditions included the enforcement of rules for compulsory disinterested weight supervision in the Chicago Terminal; and provisions

were made for testing all scales used by the department. Regulations governing the grain-handling equipment were also promulgated; and police protection for cars stored in railroad yards was secured by the appointment of special agents by the weighing department. In fact, every phase of the weighing service was covered, and every avenue of possible loss was scrutinized, and safeguards applied. This action brought results at Chicago which the grain trade was quick to acknowledge. The movement for better scales and weighing was then carried to the country. Pamphlets covering every phase of the weighing problem were issued and distributed throughout the grain belt by the Chicago Board of Trade. These pamphlets outlined plans for scale installation and maintenance; they stressed the value of testing scales with a sufficient number of test weights; they covered the equipment used in handling grain; they outlined methods for the systematic recording of weights; and they showed, in detail, the defects found in car boxes, and how to prevent losses due to such defects.

As a result of the improvement at terminals, at country shipping points, and in the equipment for carrying grain to market, the subject of grain weights, while still a matter of some controversy, is no longer a major cause for ill feeling and contention. True, there are still too many weight variations, and there probably always will be. Nevertheless, without a doubt, to-day there is more positive proof of the correctness of scales used for weighing grain than ever before. Formerly, scales at terminals were tested and approved with 1,000 pounds of test weights; now, an amount equal to 8 per cent of the capacity of the scale is the prescribed quantity. Nor is the country elevator man satisfied with a scale test made by an itinerant scale man with one 50-pound test weight. His scales are now tested by a properly equipped scale man, appointed by his State association. Moreover, all tests of grain scales, both at terminal and country points, are based on regulations for testing scales as drafted and approved by a committee especially appointed, during the I. C. C. 9009 hearings, for the purpose of determining proper scale procedure. These regulations, which have the approval of the Bureau of Standards, have done much to standardize scales and weighing practices. They are generally accepted by the grain trade, and close adherence to them brings satisfactory weighing results both at country points and at the terminals.

**REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES
RELATIVE TO BUREAU OF STANDARDS HANDBOOK M85, PRE-
SENTED BY F. S. HOLBROOK, CHAIRMAN⁶**

At the Twenty-first National Conference on Weights and Measures held last year, your committee reported a number of minor changes in codes of specifications and tolerances adopted prior to that time and these amendments were adopted by you.⁷ In connection with this presentation your committee advised that it was the intention of the Bureau of Standards, during the then

⁶ The presentation of the latter portion of this report, and its adoption, were postponed until the seventh session, but for convenience of reference the full text, and its adoption, are included at this point.

⁷ See Report of the Twenty-first National Conference on Weights and Measures, B. S. Miscellaneous Publication No. 87, p. 147.

coming year, to reprint the codes of specifications and tolerances as adopted to that date. It was suggested by your committee that it might be found advisable during the preparation of the copy for reprinting to make some further minor changes in the specifications in order that the reprinted specifications might be in as good shape as possible; accordingly, authority was requested to make such changes. Upon motion, such authority was granted by the conference.

You have been advised that the republication of the specifications was completed during the year.⁸ As was anticipated, during the preparation of the copy minor changes proved to be advisable, and under the authority conferred such changes were made. Your committee now desires to report on its stewardship—to acquaint you with the principal changes made so that you will be fully advised in this relation.

If when this report has been presented, you are fully in accord with the spirit and letter of the changes made, it may be deemed wise to have this conference adopt the codes of specifications and tolerances as contained in Handbook of the National Bureau of Standards M85 as the official codes of the conference. Since nearly all of you already have been furnished with a copy of this publication, references to the official codes of the conference would thus be made most convenient for you.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
WM. F. CLUETT,
A. W. SCHWARTZ,
CHAS. M. FULLER,
I. L. MILLER,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

MR. HOLBROOK. In accordance with the above it now devolves upon me to outline as briefly as may be those changes made by the committee which are deemed to be of any real importance. In the majority of the cases it is believed that the reason for the changes will be obvious to you. Therefore, in the case of these the character or text of the amendment will be stated, but will not be commented upon at length. In view of the fact that the publication containing the changes in the text—Handbook M85—has been in your hands for some time, it seems probable that many of the changes may already have been noted by you.

FABRIC-MEASURING DEVICES

The specifications appearing under this heading have been titled throughout to furnish a more ready reference and to make this code uniform in style with other conference codes of a similar nature.

Inasmuch as this code is intended to refer only to retail devices, the definition has been amended so that it will clearly bring out this intention.

⁸ Handbook of the National Bureau of Standards, M85, Specifications and Tolerances for Commercial Weighing and Measuring Devices.

TAXIMETERS

The specifications have been titled throughout this code to furnish a more ready reference and to make this code uniform in style with other conference codes of a similar nature.

Under the general heading "Tolerances," two subheadings occur, these formerly being "Definitions" and "Tolerances." The latter was changed to read, "Values," to eliminate repetition of the main heading.

LUBRICATING-OIL BOTTLES

A footnote referring to the heading "Maximum Height" occurring in the table in Specification 2, was added reading as follows:

COMMITTEE NOTE.—Bottles are now being developed and produced in which the bottle and the spout are integral; for instance, a metal top may be permanently attached to the bottle, or the bottle may be so shaped as to include a glass spout. In such cases it seems that compliance with these specifications will be substantially secured when the over-all height of the bottle and the permanently attached spout, or the over-all height of a bottle blown integral with the spout, does not exceed the height specified in this table, plus 6 inches which is the figure given in specification No. 5 as the allowable length of a detachable spout.

LIQUID-MEASURING DEVICES

Some modifications have been made in titles of individual specifications in this code to make these consistent in form throughout; for instance, verbal forms have usually been deleted. This results in a desirable shortening of titles.

The same character of change has been made in the definition as has been described in the case of the definition for fabric-measuring devices.

Specification 7 has been amended by adding the word "*effective*" before the words "*cross-sectional area*" and before the word "*diameter*" near the end of the specification and by inserting the word "*shall*" in lieu of the word "*must*," so as to make this specification read, in part, as follows:

7. SENSITIVENESS.— * * * *the maximum effective cross-sectional area of the measuring chamber shall be 75 square inches, and, if cylindrical, the maximum effective diameter shall be 9.75 inches.*

By adding the word "*effective*" as noted the volume occupied in the chamber by filling pipes, overflow pipes, etc., is taken care of.

Specification 20 has been amended by adding the words "*device or of the*" before the word "*installation*" in the last sentence so as to make this specification read, in part, as follows:

20. USE OF ADJUSTMENTS.—* * * Adjustments of piston displacement to correct for leaks, slippage, excessive length of pipe line, or other defects of the device or of the installation shall not be permitted.

The words indicated have been added since some of the defects mentioned are not defects of the installation, but of the device itself.

21b. A note has been added at the end of this specification which is self-explanatory. It is as follows:

COMMITTEE NOTE.—Since upon review following the twenty-first national conference the Committee on Specifications and Tolerances is convinced that the

foregoing specification in its present form does not accomplish the purpose for which it was designed, the committee proposes for consideration at this time:

First, that the first paragraph of this specification be amended to read as follows:

All liquid-measuring devices shall be so designed and constructed, or so calibrated, that they will deliver into the discharge line on the delivery side of the discharge valve, within the tolerances hereinafter provided, any nominal quantity which they are designed to deliver, within a period of 10 seconds after the main flow of liquid has ceased.

Second, that the following words be added at the end of the third paragraph of the specification: "for the nominal quantity being delivered."

It is the present intention of the committee to propose these amendments to the twenty-second national conference which is to be held in May or June, 1929. This material is included here so that timely notice may be given to interested parties.

As expressed therein this matter will come up for action later in this conference.

Specification 22 has been amended by inserting the words, "In case the discharge valve is so positioned, any other valve not immediately adjacent thereto" in lieu of the words, "In case such valve is used, any other valve," at the beginning of the second sentence, so as to make this specification read, in part, as follows:

22. VALVES IN DISCHARGE LINE.— * * * In case the discharge valve is so positioned, any other valve not immediately adjacent thereto, in any portion of the discharge line leading to this outlet, shall be so designed and constructed that it can be closed off in one of the following ways: * * *

The change noted has been made to bring out more clearly the original meaning.

GREASE-MEASURING DEVICES

Under this heading similar modifications of titles of individual specifications have been made as have been noted in the case of "Liquid-measuring Devices."

The following words were added to the definition:

This definition is not to be construed to include devices which are obviously designed and intended solely for high-pressure lubrication of bearings and similar parts.

This was done to bring out more clearly what types were intended to be included.

VEHICLE TANKS

The individual specifications have been titled to make this code uniform with others of a similar nature.

PLATFORM SCALES

The subtitle "Including Counter Platform Scales" has been included to bring out this fact more prominently.

The change proposed by the committee last year in specification 10 was omitted, since it appeared that this change made an actual change in meaning not contemplated at the time of the proposal.

Specification 14 formerly read as follows:

14. When not modified by the above, the specifications given under the heading "Scales: General Specifications" shall apply to platform scales in so far as they are applicable.

It was amended to read as follows:

14. When not modified by the above and in so far as they are applicable, the following specifications shall also apply; general for scales; those for spring scales relating to automatic-indicating elements, when the scale is so equipped (except that graduations need not be equally spaced); and also those under any heading hereafter when the scale is so constructed as to fall within the definition under such heading.

This is one of the important changes made. This was deemed to be advisable as a matter of better cross referencing of the codes of specifications for scales.

Technically under the old references "counter scale" specifications probably did not apply to counter platform scales although analysis indicated that some of them certainly should apply, Nos. 1, 2, 11, and 12, for instance. Since we did not conceive that anyone could raise the slightest logical objection to this, this specification was modified as indicated.

TOLERANCES

The expression "heavy-duty" relating to certain types of scales was changed to read "large-capacity." The former phrase is now conceived to refer to the conditions surrounding the use of a scale rather than to the capacity of the scale, although reference to the capacity was intended. The same change has been made elsewhere in the specifications when appropriate.

COUNTER SCALES

The part of the definition reading:

It is to be noted, however, that those types embraced in the definitions of platform scales, spring scales, computing scales, cream-test and butterfat-test scales, and prescription scales and balances are considered under their specific headings.

has been changed to read:

However, those types embraced in the definitions of platform (including counter-platform), spring, computing, cream-test, and prescription scales are considered under specific headings; the specifications given here apply to the first three classes, but only when applicable and not modified by the specifications therefor.

This change was necessitated by the change made in specification 14 under "Counter Platform Scales," to reserve certain of these specifications to apply to other classes.

CREAM-TEST AND BUTTERFAT-TEST SCALES

Under the heading "Tolerances" the paragraph reading:

These tolerances shall be applied to single loads of 18 grams each added successively until the maximum load as defined above, is placed upon the scale.

has been changed to read:

This tolerance shall be applied to loads of 18 grams each, one of which shall be added when the scale is under approximately the maximum load as defined above.

The former method of test, if carried out exactly as described, would, in the opinion of the committee, be tedious, unnecessary, and

impracticable. It is believed the new language provides a satisfactory and simple test and more accurately describes the original idea in mind.

PREScription SCALES AND BALANCES

CLASS B

A slight rearrangement of the material was made under this heading and the side heading "Specifications" was added for the sake of uniformity.

That concludes the presentation. We will be very pleased to go into more detail in case anyone has any question to ask.

The CHAIRMAN. Does anyone wish to ask any questions or discuss this matter?

Mr. FLAHERTY. I make the motion that the codes of specifications and tolerances as contained in Bureau of Standards Handbook M85 be adopted as the official codes of the conference.

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

(At this point, at 12.45 o'clock p. m., the conference took a recess until 2 o'clock p. m.)

**FOURTH SESSION (AFTERNOON OF WEDNESDAY,
JUNE 5, 1929)**

TOUR OF THE LABORATORIES OF THE BUREAU OF STANDARDS

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

FIFTH SESSION (MORNING OF THURSDAY, JUNE 6, 1929)

The conference reassembled at 9.50 o'clock a. m., at the Washington Hotel, Dr. George K. Burgess, president, in the chair.

A NEW TESTING DEVICE FOR LARGE-CAPACITY SCALES

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

The coming of the automobile revolutionized methods in almost every industry. Business concerns in all walks of life have accommodated themselves to the changes brought about by this invention. Where formerly a 3-ton scale or a 5-ton scale was large enough to weight the loads of preautomobile days, we now find 10-ton scales, 15-ton scales, and even 20-ton scales, common. Thirty years ago 50 bushels was the average load of potatoes carted by Long Island farmers to the scales. Now the average load is nearer 200 bushels and I have seen a truck with a load of 400 bushels driven on a scale.

What steps have the weights and measure departments taken to meet this changed condition? I'll venture to say that the truck-scale testing equipment in the possession of 95 per cent of the sealers is no better than it was 10 years ago. How woefully inadequate that equipment is! Many of the city and county sealers have 1,000 pounds or less of test weights. At one of our State conferences a State department inspector told of a city sealer whose truck-scale testing equipment consisted of two 50-pound weights and a small hand cart. With that equipment he made his rounds testing coal scales and gravely placing his marks of approbation or disapprobation thereon. That, of course, is an extreme of inefficient inspection. It is almost equally ridiculous for an inspector with a small runabout car with a box mounted over the rear end, carrying fifteen or twenty 50-pound weights, to test and pronounce judgment on a 20-ton scale. Such an outfit can be made to do where the scales are used to weigh loads up to 4 or 5 tons gross. In order to test to a capacity of 14 tons with but 1,000 pounds of test weights, it is obvious that 27,000 pounds of substitution material must be available. Those who have tested large-capacity scales by the substitution method know how difficult it is to get such material and how laborious it is to handle it. At each substitution an error of 5 or 10 pounds, owing to the wind and to slightly different positions of the beam when readings are taken, may occur. The accumulation of errors may result in the conclusion that an accurate scale is inaccurate, or that an inaccurate scale is correct.

In Suffolk County there are 180 wagon and truck scales varying in capacity from 3 to 24 tons. The average capacity is about 15 tons. In 1920 my equipment for testing truck scales was an old

half-ton truck and thirty 50-pound weights. Being without practical knowledge of scale testing I thought my outfit ideal. In 1922 I listened to a paper delivered by George Warner, chief inspector of weights and measures for Wisconsin. His subject was "Wisconsin Equipment for Testing Heavy-Capacity Scales." After listening to Mr. Warner's paper I still had faith in my equipment, but there was one thing about his outfit which appeared a step in advance and that was the use of a small truck or "dollie" of a definite weight on which was placed a certain number of test weights, the whole being easily moved about on the platform of a truck scale. In 1922 my department came into the possession of an ex-army truck. It was powered with a 2-ton motor, but the rear end was of but 1-ton construction. Profiting by Mr. Warner's paper I constructed a dollie weighing 500 pounds. With my 1,500 pounds of test weights, this made an even ton. I mounted a winch in the truck and by means of the winch and skids was able to draw the dollie and weights into the truck. The truck alone weighed 6,000 pounds, the weights and dollie 2,000, the combined weight being 8,000 pounds. The weakness of this outfit was that my test weights did not equal the weight of the truck. I could not use the truck for substitution until I had tested the scale to 6,000 pounds. Even so this was a step in advance, for in using my loaded truck in making comparisons between scales I was frequently able to detect weaknesses in scales. Too often at 8,000 pounds I found variations between scales. Sometimes it was difficult to find where the error lay.

In 1926 at the national conference, C. A. Briggs presented an able paper on "Problems in Live Stock Weighing." It will be profitable for every weights and measures official to read and reread what he said in reference to the inspection of heavy-capacity scales. Permit me to quote a few lines. He said: "The proper testing of scales is an engineering matter for which there is no occasion for uncertainty. The tolerances provided define whether or not a scale is accurate, and proper tests will determine whether or not the scale will weigh within the tolerances. Experience shows that there is just one way in which the accuracy of heavy-capacity scales can be assured at heavy loads and that is to test the scales at heavy loads." In the course of his talk he told of the method of testing heavy-duty scales at the Detroit stockyards and showed pictures of the equipment used. He had departed from the familiar 50-pound weights and was using weights of 1,000 pounds each. That was another step in advance and the inspiration for my new equipment. Thousand-pound weights were fine, but my old truck was already loaded to capacity. Two years more passed. In 1928 Mr. Rogers, of the New Jersey department of weights and measures, described their new outfit for testing truck scales. It was very similar to the outfit we have been using for the past seven years. They had advanced to the extent of using 500-pound weights.

I finally made up my mind that something had to be done to assure the users of heavy-duty scales in Suffolk County that such scales are accurate. I realized that means to handle 1,000-pound weights and transport them from place to place would be expensive.



FIGURE 9.—General view of large-capacity scale-testing equipment of Suffolk County, N. Y.



FIGURE 10.—Detailed view of cab and hoisting unit

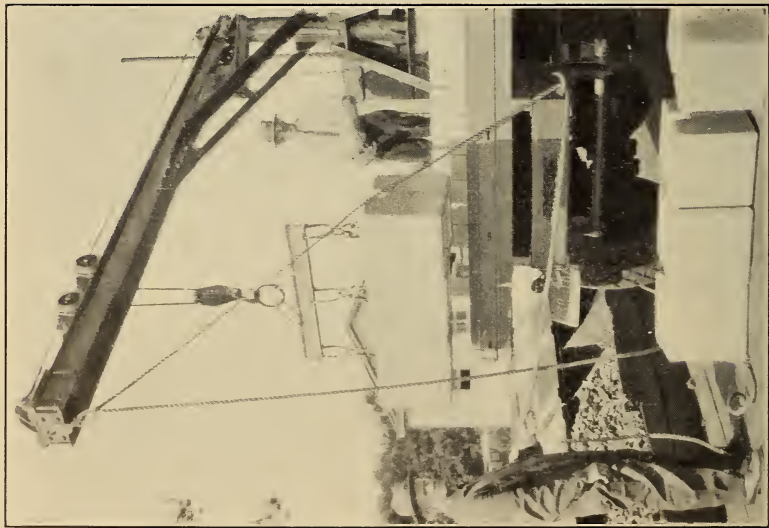


FIGURE 11.—Unloading the weights on the end of a
scale platform

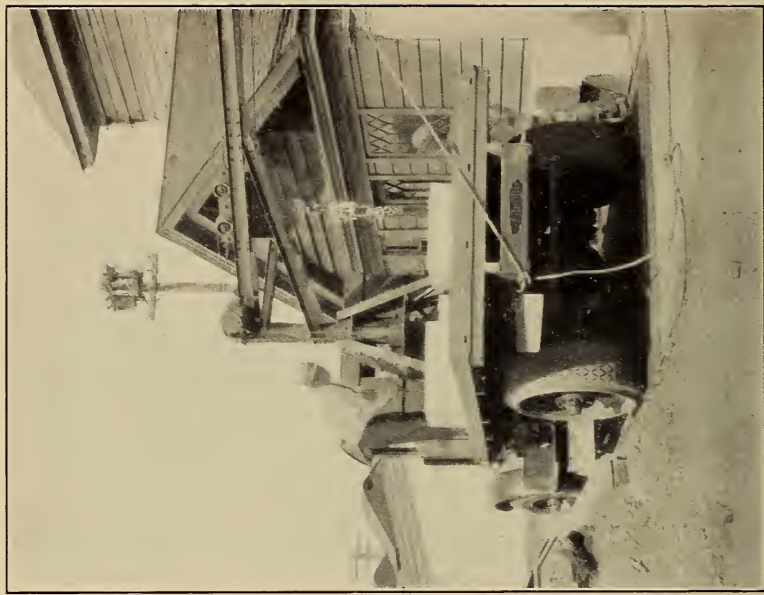


FIGURE 12.—Loading the weights from the side of a scale

On the other hand, I considered the value of the commodities being weighed annually on the truck scales in Suffolk County. The average annual value of the potatoes weighed on these scales for the past 12 years is \$5,000,000. In addition to that, about \$3,000,000 per year in coal is weighed. For a business of such magnitude it seemed to me that it would not be unreasonable for the county to spend \$7,000 or \$8,000 to make certain that the buyer and the seller should each get his due.

I went before the board of supervisors armed with figures showing the possible losses which must be stood by some one through the use of inaccurate truck scales and explained the inadequateness of my equipment. I asked for a 5-ton truck and sixteen 1,000-pound weights. In addition, I asked for a power winch and crane of 5,000 pounds capacity. The matter was referred to a committee. The committee reported favorably and \$7,500 was voted for the equipment. The final cost complete was about \$7,600.

I will now give you a general description of my outfit.

A general view of the outfit is shown in Figure 9. The boom is 12 feet long projecting 3 feet over the rear of the truck.

In Figure 10 we see at the right the two levers by which the hoisting apparatus is controlled; one lever controls the raising and lowering gears while the other lever operates the clutch. The whole thing is easily operated; when the hand is removed from the clutch lever the machine automatically stops—wherever the weights happen to be when the hand is removed from the clutch lever, they remain.

At the left of the illustration are shown the control levers within the cab; in addition to the conventional hand-brake and gear-shift levers there is an additional gear-shift lever for stepping up and stepping down the power ratio for high and for very low speeds, and there is also the lever for engaging the motor with the weight-hoisting assembly.

Figure 11 brings out in detail the unloading of the weights on the end of the scale platform and shows clearly the yoke by means of which one, two, or three of the weights may be handled in one operation. Also notice the chain hoist in the background. The chain hoist is hand operated, and is used to move the trolley in and out on the boom.

Figure 12 shows weights being loaded on the truck from the side of the scale.

The weight of the complete outfit as shown is 30,600 pounds. The truck weighs 13,600 pounds and the weights, including twenty 50-pound weights, weigh 17,000 pounds, so an accurate test can be made up to 15 tons. That is 2,000 pounds more than is permitted on the State highways, so I shall be obliged to lighten my load by 1 ton.

Owing to the urgent necessity of giving our attention to gasoline-pump inspection during the past month, I have inspected but seven truck scales with my new equipment. Of the seven, two were condemned. I will say a few words about three of these scales.

No. 1 is a 20-ton scale. I was a little doubtful about this scale, but a careful testing up to 15 tons showed the scale to be in perfect condition.

No. 2 is a 20-ton scale of a well-known and highly respected company. The scale was installed about six months ago, inspected, and passed as correct. On being tested with my new equipment an error of 150 pounds had developed at 15 tons.

No. 3, however, is the scale which gave me the greatest satisfaction to test. This scale was sold as a 15-ton scale. The beam showed 15 tons. The scale was installed eight months ago and was tested shortly after and condemned nominally because the poises did not agree. The poises were adjusted, and in due time another test was made. An error of 20 pounds was shown at 4 tons, and the scale remained condemned. A third test was made with no better result. About six weeks ago the manufacturer of the scale called me on the telephone requesting that I name a date when I could meet him at the scale and test it in his presence. I set a date and was present with the new outfit. The scale man failed to keep his appointment. I tested the scale up to 13 tons and found it to be 20 pounds fast at 4 tons and over 300 pounds slow at 26,000 pounds. A few days later the manufacturer again called up and apologized for his failure to keep his appointment. I told him of the result of my test. He was very indignant when I told him I tested the scale up to 13 tons. He claimed that it is only a 10-ton scale and was sold as such. However, I saw the bill for the scale and it read "one 15-ton scale." I advised the man to remove the scale. I am convinced that when I have gone the rounds this year many truck scales will be found lacking the necessary qualifications for use in trade.

I do not wish anyone to get the impression that operating this outfit is play. There is plenty of hard work attached to it. Pulling the trolley in and out on the boom is rather hard work. Then there are the 50-pound weights. While I can arrange to unload them all in one or two operations, so far, however, we have unloaded them by hand.

After all nothing is accomplished without hard work, but with this apparatus one has the satisfaction of knowing positively whether or not the scale is accurate.

DISCUSSION OF ABOVE PAPER

Mr. SWEENEY. You have an advantage over the New Jersey equipment.

Mr. SMITH. We think so; under the New Jersey system they unload from the end of the truck. In our system we can unload the weights over the sides or the end and can distribute the weights to any point.

Mr. SWEENEY. What do you do when you come to a covered scale?

Mr. SMITH. In that case we must unload the weights from the truck and use a two-wheeled contrivance, such as Mr. Briggs described as being employed to test weights at the Detroit stock yards.

Mr. SWEENEY. How do you calibrate your weights?

Mr. SMITH. They were calibrated by the scale company. We checked them against 1,000 pounds of weights.

Mr. SWEENEY. Have you kept any data as to corrections you have made on them in the course of your using them?

Mr. SMITH. I have not had them long enough to procure any figures.

Mr. SWEENEY. How long does it take you to unload all of these weights and place them on a scale?

Mr. SMITH. To unload all of those weights and place them on a scale at the different corners takes about one hour. To make the same test using substitution materials would take a half a day or more.

Mr. GRIFFITH. How many men are involved?

Mr. SMITH. Two men. If there is only one man on the truck, there is always some one standing around who can be pressed into service. The work of the man on the ground does not amount to very much; he has merely to release the weights.

Mr. GRIFFITH. Mr. Smith, in relation to the highway overload you mentioned, could you not get a permit from the State highway department to allow you to carry that weight if you equipped your truck with pneumatic tires?

Mr. SMITH. My old truck had pneumatic tires, but I did not like that because it was quite a task to inflate them and it is rather injurious to have that weight remain on them for any length of time. The solid tires, we decided, were very much more satisfactory. We can make 25 miles an hour and the truck at that speed rides very comfortably.

GASOLINE-METER INSTALLATIONS IN A RAMP GARAGE

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

Mr. President and gentlemen of the conference, with your permission I am going to introduce my subject with a brief description of the first 2-way spiral ramp built in the world, a striking example of engineering skill and architectural ingenuity that is destined to revolutionize present standards of storage construction.

The 2-way ramp is the product of a Richmond architect, Horace L. Smith, jr., a member of the architectural firm of Lee-Smith & Van Dervoort, designers of the garage. Since the completion of this storage garage the Packard Motor Car Co. have erected an enormous storage garage and have used this style ramp. The ramp consists of two spiral inclines, one superimposed upon the other, both beginning at the street floor and running to the roof. The two ramps are intertwined in a corkscrew effect.

This garage is equipped with 18 hydraulic meter pumps of the installation of which I will give a brief description. This building was designed for the storage of transient cars, so it was desirable to provide means for dispensing gasoline on each floor. Due to the excessive head or pressure caused by the 6-story building and the difficulty of pumping gasoline to the top floors, the system finally selected was a hydraulic one.

This method of handling gasoline consists of a water-float control box located on an upper floor of the building, the function of this water box being to maintain a constant pressure or head on the system. The box has a float which operates a valve like the float valve in an ordinary toilet flush tank. The down-feed pipe

from the water box is fitted with an electrically-operated valve that closes against the water pressure from the water box except when one of the dispensing hose is removed from its hook. From this solenoid valve the water pipe connects with a 3-way valve that is so designed that the water can flow from the water box to the gasoline storage tank, or the discharging water from the tank can flow through the water-control valve to the sewer.

The discharge line from the tank is connected through a check valve, then rises vertically to the top of the building to a return bend, which has a vent pipe extending about 20 feet above the roof, and from the return bend the line runs to the basement and then rises vertically again. From this last vertical riser the several meters are connected on the different floors.

The meters are of the same general design as ordinary house water meters, being of the wobble displacement disk type. From the meters the gasoline flows through a fabric hose that has a metal nozzle at its end fitted with a hand-operated, self-closing discharge valve. The hose is normally supported by hanging the discharge nozzle on a special hook. The weight of the hose on the hook causes the hook to open a switch that is connected with the solenoid water-supply valve. When the hose is removed, the switch automatically closes and energizes the solenoid, thereby opening the water valve and placing the system under pressure.

In explaining the normal operation of the system we will consider the gasoline tank filled with gasoline with the exception of the small amount of water that always remains in the tank. Upon the removal of any hose from its hook, the system is under pressure by the elevation or head of the water-float box. Upon opening the hand-operated discharge valve at the end of the hose, gasoline flows immediately, the column of gasoline extending from the tank up the first riser, through the return bend, down to the basement and then up the riser that is connected with the meters. In flowing through the meter the gasoline causes the meter disk to move and operate the registering and recording indicators.

When all of the gasoline has been drawn from the tank, if the system is operated, water will flow up the first vertical riser to a point below the return bends, the height of this point, of course, being the elevation of the water-float box less a small amount caused by the internal friction in the pipes.

When the tank is to be refilled with gasoline, the fill valve is opened, the water-control valve is opened, and gasoline poured in the fill box. As gasoline flows into the tank, an equal volume of water flows out through the water valve to the sewer. When the tank is almost filled with gasoline, the head of gasoline is not sufficient to elevate the water to the water valve, so gasoline backs up in the fill box and prevents the gasoline flowing to the sewer through the water valve. When the tank is filled, the fill valve is closed, the water valve is closed, and the system is ready for service. It is well to note that a column of water 12 inches high will raise a column of gasoline approximately 16 inches high. This is the reason that the pressure on the system caused by the elevation of the water-float box will force gasoline up over the

return bends, which are located above the water box. The vent connected at the top of the return bends is to prevent siphonage.

When this system was first placed in operation considerable difficulty was experienced in getting accurate readings through the meters. Any one meter could be accurately regulated within the prescribed tolerances when the discharge valve was fully opened and remained so throughout the period of the reading. If more than one meter was operated at the same time, the readings were in error by an amount greater than the prescribed tolerances. If only one meter was being operated at a time, but the nozzle-control valve of that meter was only partially opened, erroneous readings resulted. This condition caused an investigation to be made as to the cause of these errors and they were finally eliminated to a large degree.

The construction of the meters is such that the flow of gasoline through the meter causes a displacement disk to oscillate, which in turn operates the train of gears that records the amount of liquid passing through the meter. In order to provide a means of adjusting and calibrating the meter a by-pass is provided, and the meter is so constructed that the total displacement of the measuring chamber is less than the registration of the meter. With the meter in proper adjustment, the greater part of the liquid flows through the disk chamber and a small part through the by-pass, the total of these two, however, being equal to the reading on the meter. The by-pass is provided with an adjusting screw so that the amount passing through the by-pass can be regulated. It is by this adjustment that the meters are calibrated. It was discovered that a difference in pressure caused a difference in meter readings; a constant pressure should be maintained.

In the design of the meter, the cross-sectional area of the by-pass is very small in proportion to the area of the disk chamber. The resistance to flow is practically proportional to the velocity of the liquid, and the velocity is proportional to the pressure. In the small by-pass the resistance varies greatly, as internal friction builds up quickly as the velocity increases. In the disk chamber the area is so large that practically the only friction against the flow is the mechanical friction of the disk and its gear train. This remains practically constant. The result is that if the applied pressure is reduced before reaching the meter, proportionally a larger percentage will flow through the by-pass than will be the case when the pressure at the meter inlet is greater. In simpler words, a pressure of 10 pounds per square inch will cause a given number of gallons to flow per minute through the disk chamber, and a pressure of 20 pounds will cause practically twice the number of gallons to flow per minute. With the by-pass, when the pressure is doubled the rate of flow will not be doubled. It was the difference in rate of flow between the disk chamber and the by-pass that caused the error in readings. A remedy was attempted by the addition of auxiliary pipes tapped in the main lines which acted as a reservoir and furnished the necessary fluid to keep the pipes full at all times, thereby eliminating any chance of air pockets or reduction in pressure. This was not entirely effective.

The next remedy attempted was to prevent a difference in pressure. With a relatively long run of pipe and not very great pressure, the pressure drop on the meter riser varied greatly with the number of meters being used at the same time. The solution was to provide a valve at the inlet of each meter that could be so adjusted that, regardless of the pressure on the supply riser, with the nozzle valve open the rate of flow through the meter was fairly constant. When more than one meter was operated at the same time, the pressure in the meter riser would, of course, drop, but would not drop below the pressure to which the meters had been regulated. This was successful in overcoming our difficulties, since tests made showed the meters within the prescribed tolerances. Therefore, I passed the system.

(During the reading of the above paper Mr. Ragland illustrated by means of lantern slides a number of the matters discussed.)

THE EFFECT ON SCALE DESIGN OF HIGHWAY AND MOTOR-TRUCK DESIGN

By M. H. STARR, *Consulting Engineer, Howe Scale Co.*

In the course of certain investigations being made for the Howe Scale Co. selling organization certain facts in relation to the subject of this paper were brought out. Learning of this, Mr. Holbrook, of the Bureau of Standards, suggested that this subject might be of material interest to this conference. The motor-truck scale of to-day involves relatively a considerable expense for its installation. With the stress limits and loading assumptions for motor-truck scale design as set forth by the American Railway Engineering Association, it is safe to assume that the expected life of such a scale under average traffic and maintenance conditions will be in the neighborhood of 15 years with perhaps one overhauling.

It follows, then, that sellers should qualify themselves as far as possible to recommend to prospective purchasers motor-truck scales best adapted to future requirements. In doing so, it is essential that the economics of motor-truck transportation be studied so that motor-truck scales of to-day will surely have ample capacity to take care of motor traffic conditions of at least 10 years hence.

It is altogether reasonable to assume that economical motor-truck transportation rests broadly upon the same cost factor as railway transportation, and that the same trend of development will influence motor-truck design as has in recent years influenced railway transportation. This primarily concerns development of power and way to a point that will allow the maximum tonnage to be moved in one train unit. It has ever been with the railways that loads and speeds are governed by the capacity of the track; that is, not considering other limitations imposed by clearance restrictions.

Our highways may be roughly compared in their diversity to earlier railway lines and, to a lesser extent, highway conditions now are analogous to present railway conditions. Main line rails are suitable for both heavy and high-speed traffic. These are comparable to through highway arterials. Feeder lines, in both cases, are not suitable for either heavy or high-speed traffic. Therefore, there must be a limit upon loads carried upon the feeder or secondary lines

so that they will not be broken down by traffic for which they are not suited.

It is quite evident, then, that the load-carrying capacity of motor trucks at the present time is not being limited by the purchaser, but rather by the carrying capacity of the feeder or suburban highways. The demand, however, for larger capacity motor trucks is economically sound and is of such material importance that it is recognized that development of highways must be in the direction of increased load-carrying and vehicle-per-time capacity. The time element need not concern scale designers as that largely is dependent upon the permissible width of highways.

This subject is being given intensive consideration by the Motor-Vehicle Conference Committee which stands by the authority of the American Automobile Association, National Automobile Chamber of Commerce, National Automobile Dealers' Association, Motor and Equipment Association, and Rubber Association of America. In their last report, issued January, 1929, is stated:

In behalf first of the safety and convenience of vehicular and pedestrian movement on the highway; and second, to prevent uneconomic and unjustifiable wear and tear of highways, it has been found necessary to impose size, weight, and speed limitations upon motor vehicle use.

The primary consideration is not the cost per ton of hauling, but rather the conservation of human life and the preservation of the highway.

Continuing with the committee report:

These restrictions have been imposed by State laws, or by municipal ordinances in such States where the necessary power has been delegated the local governing bodies by the State legislature or by liberal home-rule provisions in the State constitution.

The Federal Government while, no doubt, potentially able to impose size, weight, and speed restrictions on motor vehicles engaged in interstate commerce, has not yet taken steps in this direction.

On the other hand, every tendency is away from municipal ordinances, especially in matters of size and weight restrictions, and in the direction of unqualified State control.

That the laws of the various States in the matter of operating limitations for motor vehicles should be uniform is scarcely open to question. What the standards of such uniformity should be is therefore a vital consideration.

Obviously, among the various kinds of highways and highway surfaces and, indeed, among the various highways of a certain kind there are strips of mileage which will carry bigger, heavier, and more swiftly moving vehicles than others. So, too, upon any one strip of some highways there are times of the year or conditions of weather when restrictions should be lower than ordinarily deemed necessary.

This at once raises the following questions:

- (a) Shall the dimensions, weights, and speeds of motor vehicles and their loads be reduced to the capacities of the weakest highways or parts thereof, or
- (b) Shall all highways and parts thereof be lifted up to standards of improvement adequate to carry the biggest, heaviest, and swiftest loads that users of motor vehicles desire to place upon them?

The Motor-Vehicle Conference Committee believes that between these two extremes lies a compromise which motor-vehicle manufacturers in designing their vehicles, highway engineers in building their roads and bridges, and public authorities in maintaining and regulating traffic upon them, would do well to follow.

Translated into specific recommendations, this middle ground taken by the conference committee calls for the following:

Size restrictions

1. Width, including load, 96 inches. (Traction engines, 108 inches.)
2. Height, including load, 14 feet 6 inches.
3. Length, including load: (a) Single vehicle, 33 feet. (b) Combination of vehicles, 85 feet.

Gross weight restrictions

1. Single vehicular unit of four wheels or less (tractor, semitrailer or trailer to be regarded as separate unit), 28,000 pounds. Single vehicular unit of more than four wheels should be granted additional weight irrespective of axle spacing.
2. Any one axle of a single vehicular unit of four wheels or less or any axle of semitrailer or trailer, 22,400 pounds.
3. Per inch width of tire measured between flanges of the rim in case of solid rubber tires.

| Size of tire | Load per inch (maximum pounds) |
|--------------|--------------------------------------|
| 3-inch | 400 |
| 3½-inch | 400 |
| 4-inch | 500 |
| 5-inch | 600 |
| 6-inch | 700 |
| 7-inch | 750 |
| 8-inch | 800 |
| 10-inch | 800 |
| 12-inch | 800 |
| 14-inch | 800 |

| 4. Minimum thickness of rubber for solid rubber tires: | Inches |
|--|--------|
| 3, 3½, 4, and 5 inch tires | ⅞ |
| 6, 7, and 8 inch tires | 1 |
| 10, 12, and 14 inch tires | 1½ |

It will be seen that these load limitations are for the purpose of keeping the bearing pressures per square inch within accepted limits. These unit pressures are all well within the design considerations set forth in the A. R. E. A. schedule.

The findings of such a representative body as this committee can not but have a profound effect and influence upon those having to do with setting up regulatory measures and, for some time to come, it is at least reasonable to presume that loading and principal dimensions will be about as set up in the foregoing schedule. There will always be special conditions requiring special scales. But, it is not the extreme or unusual that is here under consideration except as such special cases might be an indication of future practice. As late as 1923, the American Railway Engineering Association, through their Yards and Terminals Committee, set up the following list of motor-truck scale sizes and capacities adequate as of that date:

| | Platform dimensions in feet |
|----------------------------------|--------------------------------|
| 40,000-pound (for 7½-ton trucks) | 20 by 9, 22 by 9, and 24 by 9. |
| 30,000-pound (for 5-ton trucks) | 18 by 9 and 20 by 9. |
| 20,000-pound (for 3½-ton trucks) | 16 by 8 and 22 by 8. |

At that time, it was the practice to state the size of a truck as its carrying capacity; thus, a 7½-ton truck had a nominal pay-load capacity of 15,000 pounds. That practice is now largely replaced by stating the size of the truck as the gross weight. This has been

brought about mainly by tire manufacturers who have demanded, for the protection of their mileage and load-carrying guaranty, that their tires be not subjected to loads greater than their rating. Where the capacity of truck is given as net loading, the gross load might vary by wide amounts due to the type of body used, method of weight distribution, style of dumping arrangement, and other variable factors.

It is interesting to know that, while the A. R. E. A. foresaw nothing in 1923 that would require platforms in excess of 24 feet in length, at the present time, all scale manufacturers are listing a 30-ton, 30-foot platform, and the Howe Scale Co. have recently furnished two 90-foot motor-truck scales for use on the West Coast. These, of course, are to accommodate tractor and two trailers in train. These exceptions are not, in our opinion, an indication of the retirement of any of the scales now listed, but do represent a new and permanent development in motor-truck haulage.

As it is quite evident that load concentrations will not be materially increased, owing to the advisability of keeping unit loads within about the present limits to protect the weaker feeder lines, development of motor-truck scales should be toward longer platforms and capacities above 20 tons. For some time, the 16 and 18 foot platforms will be in active demand in urban districts. There is a strong indication that the demand for the scale of a capacity of 15 tons will decrease. The difference in cost between the 15 and 20 ton is relatively small, and where there is a necessity for 15-ton weighing capacity in a majority of cases, it is better to install the 20-ton scale. Even should weighing traffic never exceed the capacity of the 15-ton scale at the point under consideration, the expense of the 20-ton is amply warranted by the greater life of the longer knife-edges and the larger recovery value at any given time within the life of the unit.

There is a strong tendency toward concrete platforms and, where well designed, these are very satisfactory. At the present time the added dead load following the use of the concrete deck is ignored; but this is an item that will doubtless be considered in defining the scale's capacity, for in some cases the weight of concrete platform may equal 30 per cent of the weighing capacity. Other types of decks have been experimented with, such as steel-plate covered with wooden blocks, concrete with mastic wearing surface, laminated or mill-type wooden decks. All of these possess certain advantages, and, no doubt, as a result of their use, some one construction will show its superiority over others and be generally adopted.

Automatic indicators are of very material value in speeding up the weighing operation and eliminating the factor of "judgment" of the weighman. They are not necessary in all cases, but where speed is a material item, the automatic devices have proven their worth. The motor-truck scale of to-day is giving performance records altogether the equal of the modern railroad track scale, but purchasers should by all means install units of ample platform size and weigh capacity to take care of increasing motor-truck loads of the future.

A COOPERATIVE PROGRAM OF THE AMERICAN AUTOMOBILE ASSOCIATION

By ERNEST N. SMITH, *General Manager, A. A. A.*^o

Mr. Chairman and gentlemen of the conference, I am happy to appear before this conference to discuss a problem of vital interest to the American Automobile Association and its 1,075 affiliated clubs located in every State of the Union. That problem is the protection of the motoring public from dishonest gasoline vendors in the sale of gasoline and oil.

The responsibility for the enforcement of the weights and measures laws dealing with this subject rests with you as public officials of the various States charged with the duty of protecting the public interest by strict enforcement of the weights and measures laws. While the responsibility for the enforcement of these laws is delegated to you, the methods of meeting this problem can be best accomplished through the active cooperation of the motoring public. Notable examples of club cooperation in gasoline check ups are the work of the Cleveland Automobile Club, Detroit Automobile Club, Cincinnati Automobile Club, and a number of other A. A. A. clubs in different parts of the country, which have been cooperating with the State and local officials in conducting periodical gasoline check ups. The stations visited are picked by the number of complaints which come through various sources to both the A. A. A. club and the city weights and measures official over a period of months. I am advised that this cooperation has proved effective, and on behalf of the American Automobile Association and its affiliated clubs I pledge their continued and active cooperation.

Now, what is the problem? During the calendar year 1928 there were in operation in the various States 24,500,000 motor vehicles. These vehicles consumed approximately 12,000,000,000 gallons of gasoline, representing a retail price of about \$2,500,000,000. We know in making these purchases there is bound to be dishonesty in measuring out this enormous volume of gasoline. 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 estimate is based upon the results of check ups conducted by State and local weights and measures officials in various parts of the United States in cooperation with A. A. A. clubs. For instance, in one city where a check up was conducted, it was disclosed that out of 100 purchases of gasoline, 25 prosecutions followed, with 23 convictions, these prosecutions being made on shortage of 1 quart or more. In another city in a check up campaign 91 gasoline stations were visited, resulting in 15 attendants being caught selling short measures, while in another, during a recent drive to rid the city of dishonest operators, 391 gasoline purchases were made which showed that 44 gas stations, or 14 per cent, made short-measure sales ranging from 1 pint to 1¼ gallons. So, based upon these scattered investigations in different

^o In the absence of Mr. Smith, who was called out of town on urgent business, this paper was presented to the conference by Max. K. Kimball, of the American Automobile Association.

parts of the country we concluded that it was safe to assume that at least one-sixth of the total gasoline sold in the United States in 1928, or approximately 2,000,000,000 gallons, was subjected to short measure, and that the shortage averaged 1 quart in every 5 gallons.

This simply means, if our conclusions are correct, that the motorists of the nation were "gypped" out of 100,000,000 gallons of gasoline, and that at the current average cost of gasoline their money loss was at least \$20,000,000.

At this point it should be well to point out that this condition should not be attributed to the responsible oil companies or station owners. It has been found that they are as anxious as is the public to eliminate the dishonest operators because they realize that honesty in business is "good business."

For the solution of this problem it is essential that a clear understanding exist of the conditions which it is designed to correct, and of the results which it is planned to accomplish. A survey of the weights and measures laws of the various States, with particular reference to the sale of oil and gasoline, reveals one or more of the following conditions:

(a) In several of the States adequate weights and measures laws have not been adopted.

(b) In others, although adequate laws do exist, official administrative machinery has not been set up to carry the laws into effect.

(c) In even a greater number of States no periodical check ups have been provided to determine violations and prosecute dishonest gasoline vendors. These last two conditions are due to the lack of State appropriations.

Therefore, to solve the problem to protect the motorist from short measure, three steps are in order, namely: (1) The adoption of adequate laws (where such laws do not already exist), (2) adequate State organizations, and (3) effective enforcement.

As to adequate legislation, I am pleased to say that the National Conference on Weights and Measures has accomplished a splendid piece of work in the drafting of a model State weights and measures law in three forms to meet conditions applicable in each State. Last year after our survey of this problem, we dispatched a bulletin to all our affiliated clubs in the various States, pointing out how the affiliated clubs could cooperate with the local weights and measures officials in securing the adoption of adequate laws and additional appropriations to enable the States rigidly to enforce them through periodical check ups. As a result of this step our affiliated clubs in a large number of the States are cooperating with the State and local weights and measures officials in this important work.

In addition to this program, we have carried on an educational program in the way of publicity in order to arouse the public to the end that the various State legislatures might appropriate sufficient funds in order that your various State weights and measures departments might function 365 days a year and enable periodical check ups as a basis for prosecutions to weed out the dishonest operators.

In seeking a solution of the problem of short measures in the sale of gasoline and oil, the motoring public owes a great debt of gratitude to the National Conference on Weights and Measures.

The American Automobile Association is of the opinion that while station owners have cooperated to eliminate the dishonest vendor, the petroleum industry itself should take notice of its significance. In this connection it might be pointed out that the American Petroleum Institute last December adopted a National Code of Practices for the petroleum industry which is now before the Federal Trade Commission for consideration. We were astonished to find that the code was silent upon many questions relating to the industry, which the motorists of the Nation feel should be considered. An analysis of the proposed code adopted by the petroleum industry discloses that its adoption would accomplish little or nothing to eliminate the undesirable practices and conditions that have militated against the interests of the purchasing public and which have culminated in a large volume of national resentment. Particular attention is called to the fact that the code does not propose any remedial measures within the industry itself for the prevention of short sales of gasoline and oil. It says nothing about the stabilization of prices which now vary like a kaleidoscope in areas where basic conditions are the same. It says nothing about the excessive number of stations and pumps which tend to increase the cost of doing business and the price to the consumers. It says nothing about the universal adoption of standard mechanical facilities to insure full quantity and quality. These are some of the matters which the American Automobile Association called to the attention of the American Petroleum Institute representing the industry, and later made the subject of representations before the Federal Trade Commission which is now considering the proposed Code of Trade Practices for the petroleum industry.

A great deal has been said concerning cooperation within industry for the solution of business evils, but in spite of some progress in this direction, your duties as public officials in protecting the public's interest never cease.

In closing, I want to assure you that the American Automobile Association and its affiliated clubs are tremendously interested in insuring the immediate set up of adequate enforcement machinery to achieve the desired results. This can be accomplished by the following program:

First, the adoption of new legislation on weights and measures by those States where the existing law is inadequate;

Second, in the set up of the State and local enforcement organizations with a personnel able to administer the law;

Third, in securing sufficient appropriations by the legislatures to enable the State organizations to rigidly enforce the law.

To this end the affiliated clubs of the American Automobile Association pledge their continued cooperation.

DISCUSSION OF ABOVE PAPER

Mr. GRIFFITH. In view of the fact that a large number of the sealers are members of the A. A. A. and carry their card, I think it would be well for the automobile clubs to take the initiative to secure legislation that would protect the buyer. The American Automobile Association would have the fullest cooperation of the sealers in this endeavor. Carry that thought back with you.

Mr. KIMBALL. I think the automobile clubs in the different States are doing all in their power to put over this legislation, which is

necessary to straighten out these dishonest gasoline vendors. This is a thing that does not go through easily, but the American automobile clubs are going to do it. They are behind the movement to put out of business every dishonest gasoline man in the United States. This legislation will come through the effort of the clubs, with the cooperation of the inspectors and State officials.

MR. A. B. SMITH. Mr. Chairman, I desire to interrogate the gentleman who has just left the floor.

MR. KIMBALL. I will refer you to Mr. Bing, of the research department.

MR. A. B. SMITH. Has the American Automobile Association gathered any statistics tending to show to what extent the motoring public, the gasoline-purchasing public, have made this cheating of themselves possible?

MR. BING. You refer to the negligence of the public in not being careful in checking up the operators?

MR. A. B. SMITH. Yes.

MR. BING. We have checked up to some extent, and found that women in particular are very negligent in watching the operator. That is a problem that should be solved by education. We stress that in our magazine.

MR. A. B. SMITH. Can you tell from your figures what portion of that loss which you have estimated might be applicable to the State of Pennsylvania?

MR. BING. You appreciate that those results are based on scattered investigations. We can not give any specific data for any State. That is impossible.

MR. A. B. SMITH. Can you tell me how the work of the officials in Pennsylvania showed up?

MR. BING. There is a very good set-up in Pennsylvania, and it strictly enforces the law.

MR. GRIFFITH. I would like to mention that it might be well for the local managers of the A. A. A. to get in touch with the various sealers who are members of the local associations, and for the local weights and measures officials to get in touch with the local clubs, so that there would be concerted action to get legislation through. In the last legislative session we tried to get needed legislation, and if the automobile clubs and the weights and measures officials of the entire State of Maryland had concentrated on that particular piece of legislation we would have had it enacted. If the A. A. A. cooperated with the weights and measures officials they would probably get further than if each tried to do it individually.

THE CHAIRMAN. Is there further discussion? The subject evidently is a very important one from many angles.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES ON SPECIFICATIONS AND TOLERANCES FOR GREASE-MEASURING DEVICES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN

Your Committee on Specifications and Tolerances have to present at this time and to propose for final adoption, the code of specifications and tolerances tentatively adopted by the Twenty-first National Conference held in 1928.

Your committee took care to give these specifications and tolerances wide publicity and to invite criticisms from all interested

parties. In response to this invitation the committee received a considerable number of comments. We then carefully reviewed the specifications as adopted, and gave studied consideration to all suggestions made by weights and measures officials, manufacturers of the devices, and the petroleum industry. As a result some amendments were believed to be advisable. The report which was placed in your hands on Tuesday contains the majority of these amendments.

At the request of the American Petroleum Institute your committee held a joint meeting yesterday with a representative group from the petroleum industry. The meeting was a very friendly and helpful one, and as a result two additional amendments have been agreed upon by your committee and these will be presented in connection with the ones mentioned above.

Your committee desires to take this opportunity of discussing briefly the question of the dates at which codes and amendments to codes are recommended to take effect since the practice in this regard, while reasonably uniform, does not appear always to have been understood by the members of the conference and by the other interested parties.

The committee believes that we have not allowed too much time in the past, but, on the contrary, we feel that it may be possible better to express the original intentions of the committee in this regard and to make it clearer from the beginning what is to be expected, even though the actual date of the taking effect of a proposal may not actually be affected thereby.

The idea by which it is thought this may be accomplished may best be illustrated by a specific case:

In 1927 the committee proposed that a device be required on piston pumps designed visibly to indicate that the pump is full and ready to operate. It was provided that this provision be adopted tentatively for review at the 1928 conference and that it should not go into force and effect prior to July 1, 1928. This date was inserted to postpone enforcement by officials while the proposal was under consideration. When the provision was formally reviewed and finally adopted in 1928, it became necessary to consider the date upon which it might reasonably be enforced, and the recommendation that it be not put into force and effect prior to July 1, 1929, was proposed. On the face of it there appears to be a delay of a year additional to that at first contemplated.

As a matter of fact we feel that the entire period elapsing between the date of the proposal and the date upon which it was finally limited to take effect probably was not excessive, and that a shorter period would not have afforded the manufacturers sufficient opportunity to produce devices in compliance, without hardships, such as interruption of production schedules, etc. In the first place the allowance of one year after tentative adoption before final consideration and adoption, seems to be a sound policy. During the year thorough consideration can be given the proposal by all parties at interest and a consensus arrived at as to whether there is actually a condition demanding a remedy, and, if so, if the remedy proposed is a sound one. Officials, the manufacturers of the apparatus affected, and the industry involved can present their arguments along

this line, amendments can be proposed, and thus faulty requirements can be kept out of the regulations, and the adoption, if and when made, will be in satisfactory form.

Now considering the proposal as finally adopted, it is equally reasonable that a sufficient interval be granted to allow the manufacturer to comply with it. Surely a manufacturer should not be obliged to prepare himself to comply with a "tentative" specification, since this may never be finally adopted. Were he to be obliged to be at once ready to comply upon final adoption, most of the advantage now derived from the "tentative" adoption might be lost. Therefore an additional period of time is necessary and 13 months is probably not too long in most cases. Therefore, in our present example, at the time of final adoption in May, 1928, it was provided, as mentioned above, that the amendment should not take force and effect until July 1, 1929.

As stated above we do not believe that the total period elapsing was too long a postponement before a mandatory enforcement and we think that a shorter period would have been unjust to the manufacturers as a whole. Any manufacturer believing that the incorporation of the construction proposed, in his product, was to his best interests could, of course, utilize it at any time that he might desire to do so.

The change in practice which we now consider as desirable does not then involve a change in the total period, but consists in forecasting as accurately as may be at the time that the original proposal is made by the committee, what the total period will be. This would have involved, in the case under consideration, that in the original proposal of the committee it should have been recommended that the proposal be not put into force and effect prior to July 1, 1929. The final adoption in 1928 might then have followed in due course, but without a change in the date originally suggested. This procedure would more accurately have informed manufacturers as to what was to be expected to develop in this relation.

In accordance with the above precedents, your committee recommends that if the code of specifications and tolerances for grease-measuring devices is adopted finally at the present session, it be not put into force and effect prior to July 1, 1930.

In this code and the amendments proposed, it is to be noted particularly that careful attention has been given to making the specifications nonretroactive in so far as this is consistent with proper protection to the purchasing public.

The specific amendments will be brought to your attention in order.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
WM. F. CLUETT,
A. W. SCHWARTZ,
CHAS. M. FULLER,
I. L. MILLER,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. HOLBROOK. The first amendment proposed is one which is not on the sheet which is in your hands; the committee recommends the insertion of the following note preceding the definition:

NOTE.—A grease weighing and dispensing device is a mechanism or machine adapted to weigh and deliver grease or transmission oil by weight. The following specifications and tolerances are not to be construed to apply to devices of this character, but only to devices of the character specifically defined below.

You will remember that the proposal in the present code is that when dispensed by machines embraced in this code, grease at retail be sold by volume—specifically, in terms of the pint liquid measure.

This proposal was made to protect the operators of the machines with which we are familiar—in which the determination of the quantity is made by volume—as it is always dangerous to guarantee a definite weight, when the method of determination is by volume. However, the committee recognizes that if grease can be weighed at retail then there can be no objection to the sale of such grease by weight, and this note is incorporated to make that point clear. Thus there will be allowed full freedom to inventors to develop and to put upon the market devices which determine the quantity of grease gravimetrically.

The CHAIRMAN. Gentlemen, is it your pleasure to take up these items one at a time? If there is no objection the Chair will entertain a motion to approve or disapprove the amendment proposed.

(A motion was made and seconded that this amendment be adopted, the question was taken, and the motion was agreed to.)

Mr. HOLBROOK. The second amendment proposed is to the definition, and is included in the sheet before you. The committee recommends that the definition be amended by inserting the word “definite” before the word “volume” in the first sentence; at end of definition add the following words:

or devices employed solely in operations where a flat rate is charged for the operation and no variation in the charge is made on account of the supposed amount of grease or transmission oil delivered. When a device is so used there shall be no indicating device or statement purporting to indicate that any definite weighed or measured quantity can be delivered by the device.

The definition as amended will then read as follows:

DEFINITION.—A mechanically operated grease measuring and dispensing device, hereinafter referred to as a grease-measuring device, is a mechanism or machine adapted to measure and deliver grease or transmission oil by definite volume. This definition is not to be construed to include devices which are obviously designed and intended solely for high-pressure lubrication of bearings and similar parts or devices employed solely in operations where a flat rate is charged for the operation and no variation in the charge is made on account of the supposed amount of grease or transmission oil delivered. When a device is so used there shall be no indicating device or statement purporting to indicate that any definite weighed or measured quantity can be delivered by the device.

The CHAIRMAN. Is there any discussion?

(The amendment was duly adopted.)

Mr. HOLBROOK. The next amendment is the other proposal which is not included in the sheet which is in your hands.

The recommendation is to amend Specification 3, Indication of Delivery, by adding at the end thereof the following:

Provided, however, That a device in use at the time these specifications take effect shall not be required to comply with the above requirements for automatic indication of the amount delivered when the device delivers, within the tolerances hereinafter provided, a unit quantity of a pint, a multiple of the pint, or a binary submultiple of the pint per stroke or per cycle of its operating elements, and when, in addition, the device is conspicuously and permanently marked to indicate the value of this unit quantity.

The specification as amended will then read as follows:

3. INDICATION OF DELIVERY.—All grease-measuring devices shall be so designed and constructed that the initial zero condition and the amount delivered in terms of liquid measure shall be clearly and definitely indicated by automatic means, and the indication of any delivery shall take place only when the full discharge has in fact occurred: Provided, however, That a device in use at the time these specifications take effect shall not be required to comply with the above requirement for automatic indication of the amount delivered when the device delivers, within the tolerances hereinafter provided, a unit quantity of a pint, a multiple of the pint, or a binary submultiple of the pint per stroke or per cycle of its operating elements, and when, in addition, the device is conspicuously and permanently marked to indicate the value of this unit quantity.

The reason for this proposed amendment is that there are a very large number of devices on the market and in use to-day which will deliver grease with reasonable accuracy—which, it is said, will deliver grease within our tolerance—but which do not, at the present time, indicate the amount delivered, when they are operated. Neither do they automatically count the number of strokes made in any specific delivery. However, on the devices in question one revolution of a crank or one stroke of a piston, for instance, will deliver a definite amount of grease; for example, a half-pint or a pint.

In the case of these devices, the customer, it seems to us, is reasonably protected. If the customer is present at the operation he can see to it that the stroke of a piston is actually a full stroke or he can see to it that the revolution of a crank is completed, when the delivery is made to him. If more than one unit quantity is purchased he can count the number of times the operation is performed. While the plain indication of the unit amount and the counting of these amounts by an automatic device is certainly preferable and will be required in devices sold after these specifications take effect, these requirements are not considered so vital that they should be insisted upon in the case of devices already in use. This amendment provides that if accurate deliveries can be accomplished by normal operation, the indicating and counting mechanism may be omitted upon devices which are in use at the time that these specifications take effect, whenever such devices are calibrated upon the basis of unit deliveries of a pint or a multiple or binary submultiple thereof, and are suitably marked to indicate the value of the unit delivery.

The saving to the oil industry will be very considerable, and it is to be assumed that this saving, or a considerable portion of it, will be passed on to the consuming public.

THE CHAIRMAN. Is there discussion of this proposed amendment? (The amendment was duly adopted.)

Mr. HOLBROOK. It is proposed further to amend this specification by adding a footnote referable to the words "in terms of liquid measure," and reading as follows:

Devices which at the time of adoption of these regulations in any jurisdiction are marked to deliver in pounds rather than in pints and which in other respects conform to the retroactive sections of this code or are susceptible of being made so to conform, should not be condemned and confiscated on this ground alone, but the word "pound" should be obliterated wherever it occurs and the word "pint" substituted therefor. In this case the device should be readjusted if necessary.

It seems that that is self-explanatory.

The CHAIRMAN. Are there any remarks?

(The amendment was duly adopted.)

Mr. HOLBROOK. The next amendment proposed is to Specification No. 4, Sensitiveness, and consists of making a portion of it retroactive and the remainder nonretroactive, as indicated in the following:

4. SENSITIVENESS.—All grease-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for which a graduation, stop, or other indicating means is provided, within the tolerance 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 lubricant discharged, a volume of 1 pint shall be represented on such scale or dial by a length of not less than 1 inch.

The CHAIRMAN. Are you ready for the question on this amendment?

(The amendment was duly adopted.)

Mr. HOLBROOK. The next proposal is to amend Specification 5, Constancy of Delivery, by making it nonretroactive throughout, as follows:

5. CONSTANCY OF DELIVERY.—*The amounts delivered by any grease-measuring device shall not vary from the standard by more than the tolerances hereinafter provided (1) irrespective of the speed at which the device is operated, except that in the case of devices operated by air pressure, when operated at an air pressure lower than the minimum pressure specified by the manufacturer, the tolerance shall be applied in deficiency only—that is, the device shall not be deemed to be incorrect by reason of the tolerance in excess being exceeded during such method of operation—and (2) irrespective of the time elapsing between operations. In the case of all devices operated by air pressure there shall be legibly marked on the dial of the air-pressure gauge, by special graduations or otherwise, the maximum and minimum working pressures recommended by the manufacturer.*

The portion of this specification made retroactive last year is now being recommended to be made nonretroactive. It is believed that the tests described, while perfectly reasonable tests on devices put into use after this code has gone into effect, should not be strictly enforced upon devices which are already in use at the time this action is taken.

(The amendment was duly adopted.)

Mr. HOLBROOK. The suggestion is made to amend Specification No. 6, Indicating and Registering Parts, by making nonretroactive the word "easily," in the phrase in the first sentence, "may be easily read." This specification will then read as follows:

6. INDICATING AND REGISTERING PARTS.—Counters and graduated scales and dials used on grease-measuring devices to tally sales and deliveries to individual purchasers or to indicate the amount delivered when any portion of the cycle

or stroke has been completed, shall be of such size and style and shall be so located and disposed that they may be easily read. *The graduations shall be of such character and arrangement that the major ones are more prominent than and are clearly distinguishable from the minor ones. In all types of grease-measuring devices which utilize a graduated scale or dial to indicate the amount of lubricant discharged, the width of the graduation marks shall not exceed 0.04 inch.*

(The amendment was duly adopted.)

Mr. HOLBROOK. The next amendment is a general one, and consists in adding material at the end of the code under a heading "General Note." This is not to be a part of the code proper, but is merely a forecast of what may happen at some future time. At present the specification suggested is not to be considered as either tentatively or finally adopted. Notice is merely served upon the manufacturers and the industry that at some future time such a proposal as is here mentioned may be deemed necessary. That time will certainly not arrive until after there are a number of devices on the market, made by various manufacturers, that can comply with the specification. To act otherwise would tend to set up a monopoly. The creation of a monopoly in the manufacture of devices complying with specifications is something which the committee and the conference have always sedulously avoided.

The proposal is to add the following material at the end of the code:

GENERAL NOTE

DEVICE TO INDICATE EXHAUSTION OF SUPPLY.—The conference goes on record to the effect that it is its opinion that such a device as is mentioned in the following paragraph is a very desirable one, but considers that the time is not yet ripe to recommend its adoption. The conference suggests, however, that at some future time steps may be taken to incorporate the following paragraph in the code of specifications.

All grease-measuring devices shall be provided with a device which will make the unit inoperable when the supply of grease or transmission oil has reached a point where the accuracy of delivery would be affected, or shall be so constructed as to warn the purchaser and the operator in a conspicuous and distinct manner that the level of the supply is so low as to endanger the accuracy of the measurement.

Such a solution would be a very happy one, in view of the fact that it would prevent the supposed delivery of grease from a device which was empty. To add one word in connection with this, I may say that if that specification is ever recommended to the conference for adoption it certainly will be proposed that it be nonretroactive at that time.

(The amendment was duly adopted.)

The CHAIRMAN. Have you any further suggestions to propose? If not, we will now consider the adoption of the report as amended, as a whole.

Mr. HOLBROOK. This adoption should include the specifications that have not been read to-day. I did not go through the entire code, as it was discussed in detail last year, it was printed in our last report, and everyone is familiar with it. It can be read in full upon request of anyone. I understand also that the adoption of the code involves the adoption of the committee recommendation that it be not put into force and effect prior to July 1, 1930.

The CHAIRMAN. If there is no objection, we will consider the entire code as read, and I will consider a motion for the adoption of the code as a whole.

(A motion that the code as amended be adopted as a whole was made and seconded, the question was taken, and the motion was agreed to.)

METHODS FOR INVESTIGATING REPORTED SHORT DELIVERIES OF FUEL OIL

By E. L. PEPPER, *Bureau of Standards*

Mr. Chairman, members of the conference, and visitors, the increasing number of installations utilizing oil instead of coal as a means of heating makes it necessary that the weights and measures official be prepared to investigate reported short deliveries of fuel oil. I outlined, at a previous conference,¹⁰ a plan by which the consumer could, with the assistance of the weights and measures official, take steps to safeguard against shortage in delivery by making linear measurements of the storage tank and from this information computing the capacity of same. In this paper I will endeavor to supplement the former paper and to make some suggestions that may be helpful whenever you are requested to check the volume of oil delivered.

The demands upon the official will vary, depending upon the individual circumstances of the complaints. If the householder has been receiving "full compartment" deliveries of oil, and believes that the nominal capacity of the vehicle-tank compartment is in excess of the true capacity, a calibration of the compartment in question must be made by the official. This may be by whatever approved method the official uses for such calibrations. It may be mentioned in passing that some officials are now using for this purpose a portable liquid-meter assembly which may be connected to the discharge from the vehicle tank and from which direct readings of compartment capacity may be taken. In these assemblies, steps must be taken to eliminate air from the meter and to have the system filled with liquid to the point of discharge from the meter, before calibration of a compartment is started; it is also essential for the official to have assured himself by means of careful initial tests and check tests at frequent intervals thereafter, that the meter used is accurate throughout the range of flows which will be met with in the use of the unit.

If deliveries to the householder are made from a vehicle tank equipped with one or more meters, the indications of which are utilized to determine the amounts delivered, a complaint may involve a retest of the meter or meters being used.

In both of the examples cited above, the householder should, of course, have done his part in observing the level of oil in the compartment before and after delivery or in reading the meter indications at the beginning and at the end of a delivery, before he is in

¹⁰ See Report of the Nineteenth National Conference on Weights and Measures, Miscellaneous Publication of the Bureau of Standards No. 74, p. 22.

a position to direct suspicion specifically to the mechanical equipment. It may be, however, that the human element is suspected as the source of the trouble, in which event the householder may to a considerable extent protect himself, or may secure information pointing directly to the vehicle-tank operator as responsible for shortages. In the latter case it will be necessary for the official actually to check measure the delivery of fuel oil, either directly or indirectly, in order to give the householder the same character of protection in purchases of fuel oil as is provided in the purchase of other commodities; and this action must also be taken whenever there appear to be reasonable grounds for complaint, whether or not the purchaser has actually checked individual deliveries of oil.

The check measuring by the official of oil deliveries of varying amounts will also be necessary when complaints are received on deliveries from a distributor whose practice is to determine the gallonage of individual deliveries by bucketing or from gage-stick measurements of partially filled or partially emptied vehicle-tank compartments. When bucketing is the basis of measurement, the customer can count the number of buckets dumped, but it will usually be impracticable for him to observe carefully the accuracy with which each bucket is filled to the proper point; in the case of gage-stick measurements in the vehicle-tank compartment, the customer can not be expected to make any accurate check of the operation. Thus, unless the customer's storage tank has been calibrated and a gage stick provided, he has inadequate opportunities to check the amounts of fuel oil received.

When the official receives a complaint of shortage in fuel-oil deliveries, two factors combine to complicate his investigation. First, he must deal with a completed installation, in which the storage tank is permanently connected with other portions of the installation and is usually either buried in the ground or mounted in such a position in the basement as to make calibration inconvenient, to say the least. Second, the official must contend with a system already containing some indeterminate amount of fuel oil, which can not readily be removed to permit a straight volumetric determination of tank capacity. His principal problem is to determine the capacity of the household storage tank, either total capacity or capacity between certain levels; and, perhaps, also to calibrate a gage stick therefor. It is this phase of the investigation which I will discuss particularly. The other steps of the investigation are similar to those which must be taken in connection with various check-up operations, and need no discussion at this time.

Two types of tanks are used in fuel-oil-burning installations—those placed in the basement, and those placed underground outside the foundation line. The former are usually of a capacity of 275 gallons or less, and may be cylindrical or rectangular, or of a form combining some of the characteristics of these two forms. In the District of Columbia the rectangular flat tank is largely used. The total capacity of these tanks can be computed from the dimensions that may be obtained without difficulty, since the basement tanks are accessible; the thickness of the material from which the tanks

are made should, of course, be taken into consideration. Gage sticks are not usually supplied with this type of tank; they are, however, frequently fitted with float gages, designed to serve as a convenient indication of the approximate quantity of fuel on hand, but these should not be relied upon to check the quantities of oil delivered. These tanks are usually fitted with a capped or plugged opening on the top side; the fire regulations frown upon the frequent removal of cap or plug for the purpose of making measurements of the oil level, but this must be done if an accurate check is to be made on a delivery.

The procedure of the official in the case of these basement tanks will be the same as that outlined below for an underground tank.

The 1,000-gallon tank, 64 inches in diameter and 6 feet long, seems to be the popular size in this territory for outside installations. The fire regulations require that the tank be placed at sufficient depth so that the top of the tank will be lower than the burner. This, in most cases, means that the gage pipe, the filler pipe, and the vent pipe must be several feet in length. Gage sticks are regularly supplied, graduated either in inches, or in gallons for each inch in height of liquid; in the former case a gallons-per-inch chart is also supplied.

I am informed that the experience of one of the large firms in this city has been that the variation in the capacity of these tanks, as produced by the manufacturer, is not more than 1, or, at most, 2 per cent. At this point it may be of interest to show the order of gallons-per-inch at some portions of the 1,000-gallon tank of dimensions given above. At one-fourth capacity, 16 to 17 inches from the bottom, the gallons-per-inch equals 17; at one-half capacity, 32 to 33 inches from the bottom, the gallons-per-inch equals 20. From this it can be seen that if by the use of a gage stick you can gage to $\pm\frac{1}{8}$ inch, the quantity determination should be within ± 2 gallons at one-fourth and three-fourths capacity, and within $\pm 2\frac{1}{2}$ gallons at one-half capacity. I believe that the measurements can be made within this accuracy if moderate care is used in inserting the stick so that it will be in a vertical position with the end of the stick resting on the lowest portion of the tank. Once the official has checked the calibration of the householder's gage stick, the latter should thereafter be able to make a check, with reasonable accuracy, of all oil delivered to him.

For investigating complaints of the character of those under discussion, the official should have a series of short gage sticks or a jointed gage stick for inside tanks where clearances between top of tank and basement ceiling are small, and a long stick for outside tanks. Each stick should have a metal foot, preferably rounded, and should be made of hard, seasoned wood; the stick should be accurately graduated, from zero at the bottom, in inches and fractions of an inch, the long stick being graduated throughout a sufficient range to accommodate the diameter of the largest tanks likely to be encountered plus the maximum distance from top of tank to top of fill or gage pipe. If the stick be painted with a flat black paint, this will probably give the most satisfactory results when reading the oil levels. The upper end of the long stick should have a short, hinged metal member which may be swung out at right angles to the stick from the inner surface of this member when extended, as

zero, another series of linear graduations should be placed on the stick for a sufficient distance to exceed the maximum anticipated distance from top of tank to top of fill or gage pipes.

Having to determine the capacity of a storage tank containing oil, it will be necessary for the official to have available enough oil to fill the tank, and means for measuring accurately the oil added. For the latter purpose the portable meter assembly previously mentioned will prove most convenient, but buckets may be used where the meter assembly is not available. The official will first determine with his gage stick the level of oil in the tank; that is, the height of the oil level above the bottom of the tank. He will also determine by his stick the distance from the bottom of the tank to the top of the gage pipe (or of the fill pipe if no gage pipe is provided) and, by reversing his stick and utilizing the hinged member described above, also determine the distance from the top of the tank to the top of the pipe through which the gaging is being done; the difference between these two values will be diameter of the tank and will represent the height of the oil level above the bottom of the tank corresponding to a "skin full" tank.

Oil will now be measured into the tank until the oil level is the same distance from the top of the tank as it was originally from the bottom of the tank. Storage tanks being symmetrical, there is now an air space in the tank equal in volume to the volume of the oil originally in the tank. Now complete the filling of the tank, accurately measuring the oil added, as before; this amount will be a very close approximation to the number of gallons originally in the tank. This amount plus the total amount of oil added will thus represent the total volume of the tank.

By recording the height of the oil level for each 5 gallons of oil added, data may be secured for the calibration or checking of a gage stick marked on the basis of gallons, or for checking a chart showing gallons per inch. This will enable the householder to check future deliveries by gaging his tank before and after each addition of oil.

The calibration described above may be carried out before or after a check-up gaging made to secure evidence for possible court action, depending upon circumstances. Where a short-measure delivery is suspected, it would probably be preferable for the official to gage the storage tank just before and just after a regular delivery of fuel oil, and then subsequently to make a determination of tank volume between those two particular points, in combination with the general calibration procedure outlined; by applying the principles of the general calibration described, this check between two particular points may be made even when the oil level is above the lower of the two points when the calibration is begun.

The CHAIRMAN. The Chair notes that the hour of noon has arrived.

The President of the United States will receive the members and guests of the conference at 12.30 o'clock p. m.

(Thereupon, at 12 o'clock m., the members of the conference proceeded to the White House.)

RECEPTION BY THE PRESIDENT OF THE UNITED STATES

(At 12.30 o'clock p. m. the members of the conference were received by the President, Hon. Herbert Hoover, in the White House Grounds, and were photographed with the President. Preceding this the ladies attending the conference were conducted through the White House.)

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

SIXTH SESSION (AFTERNOON OF THURSDAY, JUNE 6, 1929)

The conference reassembled at 2.15 p. m., Francis Meredith, second vice president, in the chair.

REMARKS OF EARL J. SMITH, ENGINEER, GASES AND OILS, UNDERWRITERS' LABORATORIES

Gentlemen, I wish to express my appreciation of the work which the sealers of weights and measures are doing. I am glad to see that you are not growing horns, as some of the manufacturers with whom we come in contact implied might be the case, and also to assure you that the Underwriters' Laboratories and the underwriters in general do not grow horns. We appreciate some of the difficulties that you have. We have tried our level best to meet the demands which you have put into effect. We have tried to meet you half way. To illustrate, I might mention that we have consented to the valve being moved from the inlet side to the discharge side of a gasoline meter.

There is one thing to which I wish you to give considerable thought, and that is the draining of visible measuring containers. In spite of all that the fire marshals can do, these are allowed to stand in filled condition throughout the day. In case of an emergency there should be some way to save the underground storage tank. We do not wish to have the gasoline drain back through a separate pipe which might be opened by the dealer and allow the gasoline to flow back. Our difficulty is that we would like to have some arrangement to get the gasoline in the bowl back to storage quickly. Whether you can solve that problem I do not know, but that is one of the conditions.

We had the opportunity on the 28th of last month to meet with manufacturers of gasoline pumps. At that time I anticipated that there might be quite a number of things which they might complain about. Much to my surprise they said they were hand and glove with the sealers of weights and measures and at the same time were not in conflict with the underwriters.

I am very glad to have had the opportunity to speak.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES ON MODIFICATION OF SPECIFICATIONS FOR LIQUID-MEASURING DEVICES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN, AND DISCUSSION THEREOF

Under the item of "liquid-measuring devices" your committee on specifications and tolerances has but two proposals to make at this time. These were put into your hands in mimeographed form on Tuesday, and we have an additional supply which is now being distributed.

The first recommendation is in relation to specification No. 7. This specification reads as follows:

SENSITIVENESS.—*All liquid-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for which a graduation, stop, overflow pipe, or other indicating means is provided, within the tolerance on such amount hereinafter provided.*

This specification shall be construed to require that in the case of all devices which have a graduated scale or dial or similar indicating means which at some point or points or at all points constitutes the sole or most sensitive means of determining the amount of liquid discharged, the length on such scale or dial equivalent to the tolerance at any graduation must be readily appreciable when the character of the indicating element and its normal distance from and position in reference to the observer's eye are taken into consideration, and in no case shall this length be less than 0.04 inch. For example, if a device is designed and constructed so that (1) 1 gallon is the first graduation; (2) there is no stop, overflow pipe, or other automatic means of terminating the delivery; (3) the graduations are equally spaced; and (4) if the cross section of the measuring chamber is the same throughout its length, the minimum length on the scale or dial shall be 3.1 inches per measured gallon, the maximum effective cross-sectional area of the measuring chamber shall be 75 square inches, and, if cylindrical, the maximum effective diameter shall be 9.75 inches.

This specification was presented at the thirteenth conference held in 1920. The first paragraph was adopted finally at that time; the second paragraph, however, was adopted tentatively only and has so remained ever since, not having been reconsidered at any subsequent conference. Without making any recommendation as to whether it be accepted or rejected, your committee strongly recommends that the second paragraph be now taken up. It is believed that the intent and meaning of this paragraph of the specification are so well understood by the members of the conference that it can readily be definitely disposed of either by final adoption or by rejection and deletion from the code.

The **ACTING CHAIRMAN**. We now have for consideration the disposal of the tentative paragraph of specification No. 7 in relation to sensitiveness. The Chair will entertain a motion.

Mr. SWEENEY. Mr. Chairman, I move that the second paragraph of specification No. 7 in relation to sensitiveness be adopted finally. (The motion was seconded.)

The **ACTING CHAIRMAN**. It has been moved and seconded that the second paragraph of specification No. 7 be adopted.

Mr. ROGERS. Mr. Chairman, I move to amend the motion to change the text so that it will read "that the maximum inside diameter shall be 12.25 inches," and to make the incidental and necessary changes in wording to carry out this intention.

(The amendment was seconded.)

Mr. MAHN. Mr. Chairman, I would like to further amend the motion, so that a minimum inside diameter will also be stated. I do not think the inside diameter should ever be less than 9.75 inches. The way the proposal stands now it would be possible to have a bowl only 4 or 5 inches in diameter.

Mr. ROGERS. I would be very glad, Mr. Chairman, to entertain that suggestion and I will propose a minimum of 9.75 inches and a maximum of 12.25 inches, together with any incidental changes that may be necessary in the paragraph to make it conform to those diameters. I wish to amend my motion to cover these points.

The ACTING CHAIRMAN. Are you ready for the question? [After a pause.] All those in favor of the amendment as now offered by Mr. Rogers manifest their assent in the usual manner.

(The amendment was duly adopted.)

The ACTING CHAIRMAN. The question now is on the paragraph as amended.

(The paragraph as amended was duly adopted.)

[Specification No. 7 as amended, has been modified in accordance with the instructions of the conference to read as follows:

7. SENSITIVENESS.—*All liquid-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for which a graduation, stop, overflow pipe, or other indicating means is provided, within the tolerance on such amount hereinafter provided.*

This specification shall be construed to require that in the case of all devices which have a graduated scale or dial or similar indicating means which at some point or points or at all points constitutes the sole or most sensitive means of determining the amount of liquid discharged, the length on such scale or dial equivalent to the tolerance at any graduation must be readily appreciable when the character of the indicating element and its normal distance from and position in reference to the observer's eye are taken into consideration; the gross, inside cross-sectional area of the measuring chamber shall in no case be less than 75 square inches nor more than 118 square inches and, if cylindrical, the inside diameter of the measuring chamber shall in no case be less than 9.75 inches nor more than 12.25 inches.]

Mr. HOLBROOK. The second recommendation of the committee consists of an amendment to specification No. 21-b. The first paragraph of this specification reads as follows:

TIME ALLOWED FOR COMPLETION OF DELIVERY.—All liquid-measuring devices shall be so designed and constructed, or so calibrated, that on a nominal delivery of 5 gallons they will deliver this quantity into the discharge line on the delivery side of the discharge valve, within the tolerance for devices in use, within a period of 10 seconds after the main flow of liquid has ceased.

It is recommended that this paragraph be amended to read as follows:

All liquid-measuring devices shall be so designed and constructed, or so calibrated, that they will deliver into the discharge line on the delivery side of the discharge valve, within the tolerances hereinafter provided, any nominal quantity which they are designed to deliver, within a period of 10 seconds after the main flow of liquid has ceased.

and that the following words be added at the end of the third paragraph of the specification:

for the nominal quantity being delivered.

to make the specification as a whole read as follows:

21b. *All liquid-measuring devices shall be so designed and constructed, or so calibrated, that they will deliver into the discharge line on the delivery side of the discharge valve, within the tolerances hereinafter provided, any nominal quantity which they are designed to deliver, within a period of 10 seconds after the main flow of liquid has ceased.*

The main flow shall be construed to cease, in the case of a device of the piston type, at the completion of the upward stroke of the piston, and in the case of a device of the visible type, at the time of the disappearance of the liquid in the glass measuring chamber: Provided, however, That in the case of any nominal delivery which is such that it does not cause the liquid to disappear from the chamber, the time that the liquid apparently ceases to fall in such chamber shall be used in lieu of the time of the disappearance of the liquid: And provided further, That in the case of any liquid-measuring device equipped with an auxiliary visible indicating device such as is described in specification No. 21a, any conspicuous change of indication in this device, such as a sudden drop in the level of the liquid, occurring after the major

portion of the delivery has been completed, shall be used in lieu of either of the indications mentioned above.

All tests and calibrations shall be made on the basis outlined above, that is, the delivery valve shall be closed, or the operation of the liquid-measuring device otherwise discontinued, at the termination of the period of time mentioned above, and the amount which shall then have been delivered shall be taken as the full delivery of the device for the nominal quantity being delivered.

In stating the reason for this recommendation, I may say that last year the committee on specifications and tolerances, in an attempt to simplify the test to be made, recommended certain amendments to a tentative specification, and these were included in the specification finally adopted by the conference.

In a careful review following the conference adjournment, it became apparent to the committee that a mistake had been made, and that the new language did not carry out the original intentions of the committee, or, we believe, of the conference. In order that there might be no misunderstanding on the part of the officials and manufacturers, a "committee note" was added to the specifications that were issued shortly after the conference, and the same note was included in Handbook of the Bureau of Standards M85, which stated that an attempt would be made to eliminate the mistake that the committee had made. The matter was thus brought to your attention some 11 months ago, and it seems that you have all had the opportunity to familiarize yourselves with the whole proposal. Your committee now formally recommends the adoption of the language suggested, and which has just been read.

The ACTING CHAIRMAN. What is the pleasure of the conference with reference to the recommendation of the committee relative to specification 21b?

(The specification, as amended, was duly adopted.)

Mr. HANNA. Mr. Chairman, I would like to ask a question with reference to the recommended time of the effectiveness of specification No. 21b. I believe the original recommendation was that it be made effective July 1, 1929. Do we understand that date remains, and it becomes effective July 1?

Mr. HOLBROOK. The specification was in very much the same form in which it has now been adopted for a year during which it was tentative. While its form was changed at the last conference, very shortly thereafter interested parties were notified of the contemplated action just taken to-day. Therefore, it does not appear that the rights of any one can have been prejudiced by the temporary change made in the text. This does not seem to be a case that requires any delay. Therefore, the committee did not deem that it was advisable to change the date at which it was formerly limited to take effect, which was July 1, 1929.

OBSERVATIONS ON CERTAIN AIR-OPERATED GASOLINE-METER INSTALLATIONS

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

Mr. Chairman and gentlemen of the conference, it is with some reluctance that I present these observations this afternoon. The time that I had to prepare this paper was not sufficient for me to complete as many observations as I had hoped for. Some material about certain types of installation of apparatus has come to our attention, and we believe this should receive attention so that it may be deter-

mined whether discrepancies that we have found are only apparent, or whether they are real. I desire to emphasize that I am not here to condemn any gasoline-measuring device, or any gasoline-dispensing system.

The metering system is the latest link in the evolutionary chain of gasoline-measuring devices to win popularity. Whether or not the advantages urged for this type of dispensing device are well founded it holds a strong position in the favor of gasoline dispensers and the purchasing public. Because of the rapid growth of the demand for metering systems and the consequent production of new types, each type should be carefully tested and tried in order that some of the troubles that have been experienced in the past in the case of other devices may be avoided. Annual sales of gasoline have reached the tremendous total of 10,000,000,000 gallons. As one of the most extensively and widely used commodities its correct measurement is of paramount importance.

Perhaps no gasoline-dispensing device can ever be made fool-proof in its construction or operation, but in so far as it is humanly possible every inherent deficiency should be eliminated. It is possible that inspectors of weights and measures, as well as manufacturers, have given too much time and attention to the construction and accuracy of the measuring unit and not enough to the system of which it is a component, losing sight of the fact that the unit can not operate satisfactorily if the system of which it is a part is inherently wrong.

The observations here recorded were first suggested by erratic results obtained during the testing of certain metering devices. In these tests the delivered amounts from the same unit varied rather widely, although the tests were conducted under exactly the same conditions so far as could be observed. An attempt was made—very vaguely it must be admitted—to connect these variations in deliveries with variations in pressure that in some way may have been taking place in the system. About this time attention was called to the results of experiments made in a manufacturer's research department which indicated that dissolved air in gasoline might cause erratic deliveries through the meter.

The system under investigation was the direct-pressure system, in which the entire supply of gasoline is kept under pressure, generally about 15 pounds. Upon opening the valve in the hose nozzle the gasoline is forced from the tank through the piping system and into the meter. The passage of any gas vapor or air is measured, as well as the passage of the gasoline. The system has some advantages from the standpoint of initial cost, especially in cases in which it replaces some of the older installations of other types. The results of experiments reported on this system not only offered a possible explanation of the erratic deliveries above mentioned, but seemed to involve facts of much concern to both weights and measures officials and manufacturers. For this reason further experiments and tests were made both with an experimental set-up and with commercial installations.

The experimental set-up used is clearly indicated in Figure 13. Although the apparatus was all placed above ground the set-up closely duplicated a commercial installation. The storage tank was of 550 gallons capacity containing an initial supply of 200 gallons

of gasoline. The tank was connected with a compressor and a pressure regulator which held the pressure in the tank at 15 pounds. The pipe line from the tank to the meters was provided with a gate-valve, *V*, near the exit from the tank. To this pipe line were connected two meters of different types, designated "A" and "B." Meter "A" was provided with a visigauge to the top of which was attached a pressure gauge *X*. A second pressure gauge, also designated *X*, was placed in the line just below meter "B." These meters could be cut out of the main gasoline line by gate valves. Examina-

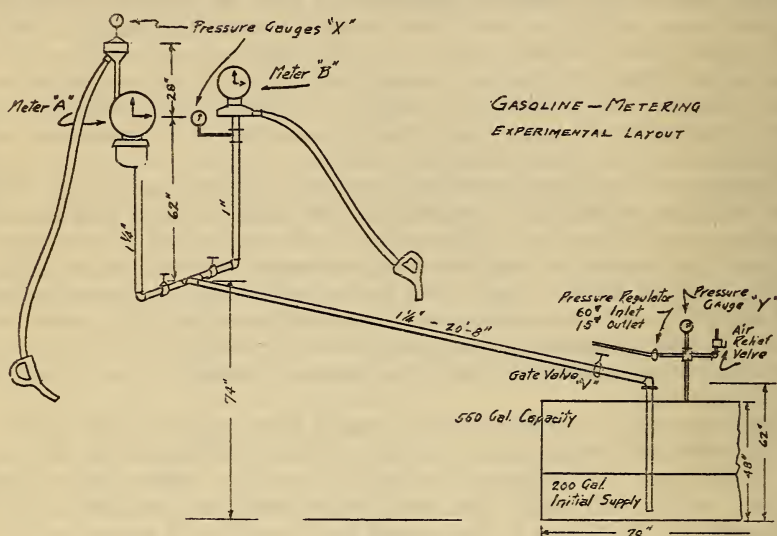


FIGURE 13

tion of the sketch will indicate clearly the size and relative positions of the component parts of the system and also that the system closely approximated those in commercial use.

Before beginning the tests on the set-up, each meter was tested in the laboratory on gasoline free from air. Table 1 shows the conditions under which these tests were made and the results. Meter "A" showed only very slight inaccuracies even when the delivery rate was less than 1 gallon per minute. Meter "B" showed slightly greater variations, but all test deliveries were within permissible tolerances even when the flow was as low as 8 gallons per minute.

TABLE 1.—Meter tests

| Meter | Test No. | Gauge X | | Pressure differential | Dial reading | Test measure reading | Rate |
|--------|----------|------------|-----------------|-----------------------|--------------|----------------------|------------|
| | | Meter idle | Meter operating | | | | |
| | | Pounds | Pounds | Pounds | Gallons | Cubic inches | Gals./min. |
| A..... | 1 | 12 | 6 | 6 | 5 | +0.5 | 24 |
| A..... | 2 | 12 | 6 | 6 | 5 | -.5 | |
| A..... | 3 | 12 | 9 | 3 | 1 | +.5 | .9 |
| A..... | 4 | 12 | 9 | 3 | 1 | +.5 | .9 |
| B..... | 1 | 12 | ----- | ----- | 5 | +2.0 | 17 |
| B..... | 2 | 12 | ----- | ----- | 5 | -2.0 | 18 |
| B..... | 3 | 12 | ----- | ----- | 5 | +3.0 | 8 |

The meters were then placed on the experimental set-up and care was taken to make sure that the system was entirely filled with gasoline and that all parts were operating properly. The gasoline in the system had been under 15 pounds pressure for 70 hours. The meter pressure (gauge *X*) was 9.5 pounds and the tank pressure 15 pounds.

In Table 2 are recorded the results obtained when operating meter "A." The first three test runs were made at the rate of 6 or 7 gallons per minute, the flow being regulated by the nozzle valve. The test-measure readings were from 0 to -19.5 cubic inches. Three runs were then made at the rate of 18 to 20 gallons per minute, the nozzle valve being practically wide open. The test measure now read between -23.8 and -57 cubic inches. Gate valve *V* in the gas line near the tank was then partially closed. The meter pressure, which had not previously fallen below 5.5 pounds during operation, now fell to from 0 to 3 pounds. The test measure showed deficiencies in the deliveries of from 177 to 185 cubic inches. In all the tests made on meter "A" the sight glass showed the presence of numerous bubbles. During the last three test runs the glass partially emptied, the gasoline being forced out by air.

TABLE 2.—*Experimental set-up, meter "A" (positive displacement type)*

[Air on tank for 70 hours]

| Test No. | Gauge <i>Y</i> | Gauge <i>X</i> | | Pressure differen- tial | Dial read- ing | Test measure reading | Rate | Remarks |
|----------|-------------------|----------------|--------------------|-------------------------------|----------------------|----------------------------|-------------------|---------------------------|
| | | Meter idle | Meter operating | | | | | |
| | <i>Pounds</i> | <i>Pounds</i> | <i>Pounds</i> | <i>Pounds</i> | <i>Gallons</i> | <i>Cubic inches</i> | <i>Gals./min.</i> | |
| 1..... | 15 | 9.5 | 6 | 9 | 5 | 0.0 | 6 | |
| 2..... | 15 | 9.5 | 8 | 7 | 5 | -19.5 | 7 | |
| 3..... | 15 | 9.5 | 8 | 7 | 5 | -13.7 | 7 | |
| 4..... | 15 | 9.5 | 6 | 9 | 5 | -57.0 | 18 | |
| 5..... | 15 | 9.5 | 5.5 | 9.5 | 5 | -20.1 | 20 | |
| 6..... | 15 | 9.5 | 5.5 | 9.5 | 5 | -23.8 | 20 | |
| 7..... | 15 | 9.5 | 0-3 | 12-15 | 5 | -177.0 | 15 | Valve <i>V</i> throttled. |
| 8..... | 15 | 9.5 | 0-3 | 12-15 | 5 | -177.0 | 15 | Do. |
| 9..... | 15 | 9.5 | 0-3 | 12-15 | 5 | -185.0 | 15 | Do. |

The results of the experiments with meter "B" are recorded in Table 3. The meter pressure (gauge *X*) stood at 11.5 pounds when the meter was idle.

The first three test runs were made with the nozzle valve wide open. The shortages in the test measure ranged from -4.5 to -33.5 cubic inches. Gate valve *V* in the gas line near the tank was then partially closed. Meter pressure fell to 5 pounds during the operation. The next two test runs were made at the rate of 18 gallons per minute. The shortages noted in delivery were 111 and 112 cubic inches, respectively. Valve *V* was then further throttled until the nozzle valve when opened wide delivered but 10 gallons per minute; the meter pressure then fell to 0 during operation and the shortage recorded was 166 cubic inches.

TABLE 3.—*Experimental set-up, meter "B" (oscillating disk type)*

[Air on tank for 70 hours]

| Test No. | Gauge Y | Gauge X | | Pressure differen- tial | Dial read- ing | Test measure reading | Rate | Remarks |
|----------|------------|---------------|--------------------|-------------------------------|----------------------|----------------------------|------------|----------------------------------|
| | | Meter idle | Meter operating | | | | | |
| | Pounds | Pounds | Pounds | Pounds | Gallons | Cubic inches | Gals./min. | |
| 1----- | 15 | 11.5 | 8.5 | 6.5 | 5 | -33.5 | 20 | |
| 2----- | 15 | 11.5 | 8.5 | 6.5 | 5 | -4.5 | 20 | |
| 3----- | 15 | 11.5 | 9.5 | 5.5 | 5 | -6.5 | 18 | |
| 4----- | 15 | 11.5 | 5 | 10.0 | 5 | -111.0 | 18 | Valve V throttled. |
| 5----- | 15 | 11.5 | 5 | 10.0 | 5 | -112.0 | 18 | Do. |
| 6----- | 15 | 11.5 | 0 | 15.0 | 5 | -166.0 | 10 | Valve V still further throttled. |

In general, the results with the two meters are in accord, the variations in delivery showing close relation to the variations in conditions under which deliveries were made. Some results, however, are out of line, due in part, perhaps, to air pockets in the line. Some difficulty was also experienced with foaming, necessitating slowing down delivery by means of the nozzle valve.

The following important points are noted from the results recorded in Tables 2 and 3:

First. So long as the differential pressure—that is, the difference in pressure at the meter during operation and at the supply tank—remains within certain limits the errors in delivery noted are comparatively small and reasonably consistent. Test 1 in each table is somewhat out of line with this statement, because in the first case the error was smaller than was found on tests 2 and 3, and in the second case it was larger than on tests 2 and 3.

Second. When the pressure differential is increased either by increasing the rate of delivery by opening the nozzle valve or by throttling the gas supply valve, the errors in delivery increase upon both types of meters used. Presumably this error could be increased indefinitely—within certain limits, of course—by throttling the valve in the gas supply line.

It is believed that the following statements may suggest the causes for the discrepancies observed:

First. Gasoline under pressure dissolves air.

Second. The dissolved air does not appreciably increase the volume of the gasoline. The total volume is only appreciably affected when the dissolved air comes out of solution and assumes its original volume.

Third. Under certain pressure conditions the gasoline gives up a part of its dissolved air between the supply and the meter and the gasoline and the air are both measured. Since the air tends to resume its original volume the test measure shows an equivalent shortage of gasoline.

Fourth. Loss of "head" or pressure between the supply tank and the meter may be due to the throttling of a valve in the line or to friction encountered in the elbows, pipe, and mechanism of the meter.

Unfortunately the investigation could not be continued on the experimental set-up because of lack of time. Other problems

which suggested themselves and which could only be solved through lengthy experimentation could not be considered.

One of the problems, the solution of which has tremendous bearing on the whole subject, is the rate of solution of the air in the gasoline and the uniformity with which the air permeates the gasoline supply. Perhaps equally important is the time required for the gasoline to dissipate its dissolved air after normal pressure is restored.

At the time the investigation was begun on the experimental set-up tests on commercial systems were also undertaken. It was realized that considerable difficulty would be encountered in gathering data on commercial systems. Only a few were available. In none of these could the conditions be controlled nearly to the same extent as was possible in the case of the experimental set-up. They were far from the office and the tests could not be supervised so satisfactorily.

The first tests on commercial systems were attempted on a system employing the oscillating disk type of meters and the results were not as anticipated from the above. The gasoline storage tank was of 6,250 gallons capacity. At the time the tests were undertaken the tank contained 5,300 gallons of gasoline. The system was placed under pressure and the meter immediately tested for accuracy. Test runs were made at the end of 19 hours and of 42 hours. No variations of consequence were noted. The tank still contained 4,470 gallons of gasoline when it was necessary to abandon the test. As no variations of consequence were noted in deliveries, it may be that the air had not permeated the entire supply and that the tests were abandoned before the aerated portion of the gasoline had reached the tank outlet.

Tests were undertaken on a second commercial installation, employing meters of the positive displacement type. The capacity of the underground storage tank in this case was only 500 gallons. The meter on which the tests were made was connected with two tanks and could be cut from one to the other. The first series of tests did not confirm the conclusions reached as a result of experiments made on the experimental set-up. A careful examination of the installation disclosed the fact that the meter was set almost directly over the storage tanks, thus eliminating to a very large extent friction that would be encountered in a longer line with a larger number of turns and off-sets. While no tests by gauges could be made, apparently there was very slight loss of pressure between the tank and the meter, the gasoline being measured at practically the same pressure as maintained in the storage tank. This probably was the reason why the expected discrepancies did not materialize.

Later it was found that pressure differential could be varied through the valves near the storage tanks which were used in cutting the meter from one tank to the other, and four additional series of tests were run on this installation under various conditions. The results are given in Table 4. The first series of three test runs was made with full flow from the nozzle and the valve at the tank wide open. The gasoline had been under pressure 20 hours. No air or bubbles were noticed in the visigauge and the shortages in the test measure were slight.

A second series of test runs were made at the end of 42 hours. The valves were again wide open. Although the visigauge showed air and bubbles, the shortages in the first 25 runs were not appreciable, as indicated by the first three runs which are recorded in the table and which are representative of the others. The 26th and 27th runs showed an overage of 15 and 18 cubic inches, respectively. Much air collected in the visigauge which undoubtedly accounts for the overages.

TABLE 4.—Commercial installation, positive displacement type meter

[Tank capacity, 550 gallons; pressure, 15 pounds]

| Series No. | Test No. | Air on tank | Dial reading | Test measure reading | Air in visigauge | Bubbles in visigauge | Gas in tank | Remarks |
|------------|----------|--------------|----------------|----------------------|-----------------------|----------------------|----------------|--|
| | | <i>Hours</i> | <i>Gallons</i> | <i>Cubic inches</i> | | | <i>Gallons</i> | |
| 1----- | 1 | 20 | 5 | -6 | None. | No. | 189 | Supply valve full open. |
| | 2 | 20 | 5 | -2 | None. | No. | ----- | Do. |
| | 3 | 20 | 5 | 0 | None. | No. | ----- | Do. |
| 2----- | 1 | 42 | 5 | -6 | Some. | Yes. | 135 | Do. |
| | 2 | 42 | 5 | -3 | Some. | Yes. | 130 | Do. |
| | 3 | 42 | 5 | -4 | Some. | Yes. | 125 | Do. |
| | 26 | 42 | 5 | +15 | Much. | Yes. | 15 | Do. |
| | 27 | 42 | 5 | +18 | Much. | Yes. | 10 | Do. |
| 3----- | 1 | 16 | 5 | -5 | None. | No. | 320 | Tank refilled. |
| | 2 | 16 | 5 | -3 | None. | No. | ----- | Supply valve throttled. |
| | 3 | 16 | 5 | -3 | None. | No. | ----- | Do. |
| 4----- | 1 | 54 | 5 | -7 | None. | Yes. | 72 | Supply valve throttled one-half. |
| | 2 | 54 | 5 | -5 | None. | Yes. | ----- | Do. |
| | 3 | 54 | 5 | -6 | None. | Yes. | ----- | Do. |
| | 4 | 54 | 5 | +27 | None. | Yes. | ----- | Throttled still further. |
| | 5 | 54 | 5 | -87 | <i>Inches.</i> 3.5 | Yes. | ----- | Throttled 7 gallons per minute. |
| | 6 | 54 | 5 | -57 | .75 | Yes. | ----- | Flow slightly increased. |
| | 7 | 54 | 5 | -30 | .5 | Yes. | ----- | Do. |
| 5----- | 1 | 59 | 5 | +10 | .5 | Yes. | 100 | Tank refilled. |
| | | | | | | | | Supply valve throttled 7 gallons per minute. |
| | 2 | 59 | 5 | -3 | .75 | Yes. | ----- | Do. |
| | 3 | 59 | 5 | -3 | 1.0 | Yes. | ----- | Do. |
| | 4 | 59 | 5 | 0 | 1.25 | Yes. | ----- | Do. |
| | 5 | 59 | 5 | -5 | 1.25 | Yes. | ----- | Do. |
| | 6 | 59 | 5 | +14 | 1.25 | Yes. | ----- | Do. |
| | 7 | 59 | 5 | -1 | 1.50 | Yes. | ----- | Do. |
| | 8 | 59 | 5 | +1 | 2.50 | Yes. | ----- | Do. |
| | 9 | 59 | 5 | -27 | .75 | Yes. | ----- | Flow slightly faster. |
| | 10 | 59 | 5 | -27 | 2.75 | Yes. | ----- | Slightly more. |
| | 11 | 59 | 5 | -57 | 3.00 | Yes. | ----- | Same setting. |
| | 12 | 59 | 5 | -71 | 3.25 | Yes. | ----- | Do. |
| | 13 | 59 | 5 | -77 | 4.00 | Yes. | ----- | Do. |
| | 14 | 59 | 5 | -77 | 4.00 | Yes. | ----- | Do. |
| | 15 | 59 | 5 | -27 | .75 | Yes. | 25 | Valve full open. |
| | 16 | 59 | 5 | -20 | .25 | Yes. | 20 | Do. |

The tank was replenished, placed under pressure, and a third series of tests made at the end of 16 hours. Even though the gasoline supply valve was throttled no air or bubbles appeared in the visigauge and the deficiencies were only slight in the test measure. At the end of 54 hours a fourth series of 7 test runs was made. On the first three the gasoline supply valve was throttled about one-half. Bubbles of air appeared in the visigauge and shortages in the test measure ranged from 5 to 7 cubic inches. On the next run the valve was throttled slightly further, when air bubbles were again

observed in the visigauge and the test measure showed an overage of 27 cubic inches. On the next three runs the supply valve was throttled to give about 7 gallons per minute delivery. Air collected in the visigauge and shortages in the test measure ranged from 30 to 87 cubic inches.

The tank was again refilled and a fifth series of 16 test runs made at the end of 59 hours when the initial supply in the tank was 100 gallons. The visigauge showed bubbles at all times and the air contained therein ranged from 0.5 to 4 cubic inches.

This series showed no serious shortages until the supply in the tank was reduced to about 60 gallons. The remaining 8 test runs showed shortages ranging up to 77 cubic inches not taking into account the air in the visigauge, which had been measured but was not recorded in the test measure. It is interesting to note that the fifteenth and sixteenth deliveries were made with the supply valve wide open and even then the shortages amounted to 27 and 20 cubic inches.

Tests with both the experimental set-up and with the commercial installation showed individual tests in which the results were out of line. In some instances overages were obtained when deficiencies would be expected. In other instances the deficiencies were less than the conditions of the test would indicate. Some of these erratic results can certainly be explained by the pocketing of air at points in the line or in the apparatus. These pockets of air or vapor, are then expelled, giving unexpected measurements. It is doubtful if any set of results can be duplicated even on the same set-up because of the many factors involved, some of which can not be controlled.

The data here recorded are perhaps not sufficient upon which to base final conclusions. They do indicate beyond a doubt that under certain conditions the direct-pressure metering system may give inaccurate deliveries. The data indicate that something happens when gasoline is held under pressure with air and that this changing condition is progressive, but that present information is not sufficient to warrant a conclusion as to the limit which it may reach. The data further indicate that measurement of this gasoline by meter may be fairly accurate or grossly inaccurate, depending upon conditions of pressure existing within the system and the degree of air saturation of the gasoline.

In the commercial systems observed the gas supply was held continuously under pressure from the filling of the tank until the supply was exhausted. In at least one system observed the gasoline would remain under continuous pressure for many days. It is conceivable that in such a system supplying several meters through complicated pipe lines, the gasoline might become thoroughly saturated with air, and that through its release under reduced pressure at the meter due to line friction, the result might be marked shortages in delivery.

The fact is again emphasized that the errors in measurement which have been discussed are the results of certain features of the system and not of deficiencies in the measuring units. Type of meter and of gasoline are believed to make little, if any, difference. Important factors are air permeation of the gasoline, the time factor, line friction, valve restriction, and tank pressure. The weights and measures

official must recognize the futility of controlling these factors. If then the direct-pressure system is inherently wrong, the only relief lies in its elimination or modification.

DISSOLVED AIR IN GASOLINE

By OSCAR C. BRIDGEMAN, *Research Associate at the Bureau of Standards for the Society of Automotive Engineers*

All commercial gasolines contain dissolved air, for at some time or other between the refinery and the engine they are exposed to the atmosphere. Some gasolines contain more air than others, for the amount which will dissolve depends upon the volatility of the gasoline and the conditions under which it is stored in dispensing systems. The air which is in solution can not be seen, for it is so finely subdivided that it is invisible. It only becomes visible in the form of bubbles when the pressure is released or the temperature is increased. It is the release of pressure which makes gasolines appear to boil when pumped into the visible container on the pump, a phenomenon observed by every motorist. While this boiling may be due to dissolved gases other than air, it is more commonly caused by air coming out of solution.

The amount of air which dissolves in gasoline under various conditions is a matter of widespread importance. The person who stores gasoline should know how much of his storage loss is attributable to air coming out of solution, thereby displacing gasoline vapors. The dispenser of gasoline is interested in the effect of dissolved air on the accuracy of the metering device. The motorist wonders what relation exists between boiling at the pump and stoppage of the engine due to vapor lock or formation of bubbles in the fuel feed line. The designers of storage and dispensing outfits and the automotive engineers desire to provide equipment which will eliminate the effects of dissolved air. Comprehensive answers to all of these questions can not be given at present, but the basic problem with regard to the amount of air which dissolves in gasoline under various conditions has been solved.

In order to obtain a better understanding of the significance of the problem of air solubility, let us consider what gasoline is. Gasoline *per se* is a mixture of a large number of substances—100 or more, perhaps even 1,000—composed of hydrogen and carbon and therefore called hydrocarbons. These substances all have different properties so that, for example, they boil at different temperatures and have different vapor pressures. Gasolines are composed of unknown numbers of these hydrocarbons present in unknown amounts, and because of this it is necessary to have some means of identifying different gasolines. The method used by the oil industry in this country consists in distilling the gasoline according to a definite procedure in a prescribed type of apparatus and recording the temperatures at which various percentages of the gasoline are distilled off. When water is distilled in such an apparatus, the temperature will remain constant throughout the distillation. However, with gasoline, since it is a mixture of hydrocarbons of widely varying boiling points, the more volatile hydrocarbons will distill off first, leaving the residual liquid less volatile and requiring successively higher temperatures to make it boil. Therefore, in dis-

tilling gasoline, the temperature will rise continuously as the distillation progresses, and there may be 300° to 400° difference between the temperature at which the first and last portions are distilled off. The curve obtained by plotting the temperatures at various stages of the distillation against the corresponding amounts distilled is the identification curve of the gasoline and is commonly known as the A. S. T. M. distillation curve.

There is one point on this distillation curve which is significant in connection with the various problems which have been mentioned, and that is the temperature at which 10 per cent of the gasoline is distilled over, usually called the 10 per cent point. This point gives information on such apparently unrelated phenomena as air solubility, vapor pressure, vapor lock in fuel feed lines, and the temperature at which engine starting is possible in cold weather.

In addition to the hydrocarbons, which are the main constituents of gasolines, there are normally present in solution a considerable amount of air and some water. When a gasoline direct from the stills at a refinery is exposed to the air on storage in a tank fitted with a vent hole, air will go into solution to an extent dependent upon the volatility of the gasoline, as represented by its 10 per cent point. If the gasoline is stored under air pressure, more air will go into the solution than when it is stored in a tank exposed to the atmosphere, for the solubility increases with pressure. When the temperature of the gasoline in the tank increases, air will normally come out of solution, for the solubility of air tends to become less at higher temperatures.

A large number of experiments on air solubility in a variety of gasolines over a range of temperature and pressure have recently been made at the Bureau of Standards. The gasolines were first freed from the unknown amounts of dissolved air present and then measured amounts of air were added. In removing the dissolved air, the gasolines were frozen in glass containers immersed in liquid air at a temperature of about -300° and while frozen, air was removed by means of a vacuum pump capable of producing a vacuum of about one-millionth of a pound per square inch. By repeating this procedure several times, all of the air was separated from the gasoline without pumping off any of the latter. By means of a special apparatus, measured amounts of air were added to the gas-free gasolines and experiments were made to determine the amount of air in solution in each gasoline at various temperatures and pressures. The temperatures used ranged from 0° to 100° F. and the air pressures from 1 to 20 lbs./in.² and each set of conditions was investigated with gasolines covering the range from very volatile natural gasoline aviation fuels to motor gasolines less volatile than those sold commercially.

The air solubility was found to depend upon the volatility of the gasoline in two respects. All gasolines exert a vapor pressure and the magnitude of this pressure depends upon the temperature and upon the 10 per cent distillation point of the gasoline. When a gasoline in a container is exposed to the atmosphere through a small opening, the total pressure above the liquid is atmospheric (14.7 lbs./in.² at sea level). Of this 14.7 lbs./in.², a part is due to

the vapor pressure of the gasoline and the remainder is due to the air. Hence, under these conditions, air dissolves in gasoline under a pressure of 1 atmosphere less the vapor pressure. At 70° , the vapor pressure of an average motor gasoline is about 4 lbs./in.² while a very volatile aviation gasoline at this temperature may exert a pressure as high as 8 lbs./in.². With these gasolines air would dissolve under pressures of 10.7 and 6.7 lbs./in.², respectively, and as the solubility changes with the air pressure, different amounts of air would dissolve in these two cases. Since the vapor pressure of a gasoline is determined by the 10 per cent point, this point also determines the pressure under which air is forced into solution when the gasoline is stored in contact with the atmosphere.

When gasoline is stored in an inclosed container not open to the atmosphere, the solubility will also depend upon the pressure of the air. Thus, if the air pressure is 20 lbs./in.², the amount of air which would dissolve in the two gasolines mentioned above would be approximately two and three times, respectively, that which dissolved when the gasolines were exposed to the atmosphere. It has been found that the solubility of air increases directly with the air pressure, so that if the solubility is known at one pressure, it can readily be computed at any other pressure by multiplication by the ratio of the two pressures.

Under the same pressure of air, all gasolines do not dissolve the same amount of air and the experimental work has shown that, for a constant air pressure, an aviation gasoline dissolves more air than does a motor gasoline. A very volatile aviation gasoline will dissolve about one-quarter of its own volume of air, whereas a motor gasoline of about the volatility of United States motor gasoline will dissolve about one-sixth of its volume of air, when both are put under an air pressure of 14.7 lbs./in.². Under these conditions of constant pressure, the amount of air which goes into solution seems to depend upon the 10 per cent point of the gasoline.

It has been found further that when the gasoline is exposed to a constant air pressure, the amount of air in solution does not change with the temperature over the range from 0° to 100° . This, however, is not the case when the gasoline is stored in a tank open to the atmosphere, for under these conditions, there is an apparent change of solubility with temperature. Since the air pressure above the liquid in this case is the difference between atmospheric pressure and the vapor pressure of the gasoline, and since the vapor pressure increases with temperature, the air pressure and, hence, the solubility must decrease. With the aviation gasoline mentioned above, stored in this manner, the solubility at 70° would be 6.7/14.7 times one-quarter, or 0.114 volumes of air per unit volume of gasoline. At 100° the vapor pressure of this gasoline is approximately 13 lbs./in.², so that the solubility would be 1.7/14.7 times one-quarter, or 0.029. The difference between these two volumes of air is the amount which would come out of solution when the gasoline is heated from 70° to 100° . In the case of the motor gasoline, the corresponding solubility at 70° would be 0.121 and at 100° , it would be 0.085 volumes of air per unit volume of gasoline.

When the air is actually in solution in a gasoline, the volume occupied by the gasoline is not appreciably different from what it

would be if there were no dissolved air in it. However, if the gasoline is saturated with air under pressure and this pressure is released, the air tends to form bubbles in the gasoline and the volume may be increased materially due to these bubbles displacing some of the liquid. Hence the accurate metering of gasoline must be done under such conditions that no bubbles of air are present while the liquid is passing through the meter.

One practical phase of the problem of dissolved air in gasoline lies in its application to the pumping of gasolines by suction lift. The height to which it is feasible to pump gasolines under these conditions is dependent not only upon the 10 per cent point of the gasoline, but also upon the amount of air in solution.

If a gasoline had no vapor pressure and no air in solution, it would be theoretically possible to lift it by ordinary atmospheric pressure to a height of about 45 feet. In the case of the two gasolines mentioned previously with vapor pressures of 4 and 8 lbs./in.², respectively, at 70°, it would be possible to lift the motor gasoline 33 feet and to lift the aviation gasoline 21 feet without loss at this temperature, if neither contained any air. If, however, gasoline is saturated with air so that the sum of the air pressure and the vapor pressure equals the atmospheric pressure, then it will be impossible to pump the gasoline to a height by suction lift without pumping off some air with consequent loss of gasoline in the form of vapor. The height to which a gasoline can be pumped under these conditions depends upon the efficiency of the pump for removing gas. While the loss may not be excessive if the suction lift is less than the theoretical height for an air-free gasoline, it certainly will be excessive if attempts are made to pump it to heights greater than that determined by the vapor pressure.

In all of the preceding discussion, it was assumed that the gasolines contained the maximum amounts of air which they could dissolve under the particular conditions, and the solubility data obtained at the bureau represent those maximum values, which would be reached if a sufficient time were allowed for the air to dissolve. While gasolines are normally saturated with air, this is sometimes not the case, for it takes time to absorb all of the air which will go into solution, and the rate at which this occurs is dependent upon various conditions, such as the extent of the surface exposed to the air and the amount of agitation. Furthermore when air comes out of solution due to release of pressure, it takes time for the air to form bubbles and rise to the surface. The extent to which the maximum amount of air will come out of solution to reach the saturation value under the new set of conditions will depend upon the design of the specific apparatus and upon the specific conditions under which the release of pressure occurs. The rate at which bubbles form and grow in any dispensing system will be affected by the rate of flow through pipes of different diameters, by changes in the direction of flow, by pressure gradients, by constrictions, and so on. That is the reason why no general answer can be given covering all types of dispensing systems. The maximum solubility under each set of conditions can be stated, but, in practice, bubble formation in any system is an individual problem for each type of installation.

DISCUSSION OF ABOVE PAPERS

Mr. MILLER. Mr. Chairman, after hearing Doctor Bridgeman's statement, I think there was one point that I overlooked in my discussion. I said that probably the characteristics of the gasoline did not have much to do with the results obtained. After hearing Doctor Bridgeman's remarks and recalling one experience I have had, I am inclined to change that statement I made. I recall that it was in the case of the gasoline that was the most volatile that we found our largest errors—in some cases the errors were three or four times greater than usual. Undoubtedly the quality of the gasoline did have something to do with it.

Mr. EARL J. SMITH. That is one case in which I believe the Underwriters' Laboratories, which I represent, can work to good advantage. We recommend that no pressure be maintained on the storage tank. Pressure left on the gasoline makes the installation just as hazardous as one fed by gravity.

REPORT OF SPECIAL COMMITTEE ON UNIFORMITY IN WEIGHTS AND MEASURES REQUIREMENTS, PRESENTED BY J. H. MEEK, CHAIRMAN

Mr. Chairman and members of the conference, we, your committee appointed to consider means for bringing about a more general uniformity among the States in the matter of weights and measures regulations and requirements, recommend:

1. That all States considering the passage of new laws or of amendments to present laws, relating to weights and measures, use the model State law adopted by the National Conference on Weights and Measures as the basis for such proposals, and in so far as practicable avoid additions to, eliminations of, and changes in its provisions.

2. That attention be given to the procuring of uniformity in the rules and regulations promulgated by the various States in pursuance of the provisions of their weights and measures laws, and that these be made to conform with the appropriate Federal rules, regulations, requirements, and recommendations in so far as this is practicable.

3. That special effort be directed to the complete elimination of dry measures from commercial use, and to the substitution, in commercial transactions, of the basis of weight, numerical count, or standard containers to replace the highly unsatisfactory basis of dry measurement wherever the latter is now employed.

4. That effort be exercised toward the securing of uniform requirements in connection with the approval by the various States of the types of weighing and measuring devices, and that as a basis for such uniformity the States follow the specifications and tolerances adopted by the National Conference on Weights and Measures.

5. That continuing attention be directed toward the simplification of containers, packages, etc., to the end that the number of these be reduced and duplication be eliminated.

6. That, in general, further consideration and study be given to ways and means for promoting uniformity along the lines outlined in the foregoing, that this consideration and study be extended to

all weights and measures endeavors in which uniformity is desirable, and that a special standing committee of the National Conference on Weights and Measures be appointed for this purpose by the president of the conference.

Your committee wishes to thank the members of the conference who so generously furnished copies of laws and regulations which we requested for study.

(Signed)

J. H. MEEK, *Chairman*,
V. A. BRADLEY,
W. F. CLUETT,
P. T. PILON,
A. B. SMITH,

*Committee on Uniformity in Weights
and Measures Requirements.*

DISCUSSION OF ABOVE REPORT

Mr. MEEK. You will note that the signatures of two members of the committee are missing. One member, Mr. Payne, has been sick and unable to give it his attention. The other, Mr. Jones, of Oregon, is not in attendance, but he has approved the report in a general way.

The ACTING CHAIRMAN. You have heard the report and recommendations of the special committee on uniformity in weights and measures requirements. What is the pleasure of the conference?

(A motion that the report of the committee be adopted was made and seconded, the question was taken, and the motion was agreed to.)

Mr. ROGERS. Mr. Chairman, we have in New Jersey a law which requires that all food or drugs put up in package form be marked with the net weight or measure of the contents of the package. For several years we have been trying to get the scope of that law amended to include all material sold in package form. I think it is just as necessary for the proprietary household articles in packages to be so marked as it is for foods. I think that if that idea were to be expressed it would be a worthy amendment or addition to the recommendations of the special committee on uniformity in weights and measures requirements.

Mr. FULLER. I think Mr. Rogers's idea is an excellent one and we have already embodied it in the net container act in California. It proves a very excellent act.

NECESSITY FOR VISIBILITY OF INDICATIONS OF SCALES

Mr. PARR. Mr. Chairman, I would like to ask a question. I am from Indianapolis and I have only had five months' experience. We have a problem on our hands as to what to do with scales which have a beam and poise hidden so that the customers can not see them. We have thousands of this kind of scale in use, and I would like to obtain some information—I am not raising the question for the sake of argument.

Mr. ROGERS. Do you refer particularly to the construction of those scales, or to the positioning of scales in such a way as to make reading difficult?

Mr. PARR. I refer to various types of scales in which the beam is out of sight of the customer as it is placed on the counter. On some types the beam capacity is only 1 pound; other types of scales having more than one reading element have beams on the rear side which the customer can not see, which have graduations running to 5 or 10 pounds. Now it is impossible for the customer to see those beams unless they turn the scales around the other way.

Mr. ROGERS. I thought that matter was covered already by our specifications. We are not having any trouble in so far as that is concerned by following the present code. What we have had trouble with in New Jersey has been the practice of the storekeeper in hiding the scales behind goods piled upon the counter, or sometimes in putting it on a back counter instead of out in the open, so that the weighing could not be observed. We require that the scales be kept out in the open, so that the weighing process can be observed. Sometimes errors occur because the scale has been manipulated, and not because it is incorrect.

Mr. SCHWARTZ. I had a prosecution where it took two weeks to catch the dishonest dealer. In putting meat on the scales he would let several inches of it hang over the edge of the platter, and by touching this portion he would get an ounce or two on every piece of meat.

Mr. SWEENEY. I think the question raised here to-day by the gentleman from Indianapolis is one that should be considered with a great deal of seriousness. To-day—and for a great many years past—even-arm scales are being manufactured that have graduated beams which in many instances are not visible to the customer, and also some of our best types of computing scales are so equipped. These scales are very essential to the business of the merchant and I would suggest that the question of the abolition of these beams merely because they can not be observed by the purchaser should be treated very cautiously by this organization.

Mr. MAHN. In answer to that, it seems it might be possible to eliminate the beam employed on even-balance scales. When the beam is graduated to 2 pounds this element will always be used to weigh 1 or 2 pounds. There is always the possibility of using these scales only with weights; that would eliminate a great deal of fraud.

Mr. SWEENEY. A great many grocery stores to-day are somewhat averse to using computing scales and still maintain the trip scale with the side beam. If a person comes in and makes a purchase which is of a fractional part of a pound, the only way the merchant can determine the weight is by utilizing the poise on the beam. As I suggested before, that is something which should be considered for the benefit of the merchant as well as of the purchaser.

Mr. MAHN. It is true enough that the beam and poise are so used, but the dealer can use weights if he wishes.

Mr. ROGERS. The small weights can be done away with by the use of that beam. The chain stores are using that type almost entirely.

(At this point, at 4.25 o'clock p. m., the conference adjourned to meet at 9.30 o'clock a. m. Friday, June 7, 1929.)

SEVENTH SESSION (MORNING OF FRIDAY, JUNE 7, 1929)

The conference reassembled at 9.50 o'clock a. m., at the Washington Hotel, Dr. George K. Burgess, president, in the chair.

DESIRABILITY OF SPECIFICATIONS FOR AUTOMATIC-INDICATING SCALES

Mr. HOLBROOK. When we included on the program for the meeting the item on specifications for automatic-indicating scales, we were too optimistic. The Committee on Specifications and Tolerances hoped to be able to report a code on this subject for your consideration. However, the time was not available to get it into shape; consequently it has not as yet been done, and the subject will have to go over.

I may say, however, that it is the thought of the committee that the conference does not have satisfactory specifications for automatic-indicating scales, or if there are satisfactory specifications they are so widely distributed throughout various codes that it requires considerable cross-referencing to determine just what the requirements are. For instance, when these codes were first established the spring scale was the most widely used automatic-indicating scale, and, therefore, the requirements as to graduations on dials, etc., were included under the heading "Spring Scales." However, with the rapid advent of automatic-indicating scales of differing types it seems that it would be more reasonable to have the specifications referring to graduations on dials, etc., assembled under the general heading "Automatic-Indicating Scales." As you know we already have tolerances for this class of machine.

That outlines what the committee has in mind and we may advise that we may find it possible to bring in next year a report along these lines, in which case you will have an opportunity to accept or reject the recommendations made.

The CHAIRMAN. I am sure the Committee on Specifications and Tolerances will be glad to receive any suggestions either from the floor or by letter, on the subject of automatic-indicating scales. As you heard Mr. Holbrook say, that will probably be brought to the attention of the conference at the next session.

Mr. HOLBROOK. Might I add that the committee would be glad to receive suggestions from the conference as to what classes of apparatus, if any, are still in need of regulation, or what codes need revision, in order that the committee may bring before you reports on those types of apparatus in which you are interested, and which you think are not adequately covered at the present time.

INVESTIGATION OF HUB ODOMETERS

Mr. MEREDITH. Mr. President, I would like to suggest that the conference make a request of the Bureau of Standards that the

bureau make a study of the performance of hub odometers as used to determine charges for hire of motor vehicles.

The CHAIRMAN. You have heard the request of Mr. Meredith, and speaking as the Director of the Bureau of Standards we will be glad to comply with your wishes in the matter.

Would you care to put that in the form of a motion, Mr. Meredith?

Mr. MEREDITH. Yes; I would like to offer that as a motion.

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

**REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES
ON MODIFICATION OF SPECIFICATIONS FOR LIQUID CAPACITY
MEASURES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN**

Your committee on specifications and tolerances recommends that specification 2 under the heading "Liquid Capacity Measures" be amended by adding after the word "of" in line 7 the words:

cans for ice cream, exclusively, in the 2½-gallon (10-quart) size, but only when having an inside diameter of not less than 8½ inches, of

by substituting for the word "forms" in line 7, the words "brick molds," and by inserting before the word "bottles" in line 8 the word "of" to make the specification read as follows:

2. Liquid measures of the customary system 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 by a power of the number 2: Provided, however, That nothing in this specification shall be construed to prevent the use of cans for ice cream, exclusively, in the 2½-gallon (10-quart) size, but only when having an inside diameter of not less than 8½ inches, of brick molds for ice cream, exclusively, in 5-pint and 3-pint sizes, or of bottles for milk or cream in the 3-pint size.

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
WM. F. CLUETT,
CHAS. M. FULLER,
A. W. SCHWARTZ,
I. L. MILLER,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. HOLBROOK. Copies of this report were distributed in mimeographed form on the opening day of the conference, and you doubtless have had an opportunity to study it and see what is contemplated.

You remember that Tuesday afternoon a representative of the International Association of Ice Cream Manufacturers described their standardization program for ice-cream cans, brick molds, and cartons, and that a very important feature of that program was the 2½-gallon can, two of which may be used in the mechanically refrigerated cabinet to replace one 5-gallon can. In adopting this size they acted doubtless in good faith, without realizing that the 2½-gallon size was forbidden by our specifications. It seemed to your committee that the arguments in favor of the can were very strong ones and that the can might reasonably be permitted in use. In order to prevent confusion because of the use of the present 2-gallon and 3-gallon cans,

and this new 2½-gallon size, a limitation on the diameter of the 2½-gallon can has been recommended, so that the 2½-gallon can will be a measure with a large diameter and a small height, while, as you know, the 2 and 3 gallon cans are much higher and of smaller diameter. Now, if you are satisfied with the explanation made by the ice-cream industry, it seems reasonable to add that size to the specifications for the use of ice-cream manufacturers only.

It is further recommended that the word "forms" be stricken out and the phrase "brick molds" substituted, because it is the consensus of the opinion in the ice-cream trade that "forms" applies to fancy shapes only, and that "brick molds" is a better description of what we had in mind when the specification was originally adopted.

(The report was duly adopted.)

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

Your committee on specifications and tolerances recommends the following amendments in the code of specifications and tolerances for milk bottles:

Amend this section by adding at the beginning thereof the following definition:

DEFINITION.—Milk bottles shall be construed to include all glass bottles of the form which has been customarily used for the purpose of the measurement and delivery of milk, cream, and buttermilk, at retail, and also other containers which are employed for this purpose.

Amend specification No. 1 by striking out the words "Bottles used for the sale of milk or cream" and inserting in lieu thereof the words "Milk bottles."

Amend specification No. 2 by inserting the word "milk" before the word "bottle" in line 1.

Amend specification No. 3 by striking out the first word, i. e., "Glass," and inserting in lieu thereof the word "Milk."

Amend the tolerance paragraph by striking out the words "bottles to be used in the sale of milk or cream" and inserting in lieu thereof the words "milk bottles."

Respectfully submitted.

(Signed)

F. S. HOLBROOK, *Chairman*,
WM. F. CLUETT,
CHAS. M. FULLER,
A. W. SCHWARTZ,
I. L. MILLER,

Committee on Specifications and Tolerances.

DISCUSSION OF ABOVE REPORT

Mr. HOLBROOK. In explanation of the above recommendations it may be said that milk bottles have not formerly been defined in the specifications. Your committee has given some consideration this year to single-service containers which are used in dispensing various articles of food in delicatessen stores, ice-cream stores, and by other retailers, etc.—cardboard cartons used both to measure the contents and serve as a delivery package for the material. The committee

has that subject on the agenda for next year, and probably will bring in a code of specifications and tolerances for single-service containers.

The question arose as to whether cardboard milk containers should properly fall under the proposed general classification of "single-service containers" or under the present classification, "milk bottles." In this relation it occurred to the committee that in the case of containers used in substitution for the customary types of glass bottles, in the delivery of milk, it was consistent that they should adhere to the specifications and tolerances of the milk-bottle code. Therefore, it was deemed advisable to introduce a definition of the term "milk bottles," in the code so headed.

In the definition as read the word "containers" will include within the definition the cardboard, paper, and perhaps fiber, cartons which are sometimes being substituted for glass milk bottles. Furthermore there will be brought within the purview of this definition all bottles simulating milk bottles and it will be required that such bottles when used, must be of the size of milk bottles and comply with the other requirements. In some sections of the country it seems to have become the practice to utilize bottles which look like a milk bottle, but which are of odd sizes—they may hold 7 ounces, for instance. These are being largely used in the sale of preparations, such as "chocolate-milk," and the like—preparations which may employ skimmed milk to which chocolate or some other flavor has been added.

Now some of the officials have had difficulty with this 7-ounce size because it simulates the 8-ounce size. Such bottles have been mixed up and the 7-ounce size actually has been used for the delivery of cream to the consumer, thus violating the law which is in force in many States to the effect that milk bottles may only be of 1 quart, 1 pint, or one-half pint sizes. By making this definition inclusive of all bottles of the milk bottle form or type, we endeavor to require that all bottles of this type be of the sizes as prescribed by law for milk bottles.

The remaining changes are merely formal ones to make the code consistent with this new definition.

(The report was duly adopted.)

RECONDITIONING REJECTED OR TRADE-IN SCALES

By A. G. SENER, *Vice-President, Sanitary Scale Co.*

First, I would like to digress, for a moment, from the subject assigned me in order that we may appreciate, to the fullest extent, the real function of the scale and its relation to the most important transaction in the store.

My years of experience in the scale business have indelibly impressed upon me the fact that very little, if any, importance has been attached to the weighing transaction in the store by either the buying public or the merchants. I am convinced that the matter is purely an educational procedure and that the educational responsibility rests squarely upon the shoulders of the various departments of weights and measures and the scale manufacturers jointly. Observation of many beautiful stores, equipped with the most modern

fixtures to make them inviting and to make for expediency and efficiency, show that they are using antiquated weighing equipment, which proves conclusively that the merchants, as a whole, do not fully appreciate the importance of the weighing transaction.

Let us stop for a second and analyze just what this means. The buying public and the merchant are mutually interested in the scale from a financial standpoint because it is the only piece of equipment in the store that determines for them both, the pounds and ounces of commodities to be exchanged for dollars and cents. Now when we are brought to realize that the scale is the only determining factor which stands between the merchant and the customer, and we endeavor to visualize the magnitude of the combined purchasing power of the housewives throughout the entire world, we find ourselves dealing with an incomprehensible problem of staggering proportions, but we are certain that it exceeds, by far, the combined purchasing power of our large corporations.

We will be conservative and say that the housewife purchases only 40 articles per week upon which the prices are determined by the scale; then let us multiply that by the 52 weeks in the year. Now try to imagine, if we can, the vast multitude of housewives throughout the world who are doing this purchasing day after day. It presents a problem far beyond our comprehension, yet the condition exists.

Now let us see what might result should the scale happen to be inaccurate and cheat the housewife out of only a single ounce on every weighing transaction. She purchases 40 drafts per week for 52 weeks, or 2,080 drafts per year and loses only 1 ounce per draft, or 2,080 ounces per year, and we will say that the average cost of commodities is 4 cents per ounce—she pays out \$83.20 annually for foodstuffs she never receives. This looks like a modest amount, but it is the interest on better than \$2,000 deposited in a bank at 4 per cent and should we attempt to multiply it by the great number of housewives doing this purchasing all over the world, we would soon become dizzy with mathematics. Every housewife within the hearing of my voice will readily concede that the purchasing of food for the family cuts a mighty big hole in the weekly pay envelope, and that my figures are entirely too conservative should the condition I have described exist.

We worry about the accuracy of gasoline pumps—I'll admit that the consumption of gas is something to be reckoned with—but how many families put up their cars for the winter, or allow them to stand idle in the garage for weeks, during which time there is no gas consumed? Do families refrain from eating for such extended periods of time? We might go on a diet occasionally and reduce our food consumption, but let the dinner bell fail to ring at the customary time and the whole family is up in arms. Eating is more than a habit, it is a necessity, and the majority of the food we eat must, at some time, pass over the scale, so you can readily see just how closely the scale is entwined in our every-day life and pocket-books. The scale can be compared similarly with every other measuring device and, in every instance, will prove to be the most important factor in relation to our weekly income.

The scale also has its important duty to perform for the merchant. He is also great in numbers and plays no little part in

our every-day life. He gets very little credit for the important rôle he plays in our scheme of things. He must be a most courageous gambler of the first water, for does he not take a hazardous risk when he invests his good money every day at market, purchasing all sorts of perishable food stuffs, in and out of season, and displaying them for your selection in his store, with no definite assurance that you are going to purchase? Does not shrinking in weight and decomposition of his wares menace him constantly? Is he not compelled to smile through all of his business trials and tribulations and greet you pleasantly when you enter his establishment, for you would not patronize a grouch? So he, too, is entitled to consideration when we speak of the weighing transaction in the store.

He buys a slicing machine in order that he may give you expeditious service and cut your meats thin and uniformly but he also buys the slicer in order that he may get his poundage out of his meats; in other words, he must cut the bacon down to the rope if he is going to get his just profit out of his meats, which he must do if he is going to remain in business and give you the quality and service you demand and have every right to expect. Yet, if his scale is old and sluggish and is giving 17 ounces to the pound, doesn't it defeat the economic purpose of his slicing machine?

He pays considerable money for an electric-lighted, electrically-refrigerated showcase. He spends his good money for this very efficient display fixture in order to place before the housewife his choicest cuts of meats and perishable food stuffs. He feels that he can do this without losses from trimming his meat or decomposition of other perishable foods, because of the uniform refrigeration maintained within his case and the fact that his wares will remain in a salable condition; but, if his case is functioning 100 per cent efficiently and his scale is giving 17 ounces to the pound, doesn't it defeat the purpose of his showcase and has not his outlay of money for his case been in vain?

He buys a cash register to accurately record his business transactions. It is needless to dwell upon the necessity of a cash register in every store, but suppose the merchant places 28 cents worth of a commodity upon his scale and the scale lies to him and registers 25 cents; he has no alternative other than to press down the 25-cent keys on his cash register, for the scale determines what keys he shall press down—he is guided entirely by its determination of values. Then what happens? He rings up 25 cents on his register, gets out a 25-cent ticket, which he hands to the customer, who pays 25 cents to the cashier, who, in turn, adds up 25 cents on the adding machine and the 25 cents goes on the deposit slip, along with all the other amounts and goes into the bank, and there is no piece of machinery known to modern science that can retrieve for the merchant the 3 cents out of which the scale has cheated him. The scale then, has defeated the merchant, the cash register, the cashier, and the adding machine.

I could go on for hours, proving to you conclusively that the scale is by far the most important factor in our every-day existence, but time will not permit of it; but it is my desire to impress upon your minds the importance of the scale and its relationship to our daily life and business generally.

Now that we have some idea of the real necessity of weighing with accuracy and how important it is that the scale should function correctly at all times in order to guarantee a square deal on both sides of the counter, we come to the problem that confronts the scale manufacturer, and that is: What disposition shall we make of rejected or trade-in scales?

Scale manufacturers make honest scales, the majority of merchants are honest in their dealings with the public, and those who might be inclined to resort to sharp business practices are soon brought into line by the activities of the departments of weights and measures. I often wonder if the representatives of the various departments of weights and measures are properly appreciated as public benefactors by the multitude, whose pocketbook they protect by their watchful investigation of the important weighing transaction in the store.

Scales are usually traded in for one of three reasons: First, the merchant wants to avail himself of a more modern type of scale. Second, he has found that his scale is not functioning properly. Third, his scale has been condemned by the sealer and must either be repaired or replaced. In the first instance, it is possible that the scale is in good weighing condition, but is obsolete in design or refinements. In the two latter instances it is acknowledged that the scale is not functioning correctly and he is, either of his own choice, by the persuasion of a salesman, or by the order of the sealer obliged to trade it in for a new one.

Some manufacturers of scales insist that all trade-in scales be turned in by the salesmen to the company and that they then be forwarded to the factory, where they are rebuilt and sold again at reduced prices. If the trade-in scale is in very bad condition, it presents quite a problem when rebuilding it because of the expense involved; that is, freight to the factory, labor, new parts, and freight back again into the field. Because of the necessity of making it weigh with the highest degree of efficiency, it must be torn down to its casting, the pivots honed, sharpened, or replaced, bearings cleansed or replaced, and all working parts that are worn replaced throughout the entire scale. If this work is not done with the same efficient care as is given to the building of a new scale, it becomes a menace to both the buying public and the merchant, if it finds its way back into the store again. Some manufacturers have arrived at the conclusion that the majority of trade-in scales have outlived their usefulness, and do not attempt to salvage any return from them.

It would be an excellent precautionary measure were a law passed making it necessary that every rebuilt scale bear some distinctive mark, placed in a conspicuous place on the scale, so that the sealer could tell at a glance that it was purchased second hand. At the same time this would preclude the possibility of unscrupulous salesmen and secondhand dealers misrepresenting them to gullible merchants. Many secondhand dealers have inadequate facilities for reconditioning scales and oftentimes they find their way back to the counters of merchants who, through their improper conception of the weighing transaction, try to save money by purchasing a scale for as little money as possible; and the rebuilt scale is still in poor

weighing condition and it will continue doing duty, cheating either the merchant or the buying public until it is checked by the sealer and meets its deserved doom.

Of course, there are arguments in favor of both reconditioning and junking trade-in scales. We have gone over some of the reasons why the scale is so very important to us in our every-day existence and business life. It must weigh with accuracy, as there is no more middle ground in weighing than there is in recording of time; it is either right or wrong, and when we stop to consider the expense and care we must exercise in rebuilding scales so that they will guarantee that square deal on both sides of the counter, I am of the opinion, after many years in the business, that it would be better for all concerned if the majority of the trade-in scales were relegated to the junk heap.

DISCUSSION OF ABOVE PAPER

Mr. FITZGERALD. I would like to state that it would be much better if the scale companies would reclaim some of their old scales and scrap them. In Wisconsin, for example, they are bringing back to the cities a lot of stuff that we condemned 15 to 18 years ago. I think that to recondition those old scales is wrong, and I think the scale people should get together on that and get them off the market. It would make a better market for the scale companies, and it would make conditions much better for the merchants and inspectors.

Mr. SENER. I would be glad to get them together and junk all old scales that are taken in.

Mr. FITZGERALD. I would not say that, because some of the scales are good—what I am talking about are the obsolete scales that are sold for cash to merchants who do not know anything about them. I think the scale people should cooperate with the inspectors along that line and great good will result.

Mr. SENER. Unfortunately there has never been any such suggestion. I think most of the manufacturers would be willing to do that, in which event we could dispose of that matter.

Mr. FITZGERALD. The average scale company knows what types of scales are obsolete, and they surely could make it hard for their salesmen if they sold such scales taken in on trade that should be scrapped. In the large cities in our neighborhood we have continual trouble with scale people selling this old junk. I have taken it up with Mr. Warner, and at the next meeting in Madison it will be on the program, and we are going to try to stop the practice. The scale salesmen sell these scales for cash, and the merchant buys something which we will condemn. We believe the scale people should cooperate with us and not sell such scales.

Mr. SENER. Most companies have no jurisdiction over the trade-in scales and do not recognize them in the transaction other than to make allowance for them. The same thing is true with the automobile business. I wanted to trade in my car; it was an obsolete type of car, and the automobile company advised that they could only allow \$150 for it. I said that I would not take that. Then they said: "If you will come in, we can get you a car for \$200 on which we will allow you \$800."

If we can get rid of that situation you speak of, we would be delighted—nobody more so than the manufacturers—but how can we do it? If you can get the scale manufacturers working along that line, you will be doing a fine piece of work.

Mr. FITZGERALD. A salesman sold a scale to a merchant for \$40, and it fell to me to inspect it. When I looked at it I was thunder-struck that the salesman had attempted to sell such a scale, and I condemned it. In the course of a day or two the agent came back to collect his money, and the merchant told him I would not pass the scale. The salesman then tried to sell the scale to the merchant for \$5; and when he refused to purchase, the salesman asked for a cleaver and smashed it. Attempts to sell such scales must be stopped.

Mr. NEALE. My dear friend has, I think, magnified the situation somewhat. The term "salesmen" in an organization such as we have, should in all fairness be limited to "some salesmen." Any reputable scale company to-day who sells defective scales undermines its own prosperity just as much as it injures a retailer. Now this salesman who gets hold of a defective weighing device and sells it for what he can get for it, would not be assured of a living by any reputable scale company. But as a matter of economy trade-in scales are not broken up because they may have considerable value—they may have been returned for later models for example—and on being reconditioned they may be accurate within the tolerances. All our reconditioned scales are certified by the company and are lettered, showing that they were reconditioned by the company, and that the company is behind them.

Mr. FITZGERALD. I must say I was not referring to any particular scale that may have been brought to the factory and reconditioned.

Mr. NEALE. I can not see how a deal such as you speak of would be made because such a scale can be sold only on a bona fide order—if it was sold by a salesman it would have to be his own property.

Mr. FITZGERALD. I will correct my statement and say "some salesmen."

Mr. NEALE. That is bad enough.

Mr. SENER. You can not make all men honest. No scale manufacturer wants things like that foisted on the merchants or public. That is not what we are in business for. We make honest scales, and the weights and measures men make honest merchants. You told us that merchants have scales foisted upon them which are not up to the qualifications, or do not function as well as the department of weights and measures would like to have them function. That is not our fault, and we will do all we can, and cooperate in any way to bring about any condition which would be more satisfactory to them.

Mr. SWEENEY. Just as a matter of suggestion, Mr. Chairman: I believe in every locality the sealer becomes familiar with certain concerns which do this work of reconditioning, and I think it is very easy for the sealer to arrange that before a reconditioned scale is used it should be sealed by the department. That would help considerably. I also think in the general course of his work that a sealer should try to educate the public so they would submit a

secondhand scale to the office for a test before it was put into operation.

Mr. BORTELL. I think you gentlemen would like to know that there are certain vital parts in the scales we manufacture which are not sold, and in the event that they are needed in a scale it is necessary to send the scale back to us for reconditioning.

Mr. DAVIS. I think we would save quite a bit of time if we had all second-hand or reconditioned scales resealed before they were put into service. In our State in particular there are very few merchants who can not afford a reconditioned scale, but many can not afford one of the new ones. In Vermont we try to get secondhand and reconditioned scales inspected before they are put in use, and quite often we urge our merchants not to buy a secondhand scale, or even a new scale, without having it inspected by an inspector of weights and measures. We say to them, "Do not buy a scale until you have had the pleasure of having it sealed," and they are doing that pretty generally in Vermont.

Mr. FULLER. Mr. Chairman, I think we have solved that problem in California by requiring every scale which is offered for sale or kept for the purpose of sale to be tested before it is sold. This applies to both new scales and second-hand scales. We prosecute secondhand dealers who try to slip out scales without having them tested first.

COIN-CONTROLLED PERSON-WEIGHING SCALES

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

One of the policies with regard to weights and measures administration generally considered best by those who have any knowledge of the subject is to require weighing or measuring instruments used in connection with commercial transactions to conform to reasonable and fair specifications as to construction and to be subjected to periodical tests as to accuracy by competent officials.

Reliable information indicates, however, that in many localities small attention is given to weights and measures administration. Those in authority who are ignorant of the subject usually consider it of relatively small importance. On the other hand, its importance is well understood by intelligent officials and other persons who have given the subject fair consideration.

Even in those jurisdictions where regulation has been seriously undertaken there appears to be a quite general tendency to confine inspections to apparatus used in connection with sales of merchandise.

It appears from information which I have been able to obtain that in but few localities do weights and measures officials make any test at all or exercise any supervision over apparatus used for weighing persons for compensation; that is, the penny-in-slot or coin-controlled scales found in operation in almost every advantageous location in almost every town and city in the country.

The business of operating these penny or coin-controlled scales has grown tremendously during the past few years. It has come to be a highly specialized business in which much capital is invested and much effort employed.

Prior to 1921, the weights and measures law for the District of Columbia did not authorize the department here to test penny scales, and provided no penalty for employment of inaccurate instruments of that type in collecting money from the public. When a new law was enacted in 1921, there was placed in it a stipulation to the effect that scales used for weighing persons "for a charge or compensation" should come within the regulatory provisions which provided for tests of all new scales before being placed in use and semiannually thereafter. The use of inaccurate scales for that purpose was also penalized as were other violations of the law.

The law became operative in June, 1921, and during the year following, tests were made of all penny scales found in operation in the District of Columbia. It is probable that inspectors did not find all of them, but during the first year 358 such scales were tested. Of that number only 223 were approved; 135, or approximately 38 per cent of the penny scales operated to collect money from the people under pretense of indicating their correct weight, were found to be so inaccurate that it was necessary to condemn them and forbid their use, either permanently or until repaired.

Some of the owners of such scales expressed much indignation because the weights and measures department undertook, in accordance with law, to test their scales. After the law was passed, but before it became operative, one man, operating a large number, came in with a lawyer who undertook to explain that Congress really did not intend that penny scales be tested, and thought they should not be molested. When the owner ascertained that we intended to carry out the law, he sold all his scales and moved to the Pacific Coast. Our inspectors found a larger percentage of his scales inaccurate than of those of any other operator. All of them would take in the pennies, but some of them would not weigh at all. They were so bad that the man to whom he sold the lot had soon to quit the business.

During the first year a liberal policy was maintained. Penny scales were not condemned or confiscated, unless such action was unavoidable. Had a rigid policy been then adopted it is probable that there would have been a much larger percentage of condemnations. Confiscation was resorted to only in aggravated cases.

In some instances scales were found stationed on the streets, in front of stores, and no one could be found who would confess to ownership. When such scales were found out of order and confiscated, the owner would usually present himself to inquire what it was all about. Those confiscated fell victim to a sledge hammer.

One owner wanted to know why we were giving attention to such little things. "Why," he said, "these scales of mine only take a penny at a time." But when requested to state how much he received from them per year, he suddenly lost all sense of recollection.

I have not been able to obtain definite information with regard to the number of penny scales in use throughout the country. One concern engaged in the manufacture and sale of penny scales has informed me that, based upon its investigation and knowledge of scale distribution, it assumes that there are in use in the United States approximately 65,000 coin-controlled person-weighing scales.

During the past few years much attention seems to have been given by manufacturers or distributors of penny scales to so-called promotion work; that is, to publicity calculated to induce the public to make frequent use of the scales in question. Particular stress is laid upon the importance of persons keeping constantly informed regarding their weight as a health precaution. A prominent Government official here in Washington was told by his physician to weigh himself at frequent intervals in order to ascertain whether treatment he was undergoing was having proper effect. He patronized the penny scales. One night he weighed himself on two scales in front of the same store. One of them showed that he had lost a pound since the day before. The other showed that he had gained a pound. It may be very readily imagined that the weights and measures department heard from that Government official and that the manager of the store heard from the weights and measures department.

The public has been reading the advertisements published by the penny-scale concerns. The result is that probably more people are weighing themselves to-day than ever before, and they are demanding that the scales shall tell them the truth. Women probably use penny scales to a much larger extent than men. Most of the ladies are trying to reduce. Some years ago one lady spoke to me in much distress because a scale upon which she had weighed indicated that she had gained in weight from 97 to 98 pounds. She did not want to grow fat.

A prominent lawyer in this city wrote to me stating that he had weighed himself on two scales and that they showed a variation of about 5 pounds. Of course, he felt sure that both of them could not be correct. Investigation disclosed that, while both scales were correct at the time of the last preceding regular test, the owner of one had paid no attention to anything about it except its ability to accumulate pennies, had allowed his scale to become out of order, and it was promptly condemned. He was also forcefully informed that a repetition of the offense would result in his being taken to court.

Claims of accuracy are very generally made by manufacturers and distributors of penny scales. As stated above, by advertisements and by placing their scales in the most conspicuous places possible they invite the public to use them. The income from a penny scale of attractive type, advantageously located, is said to be quite large. I am informed that the average receipts from penny scales of a certain type amount to more than \$15 per month for each scale. Where the location is especially good, the income is much larger.

One concern, in advertising its product, says: "This scale performs like a reliable watch, with bankable accuracy and stability." Legends indicating accuracy are often printed in a conspicuous place on the scale, thus holding out to the public promise of correct weight.

It is not unreasonable to require manufacturers, distributors, owners, and operators of these scales to render to the public a truthful service. In fact, to do so would not only be just to the public whose pennies go to make up the large returns from their operation, but it would be a distinct service to reliable manufacturers and dis-

tributors who want to place a reliable product on the market. It would afford them relief from unfair competition.

I have not undertaken to discuss this subject from a technical standpoint. My purpose is only to point out that for the public welfare penny scales should be under rigid supervision, and persons operating inaccurate ones should be punishable therefor.

So far as I am informed this conference has never given consideration to the subject of recommending or suggesting specifications and tolerances for penny scales. It seems to be that it is a subject which should receive attention. In my opinion the Committee on Specifications and Tolerances should investigate the subject and recommend to the conference at its next regular meeting a complete code, in order that the various State and municipal officials whose duty it is to put into effect specifications and tolerances may have the benefit of such recommendation to guide them. I may say in passing that in the District we allow a tolerance of 1 pound in 100 pounds. I am inclined to believe that the tolerance should not be much greater than is allowed on similar commercial scales.

In the District of Columbia there are two general types of penny scales in use; one is the dial scale with a pointer indicating the weight on a dial when the person weighing himself stands on the platform and inserts a penny in the slot, the other is what is commonly known as the ticket scale which delivers a ticket with the indicated weight stamped thereon when a penny is inserted in the slot.

One difficulty found here with the ticket scales is that if a person inserts the penny immediately upon stepping upon the platform, and before becoming perfectly still, an inaccurate weight is frequently indicated on the ticket delivered. The variation will sometimes be 10 pounds or more. The same scale when tested with dead weight, or when a person stands perfectly still in the center of the platform, might indicate correct weight. This situation tends to cause public dissatisfaction and complaint, and it is doubtful whether a penny scale which operates thus should be approved. I am informed that some manufacturers are already attempting to overcome this difficulty.

In drafting specifications, the purpose for which the scales are intended and the conditions under which they are used should be carefully considered. As is well known, most of them are located in public places used by many different persons and receive rough treatment. For that reason they should be of best construction in order that accuracy may be maintained.

There is one feature in connection with the so-called ticket scales upon which I have not touched. That is the "fortunes" printed on the back of tickets delivered to the customer. I do not know whether or not these fortunes are always true. Most of them are complimentary. A few nights ago I patronized a ticket scale. I believe the weight indicated was about correct. I have some suspicion, however, regarding the truth of the "fortune" it told, but am not going to enter into any dispute with the manufacturer on the subject. Here is what it said: "You are liked by people and well you may be, for you are frank, honest, liberal, generous, and truthful." Surely no one would complain about receiving that statement from a fortune-telling scale.

DISCUSSION OF ABOVE PAPER

The CHAIRMAN. Is there discussion of Mr. Roberts's paper?

Mr. SPOTZ. Mr. Chairman, it happens that I recently engaged in a venture of supplying weighing machines for person-weighing purposes and there are several points in Mr. Roberts's address which pleased me very much. I was particularly interested in the case of the Government official who weighed himself on two penny scales in front of the same store, the one showing that he had lost a pound since the previous day and the other that he had gained a pound in the same time.

I had a similar experience with a very prominent physician who said that a scale was inaccurate. It happened that there were standard test weights immediately available. Before the gentleman left the store I asked him to step back on the scale and check his weight with the test weights and it was determined that the scale was accurate. I asked him why he questioned the accuracy of the scale. At first he declined to answer, but finally he said he had drunk some beer before he weighed himself. It is situations like this which cause trouble and complaints about the inaccuracy of scales. I believe you can get in just as much controversy with an accurate as an inaccurate scale, but that does not excuse you for permitting a scale to be inaccurate. I have had much experience with this problem and I have come to the conclusion that so long as the respective States permit inaccurate scales to continue in operation—whether penny-weighing scales or other types—the manufacturer of a better weighing machine has small opportunity of disposing of his product. When the time comes that the sealers are permitted to test penny-weighing scales and condemn those which are inaccurate, that will solve the penny-weighing scale problem absolutely. I thank you.

The CHAIRMAN. We will proceed with item No. 42, "Citation by Weights and Measures Officials of Important Decisions in their Jurisdictions."

Are there any citations to be made at this time?

This particular item is of considerable importance to you as administrators in your various districts and if you do not have oral presentations to make we would be very glad to receive written reports which could be included in the proceedings of the conference.

LEGAL STATUS OF RULES AND REGULATIONS AS ESTABLISHED BY DECISIONS OF THE COURTS

By WILLIAM PARRY, *Bureau of Standards*

INTRODUCTION

It is not the purpose of this paper to cover all phases of the subject in hand, nor even to give an extended discussion of the particular topics mentioned, but to discuss briefly some phases of particular interest to the sealer of weights and measures, and which may be of practical application.

The general conception by weights and measures officials of the term "rules and regulations" is that body of formal, written directions which have been promulgated under authority of legislative enactment. This is generally the conception treated in this paper;

but there is also another sense in which the term "rule" is used, and that is a rule of action for applying or interpreting the statutes. Rules referred to in this sense are generally not formally promulgated. Some references which follow in the discussion pertain to rules of this sort.

REFERENCES

In order to give opportunity to those interested for a more thorough consideration of this subject, there have been included a number of references to decided cases or other authorities upon various points which are here only briefly discussed or referred to. A perusal of these references will throw further light on the subject and call attention to other considerations to be observed in the preparation and application of rules and regulations which it is not intended to bring out in this brief paper on the subject.

THE LEGISLATIVE, EXECUTIVE, AND JUDICIAL BRANCHES.

In order that we may clearly understand some of the discussion which follows, it may not be out of place here to make a brief statement regarding the three branches of our form of government, namely, the legislative, the executive, and the judicial. Briefly, the legislative branch makes the laws, the executive administers them, and the judicial branch interprets them and determines whether or not they have been violated, and whether they are valid and not in contravention of the will of the people as expressed in the National or State constitutions or in some fundamental law. In the wise judgment of the framers of the National Constitution these three branches were given well-defined powers and prerogatives, each independent of the other in the discharge of its functions, yet each having a check upon the other so as to prevent extensive abuse of power, so that, finally, the combined action and cooperation of the three is necessary to carry into effect the will of the people. The powers of one branch can not be delegated to another; and conversely, the rights of one can not be usurped by another. In the language of the Supreme Court of the United States:¹¹ "One branch of the Government can not encroach on the domain of another without danger. The safety of our institutions depends in no small degree on the strict observance of this salutary rule."

In the very nature of some legislation, it is not practicable¹² for the legislative branch to foresee and provide for all the circumstances and details, sometimes of a very technical or scientific nature, which may arise in the execution of a law, and it is therefore a very common practice for the legislative branch to provide the general program and confer upon the executive branch authority to provide, by rules and regulations, for the details necessary for carrying the program into effect. This practice had its origin at the time of the adoption of the Constitution, and was undoubtedly in strict conformity with the views entertained by the great statesmen of that day,¹³ for we find that from the beginning of the Government various acts¹⁴ have been passed conferring upon executive officers

¹¹ Sinking Fund Cases, 99 U. S. 718.

¹² United States v. Grimaud, 220 U. S. 506.

¹³ United States v. Grimaud, 220 U. S. 506, 517.

¹⁴ 1 U. S. Stats. at Large, ch. 36, p. 275, ch. 57, p. 569.

power to make rules and regulations. This is not, however, a delegation of power;¹⁵ but it will be seen in the discussion which follows that circumstances and conditions may arise in the preparation of rules and regulations which make it difficult to determine whether or not such rules and regulations usurp any of the functions of the legislative branch, or even those of the judicial.

JUDICIAL NOTICE AND RESPECT

Judicial notice.—The courts take judicial notice of certain rules and regulations made in pursuance of legislative enactment; that is, the courts will take cognizance of them without proof. The highest court of the land has expressed itself on this point in the following terms with regard to rules and regulations made by the principal departments of the Federal Government under proper authority:

Wherever, by the express language of an act of Congress, power is entrusted to either of the principal departments of the Government to prescribe rules and regulations for the transaction of business in which the public is interested, and in respect to which they have a right to participate, and by which they are to be controlled, the rules and regulations prescribed in pursuance of such authority becomes a mass of that body of public records of which the courts take judicial notice. (*Caha v. United States*, 152 U. S. 211, 222.)

Respect accorded rules and regulations.—The respect accorded rules and regulations by the courts is founded in some degree upon the confidence they have in the integrity, knowledge, and ability of the men charged with the enforcement of the laws. Expression has been given to this confidence by the courts. The United States Supreme Court has said, respecting the construction given a statute by those charged with its enforcement—

The officers concerned are usually able men and masters of the subject. Not infrequently they are the draftsmen of the laws they are afterwards called upon to interpret. (*United States v. Moore*, 95 U. S. 760, 763.)

One of the guiding principles of the courts in considering rules and regulations is that, unless it is clearly erroneous, a regulation, issued under authority of law by an executive officer charged with the enforcement of the act, will not be set aside when the wording of the statute is elastic or ambiguous and subject to more than one interpretation, especially when the construction in question has been acted upon for a number of years. A few excerpts are given from court decisions respecting this principle and touching upon the respect accorded rules and regulations, or the interpretation of statutes by officers charged with their enforcement:

In the construction of a doubtful and ambiguous law the contemporaneous construction of those who were called upon to act under the law, and were appointed to carry its provisions into effect, is entitled to great respect. (*Edwards v. Darby*, 12 Wheat. 206, 210.)

It is not unimportant to state, that the construction which we have given to the terms of the act, is that which is understood to have been practically acted upon by the Government, as well as by individuals, ever since its enactment. * * * A practice so long and so general, would, of itself, furnish strong grounds for a liberal construction; and could not now be disturbed without introducing a train of serious mischiefs. We think the practice was

¹⁵ State ex rel. Milwaukee Medical College v. Chittenden, 127 Wis. 468, 471.

found in the true exposition of the terms and intent of the act; but if it were susceptible of some doubt, so long an acquiescence in it would justify us in yielding to it as a safe and reasonable exposition. (*United States v. The State Bank of North Carolina*, 6 Pet. 29, 39.)

It is a settled doctrine of this court that, in case of ambiguity, the judicial department will lean in favor of a construction given to a statute by the department charged with the execution of such statute, and, if such construction be acted upon for a number of years, will look with disfavor upon any sudden change, whereby parties who have contracted with the Government upon the faith of such construction may be prejudiced. (*United States v. Alabama R. R. Co.*, 142 U. S. 615, 621.)

It may be well to emphasize here that the excerpts quoted are in regard to statutes which are ambiguous and subject to more than one viewpoint, or method of administration; while on the other hand there are numerous instances in which the courts have refused to adopt the rules of construction or application of a statute followed by the enforcing department. In these cases, however, the language of the statute was clear and explicit and free from ambiguity and doubt, and the rule of the enforcing department was found to be without weight.

We have just seen that the courts are not inclined to set aside a regulation or interpretation of a statute by an executive department when ambiguity exists, and when the regulation or construction has been in effect for some time. An opinion touching on the latter point was rendered some years ago when the United States Department of Agriculture requested an opinion from the Attorney General, as to whether single hams and single sides of bacon, wrapped or covered with paper, cloth, or gelatine, were "in package form" and, hence, included within the list of articles to be marked with the net weight, measure, or numerical count under the national food and drugs act. The department had issued a regulation under the statute in question in July, 1914,¹⁶ which included the ruling that single hams and single sides of bacon wrapped or covered with paper, cloth, or gelatine were not in package form within the meaning of the act. When the question was submitted to the Attorney General, January 15, 1917, about two and a half years after the regulation had been in effect, the Attorney General replied in part as follows:

It appears from your letter that in Service and Regulatory Announcements, Chemistry No. 6, issued July 17, 1914, the Department of Agriculture, which is charged with the administrative enforcement of the food and drugs act, ruled that single hams and single sides of bacon wrapped or covered with paper, cloth, or gelatine are not "in package form" within the meaning of the net weight amendment. This ruling has been in effect continuously.

While as is usually the case where elastic words have to be construed, there is more than one side to the question, I am certainly not prepared to say that the construction adopted by the Department of Agriculture is clearly erroneous; and where the department of Government primarily charged with the enforcement of a statutory provision has adopted a construction and that construction has been in practical operation for several years, I do not think that the Attorney General should disturb it unless of opinion that it is clearly erroneous. *United States v. Philbrick*, 120 U. S. 52, 59; *United States v. Moore*, 95 U. S. 760, 763; *United States v. Hammers*, 221 U. S. 220, 228-229; *Illinois Surety Co. v. United States*, 215 Fed. 334, 338 (C. C. A. 4th Cir.); 27 Op. 446; 26 Op. 390; 20 Op. 648; 20 Op. 719. (31 Op. Atty. Gen. 150.)

¹⁶ Service and Regulatory Announcements, Chemistry No. 6.

THE NATURE OF RULES AND REGULATIONS

Rules and regulations which may be prescribed by the administrative branch of the Government must of necessity keep within the scope of the statute under which they are promulgated and be of an administrative nature only. They may fill up details where the legislative branch has indicated its will in the matter; and they may even extend to the prohibition of certain acts not specifically mentioned in the text of the law, provided the prohibition of such acts is necessary for the proper carrying out of the law.¹⁷ However, if the rules and regulations go beyond the intent of the law, they would be an attempt to create new legislation, and consequently an endeavor to exercise a function which is lodged exclusively with the legislative branch. For instance, a regulation fixing an excessive fee for the inspection and test of a spring scale was found to be tantamount to the exercise of the legislative function, because the fee was purposely placed very high with a view to discouraging the use of this class of apparatus.¹⁸

It is a difficult matter to define the line which separates legislative power to make laws, and administrative authority to make rules and regulations. It would be as impossible to lay down a rule which would cover the innumerable fields into which rules and regulations must reach to meet the demands of the new and ever-increasing intricacies of modern life, as it is to define the police power, the foundation upon which rules and regulations are very often laid. And like the police power,¹⁹ it is easier to determine the application of a given instance, than it is to define and include the whole field in one masterful stroke of judicial sagacity and prophetic insight.

A Wisconsin case²⁰ states that "the true test and distinction whether a power is strictly legislative, or whether it is administrative, and merely relates to the execution of the statute law, is between the delegation of power to make the law, which necessarily involves a discretion as to what it shall be, and conferring authority and discretion as to its execution, to be exercised under and in pursuance of the law."

The nature of the limitations placed upon the police power give some light concerning the limitations which may hedge about rules and regulations. As already intimated, the police power has never been exclusively and inclusively defined, nor indeed is it capable of such definition. The ever changing conditions of modern life require new applications of the police power to conditions which could not be foreseen from experiences of the past. Descriptions of the police power, however, have been expressed and these do throw light upon its nature and limitations, and the scope of the matters which may come within its jurisdiction, and, consequently, upon matters which may come within the purview of rules and regulations properly predicated upon legislative authority. A few quotations bearing upon this point will be given later in another section of this paper.²¹

We have seen that rules and regulations are prohibited from entering the field of legislation, and likewise they are restrained from

¹⁷ *United States v. Grimaud*, 220 U. S. 506.

¹⁸ *Bryan v. Newman*, 7 Ky. Opin. 270.

¹⁹ *Aetna Fire Insurance Co. v. Jones*, 78 S. C. 445, 59 S. E. 148, 150.

²⁰ *State ex rel. Adams v. Burdge*, 95 Wis. 390, 402.

²¹ See pp. 139-140.

occupying the field reserved to the judicial branch of the Government.²² But encroachment upon the judicial is not nearly so likely to happen in the preparation of rules and regulations as is the invasion of legislative rights. Without encroaching upon the prerogatives of the judicial, rules and regulations may explain the details, throw light upon the text so that it may more easily and surely be carried into effect, and make plain details necessary for its execution which are not included in the text, but which may be a natural outcome from the nature of the provisions included in the law and requirements for its execution. Here again the line of demarkation between those functions which are administrative and those which are judicial is not clear, distinct, and easily followed, and consequently differences of opinion arise in many instances.

SUBSTANTIVE LAW

There must be substantive law upon which to base the issuance of rules and regulations;²³ that is, a definite law which creates and defines the matters to be regulated. It must be sufficiently broad in its terms to include the scope of the rules and regulations; otherwise they partake of the nature of legislation and are void for lack of authority. It may be noted, however, that the precise limit upon the competency of the legislature to delegate the power of government is uncertain.²⁴

In considering the question of substantive law upon which rules and regulations are to be based, we should ascertain (*a*) whether the substantive law is sufficient and adequate to justify all the provisions desired in the rules and regulations, and (*b*) whether the law contains a delegation of authority.

The sufficiency of the substantive law with reference to penalties inflicted for violation of rules and regulations made by an executive officer, is stated by the Supreme Court of the United States,²⁵ and it will be noted from the language quoted from the syllabus in this case that the penalty is prescribed by statute and not by the executive officer making the regulations:

When the penalty for violations of regulations to be made by an executive officer is prescribed by statute, the violation is not made a crime by such officer but by Congress, and Congress and not such officer fixes the penalty, nor is the offense against such officer but against the United States.

A Wisconsin statute authorized the State board of health "to make such rules and regulations and to take such measures as may, in its judgment, be necessary for the protection of the people from Asiatic cholera or other dangerous, contagious diseases." The law further provided that the terms "other dangerous, contagious diseases," should be construed to mean such diseases as the board should designate as such. A rule promulgated by the board required a certificate of vaccination as a condition for attending the public schools. A case arising under this law came before the Supreme Court of the State²⁶ and the act was held to be void as a delegation of legislative power. The court pointed out that "the provisions of the statute import and include an absolute delegation

²² *Sinking Fund Cases*, 99 U. S. 718.

²³ *In re Griner*, 16 Wis. 423, 434.

²⁴ *State v. Gloucester County*, 50 N. J. L. 585, 594, 15 Atl. 272.

²⁵ *United States v. Grimaud*, 220 U. S. 506.

²⁶ *State v. Burdge*, 95 Wis. 390, 70 N. W. 347, 60 Am. St. Rep. 123.

of the legislative power over the entire subject here involved, and this, too, without any previous legislative provision for compulsory vaccination, or as a condition of enrollment of children of proper school age as pupils in the public school, or of their right to attend such schools." Substantive law for the rules and regulations as issued by the State board of health was lacking in this case.

SCOPE AND POWER

The police power, upon which rules and regulations are often founded, is broad in its scope,²⁷ and in the exercise of this power the State is not confined to matters relating strictly to the public morals and peace, but it may extend this power within its recognized scope wherever the business interests demand.²⁸ It may protect against ignorance and incapacity as well as deception and fraud; and subject to limitations, it may make all needful regulations as in its judgment will secure or tend to secure the general welfare of its people.²⁹ The scope of the police power, however, has its limitations—it can not extend to certain matters which do not come within its recognized functions, nor may it impose onerous and unnecessary burdens upon business or property,³⁰ nor impair the obligation of contract.³¹

Regulations issued under authority must be consistent with the statutes enacted by the legislature on the subject;³² they must have a real and substantial relation to the ends sought;³³ they must tend in some degree toward prevention of some offense or manifest evil;³⁴ they can not be purely arbitrary nor purely for the promotion of private interests;³⁵ and they may not impose rates such as to work a practical destruction of property rights³⁶ nor prohibit an act, entirely innocent in character, which the courts can clearly see has no tendency to affect, injure, or endanger the public along the lines recognized as within the police power.³⁷

There are many angles to the question as to whether rules and regulations are within the scope or power of the legislative act under which they are promulgated. In some instances it has been held that rules and regulations touching upon matters not specifically mentioned in the legislative act have been found valid,³⁸ while in other cases the contrary has been true.³⁹ However, it may be said, in general where a thing is needed, or would be a natural outgrowth or consequence of carrying out the provisions of the legislative act, it would be held a valid and proper requirement although not specifically mentioned in the law, while, on the other hand, a regulation might be void as being too remote from the language of the act and in a sense as an additional requirement not deducible from the language of the act and not contemplated by the legislative body.³⁹

²⁷ *Ex parte Quarg*, 149 Calif. 79, 81, 84 Pac. 766, 767; *The State ex rel. Adams v. Burdge*, 95 Wis. 390, 399.

²⁸ *State v. Wagener*, 77 Minn. 483, 80 N. W. 633, 635.

²⁹ *Dent v. West Virginia*, 129 U. S. 114, 122.

³⁰ *Ex parte Charles E. Hayden*, 147 Calif. 649.

³¹ The Constitution, Art. I, sec. 10.

³² *United States v. Symonds*, 120 U. S. 46, 49.

³³ *Mugler v. Kansas*, 123 U. S. 661.

³⁴ *State v. Ashbrook*, 154 Mo. 375, 385, 55 S. W. 627.

³⁵ *Cooley*, Const. Lim. 837, 7th ed.

³⁶ *Regan v. Farmer's Loan and Trust Co.*, 154 U. S. 362; *Bryan v. Newman*, 7 Ky. Opin. 270.

³⁷ *Ex parte Quarg*, 149 Calif. 79, 81, 84 Pac. 766, 767.

³⁸ *United States v. Grimaud*, 220 U. S. 506.

³⁹ *United States v. Eaton*, 144 U. S. 677.

Rules and regulations promulgated under authority of law have the force of law,⁴¹ and the power to establish rules and regulations necessarily implies the power to modify or repeal or create anew.⁴²

In the exercise of the police power, the enacting authority is the sole judge as to what is expedient, but the judiciary is the judge as to what is beyond the boundaries of reasonable regulation and in the domain of destruction.⁴³

Regulations can not be questioned or defied because they may be thought unwise or mistaken,⁴⁴ neither will the courts hold that an act is not within the police power unless it is so clearly without as to remove every reasonable doubt that it is.⁴⁵

In the preparation of rules and regulations, their scope should be bounded by two important considerations, first, they must be for the public welfare, and second, the measures adopted must have relation to the purpose sought to be accomplished.⁴⁶

The scope and effect of rules and regulations, issued under authority of law, have come before various courts for determination from time to time,⁴⁷ and in passing upon such cases and upon others arising under legislative enactments based upon the police power, the courts have expressed opinions as to the nature of the police power, its force, scope, and limitations, and a number of these are quoted below. A careful study of these viewpoints will be very helpful in obtaining a comprehensive idea of the powers which may be exercised by rules and regulations and the limitations placed upon them.

It would be presumptuous for any court to attempt to formulate an exact definition of the term the "police power of the State." Legal definitions do not sum themselves up in single sentences. They are, and of necessity must be, more or less general and elastic, in order that the courts may apply them to the infinite variety of circumstances which may arise in the relations and affairs of mankind in civilized society. (*State v. Dalton*, 46 Atl. 234, 235, 84 Am. St. Rep. 818.)

It has been declared by Chief Justice Shaw that it is much easier to perceive and realize the existence and sources of the police power than to mark its boundaries or prescribe limits to its exercise. This power is and must be from its very nature incapable of any very exact definition or limitation. Upon it depends the security of social order, the life and health of the citizen, the comfort of an existence in a thickly populated community, the enjoyment of private and social life, and the beneficial use of property. (*Slaughterhouse Cases*, 83 U. S. (16 Wall.) 36, 62.)

All property in this Commonwealth is held subject to those general regulations which are necessary to the common good and general welfare. Rights of property, like all other usual and conventional rights, are subject to such reasonable limitations in their enjoyment as shall prevent them from being injurious, and to such reasonable restraints and regulations established by law, as the legislature, under the governing and controlling power vested in them by the constitution, may think necessary and expedient. * * * The power is vested in the legislature by the constitution to make, ordain, and establish all manner of wholesome and reasonable laws, statutes, and ordinances, either with penalties or without, not repugnant to the constitution, as they shall

⁴¹ *Stotesbury v. United States*, 23 C. Cl. 285, 292.

⁴² *United States v. Eliason*, 16 Pet. 291, 301.

⁴³ *State ex rel. Milwaukee Medical College v. Chittenden*, 127 Wis. 468, 521.

⁴⁴ *United States v. Eliason*, 16 Pet. 291, 301.

⁴⁵ *State v. Holden*, 14 Utah 71, 46 Pac. 756.

⁴⁶ *Parkes v. Judge of Recorder's Court*, 236 Mich. 460, 466.

⁴⁷ *Harvey v. United States*, 3 C. Cl. 38, 41; *Landram's Case*, 16 C. Cl. 74, 84, 85; *Savings Bank v. U. S.*, 16 C. Cl. 335, 347, 349; *Maddon v. U. S.*, 20 C. Cl. 193; *Symonds's Case*, 21 C. Cl. 148, 152; *Stotesbury v. U. S.*, 23 C. Cl. 285; *Romero v. U. S.*, 24 C. Cl. 331; *Kendall v. U. S.*, 12 Pet. 524, 610; *U. S. v. Eliason*, 16 Pet. 291, 301; *Aldridge v. Williams*, 3 How. 1, 29; *Gratiot v. U. S.*, 4 How. 80, 117; *Ex parte Reed*, 100 U. S. 13, 22; *U. S. v. Symonds*, 120 U. S. 46; *Smith v. Whitney*, 116 U. S. 167, 181; *U. S. v. Grimaud*, 220 U. S. 506; *Overt v. State*, 97 Tex. Crim. Rep. 202.

judge to be for the good and welfare of the Commonwealth and of the subjects of the same. (*Commonwealth v. Alber*, 7 Cush. (61 Mass.) 53.)

This power [police power] has been defined in varying language, but of substantially the same general import. "All laws for the protection of life, limb, and health, for the quiet of the person, and for the security of property," fall within the general police power of the Government. "All persons and property are subjected to all necessary restraints and burdens, to secure the general comfort, health, and prosperity of the State;" and it has been said that "it is coextensive with self-protection, and is not inaptly termed 'the law of overruling necessity.'" It is that inherent and plenary power in the State which enables it to prohibit all things hurtful to the comfort and welfare of society. (*State ex rel. Adams v. Burdge*, 95 Wis. 390, 398.)

REASONABLENESS

Inherent qualities.—It is a well-established principle that laws must not be arbitrary, discriminatory, oppressive, harsh, capricious, or unreasonable, and it follows that rules and regulations, deriving their existence by authority of law, must come within all the limitations placed upon the laws themselves. They can not exercise greater authority, and they are bound by all the rules of law which govern enactments of the legislature.

A regulation must have a sound necessity for its promulgation, and can not subsist upon some whim or imaginary evil to be suppressed. A requirement might be unreasonable in one place and perfectly reasonable in another. It might be unreasonable in a mere village, whereas in a large city, with its great volume of business of the character affected, it might be a reasonable regulation.⁴⁸

The question as to whether rules and regulations are arbitrary, discriminatory, oppressive, harsh, or capricious is very much bound up in the question of reasonableness, and consequently the determination of the question of reasonableness is very largely the solution of the other questions. Tersely, it may be stated that the determination of reasonableness in the exercise of the police power is the stumblingblock to perfection; or, in the words of another,⁴⁹ "unreasonableness is one of the inherent limitations of the police power." If it were not for these differences of opinion as to what constitutes reasonableness, it would be a much easier task to promulgate valid rules for the enforcement of legislation and there would be fewer cases for determination by the courts.

In various decisions of the courts we find some basic principles stated which throw light upon the question of reasonableness. A few of these are quoted.

Liberty implies the absence of arbitrary restraint, not immunity from reasonable regulations and prohibitions imposed in the interests of the community. * * * Where the legislative action is arbitrary and has no reasonable relation to a purpose which it is competent for government to effect, the legislature transcends the limits of its power in interfering with liberty of contract; but where there is reasonable relation to an object within the governmental authority, the exercise of the legislative discretion is not subject to judicial review. The scope of judicial inquiry in deciding the question of power is not to be confused with the scope of legislative considerations in dealing with the matter of policy. Whether the enactment is wise or unwise, whether it is based on sound economic theory, whether it is the best means to achieve the desired result, whether, in short, the legislative discretion within its prescribed limits should be exercised in a particular manner, are matters

⁴⁸ *Stegmann v. Weeke*, 279 Mo. 131, 151; *Locke's Appeal*, 72 Pa. 491; *Davis v. Anita*, 73 Ia. 325, 35 N. W. 244.

⁴⁹ *Op. Atty. Gen. of Pa.*, 20 Pa. Dist. 881, 882.

for the judgment of the legislature, and the earnest conflict of serious opinion does not suffice to bring them within the range of judicial cognizance. (Chicago, B. & Q. R. Co. v. McGuire, 219 U. S. 563.)

By the term "reasonable" is not meant expedient, nor that the conditions must be such as the court would impose if it were called on to prescribe what would be the conditions. They are to be deemed reasonable where, although perhaps not the wisest and best that might be adopted, they are fit and appropriate to the end in view, to wit, the protection of the public, and are manifestly adopted in good faith for that purpose. If the condition should be clearly arbitrary and capricious; if no reason with reference to the end in view could be assigned for it; and especially if it appeared that it must have been adopted for some other purpose—such, for instance, as to favor or benefit some person or class of persons—it certainly would not be reasonable, and would be beyond the power of the legislature to impose. (State v. Vanderluis, 42 Minn. 129, 43 N. W. 789.)

If a regulation is within the scope of the legislative power and its purpose is not arbitrary supervision, but the protection of the public, the mere fact that it may be unwise in the opinion of the courts or involve an added expense upon the consuming public is no justification for judicial interference. (State v. Armour & Co., 27 N. D. 177, 205.)

In determining the question of reasonableness it [the legislature] is at liberty to act with reference to the established usages, customs, and traditions of the people, and with a view to the promotion of their comfort, and the preservation of the public peace and good order. (Plessy v. Ferguson, 163 U. S. 537, 550.)

An inquiry into the question of whether an ordinance is a fair, reasonable, and appropriate exercise of the police power, or is an unreasonable, arbitrary interference with the right to hold and enjoy property, under the guise of an exercise of police power, is a judicial one, and the courts are not precluded from answering it by the mere fact that a board of supervisors or municipal council has expressed its judgment. (Hume v. Maurel Hill Cemetery, 142 Fed. 552, 563.)

Liberty and property yield to the police power, but not to the point of destruction. (Freund on Police Power, p. 60.)

Affected by statutes.—The courts are not in entire agreement as to what constitutes reasonable requirements in a law or in rules and regulations. This may be due to differences of opinion as to what elements are necessary in arriving at a conclusion as to when a law is arbitrary, harsh, oppressive, or incapable of enforcement; or it may be due to some restrictions found in the constitution or some fundamental law of the State. A case in point where provisions of the State penal code have a direct bearing on the validity of rules and regulations is one which arose in Texas under the net container act of 1919.⁵⁰ In this case a sack of flour, weighing 47 pounds and 13 ounces, was sold for a sack which by law was required to weigh 48 pounds.

The particular portion of the law in question reads as follows:

All articles of foodstuff, feed, or other commodity which are sold in packages, shall in all instances contain the net weight of the produce or commodity other than drugs so sold in such packages or containers, and shall not include the weight of the package or container. No person shall sell or offer for sale food, feed, or other commodity in package form unless the quantity of the contents be plainly and conspicuously marked on the outside of the package or container giving the weight, measure, or numerical count of the contents thereof. *Provided, however,* That reasonable variations may be permitted and tolerances and exemptions allowed under such rules and regulations as may be made from time to time by the commissioner of markets and warehouses. * * *

It will be noted that the law states that "reasonable variations may be permitted and tolerances and exemptions allowed under such rules and regulations as may be made from time to time by the com-

⁵⁰ Gen. Laws, 1919, ch. 130, p. 231.

missioner of markets and warehouses." It appears from statements made in the case that the commissioner of weights and measures had not made rules and regulations under the act. The court held that it was mandatory upon the commissioner to issue rules and regulations, notwithstanding the use of the conditional tense in the language of the law, and the court then makes the following statement: "Whether, however, the authority thus conferred upon the commissioner be mandatory or permissive it is couched in terms too general to become a valid part of a criminal statute." A further statement regarding the limitations which it believes should have been placed by the law upon the authority to make rules and regulations was made by the court as follows:

The power conferred is to make rules and regulations from time to time, permitting variations, tolerances, and exemptions. The statute places no limitation upon this authority, save that the variations, tolerances, and exemptions must be reasonable. It prescribes no measure by which their reasonableness may be tested, and sets forth no further expression of the legislative will touching the nature of the rules permitted. It is contemplated that rules prescribed by the commissioner shall have the force of law and that the non-observance of them shall constitute a criminal offense. This being true, it is deemed essential to the validity of the law that the legislature define the power conferred and place limitations upon the authority to make and promulgate the rules, to the end that they may not be lacking in the imperative elements of a law denouncing an offense, which are stated in our penal code thus:

"The design of enacting this code is to define in plain language every offense against the laws of this State, and affix to each offense its proper punishment." (P. C., art. 1.)

"No person shall be punished for any act or omission unless the same shall be made a penal offense, and a penalty is affixed thereto by the written laws of this State." (*Overt v. The State*, 97 Tex. Crim. Rep. 202.)

The law was held invalid as not defining nor limiting the power of the commissioner, and the court discharged the party accused of the sale of short-weight flour.

This net-weight law of Texas is similar to other State laws on the same subject in which provision is made for the official charged with the enforcement of the law to promulgate rules and regulations affecting tolerances and exemptions, and these latter laws have been found workable; but, as previously stated, a law may be found invalid in one State because of some local statute or constitutional provision, while a similar law in another State may be valid.

For the purpose of comparison with the Texas law, attention is directed to similar laws which are in force in other States, as in New Hampshire, Pennsylvania, Virginia, and West Virginia.⁵¹

Reasonable requirements.—We shall now consider some specific instances in which certain provisions or requirements have been held to be reasonable by the courts, and we shall then take up some which have been held to be unreasonable.

The decisions of the courts upon the subject of reasonableness are generally in relation to legislative enactments, rather than to rules and regulations made by the executive authority; but we may examine these for guidance also, since, as already pointed out, rules and regulations made by administrative officers have no greater freedom from review and restraint by the courts than has statute law.

⁵¹ New Hampshire, Public laws, 1926, vol. 1, ch. 161, p. 594, secs. 29 and 41; Pennsylvania, laws, 1913, act No. 445, p. 965; Virginia, acts, 1926, ch. 145, p. 248; West Virginia, acts, 1915, ch. 16, p. 167, as amended by acts, 1919, ch. 53, p. 224.

In a North Dakota case ⁵² the law in question required lard or lard compounds or substitutes, unless sold in bulk, to be put up in pails or other containers holding 1, 3, or 5 pounds or whole multiples of these numbers, and the label was required to show the true net weight of the contents and the name and grade of the product. In this case the court held that a law is not unreasonable because it interferes with a custom of an industry which has extended over a period of more than 30 years, nor because it imposes an additional expense upon the industry in question, nor because the purchasers of the commodity are not prejudiced against buying the commodity as formerly put up.

A city ordinance is not unreasonable in requiring glass bottles or jars for the sale of milk to have the capacity permanently and legibly indicated upon the bottle or jar, nor because the ordinance has the effect of depriving the owner of the use of glass bottles or jars which he had on hand when the ordinance was passed.⁵³

A city ordinance is not unreasonable in limiting the weights of loaves of bread to one-half, three-quarters, 1, 2, 3, 4, 5, and 6 pounds.⁵⁴

A municipal ordinance requiring that all articles of merchandise sold in load lots by weight shall be weighed by specially appointed weighmasters is not an unreasonable classification in not including wholesale dealers who sell coal in carload lots, as the latter deal with those who have the means of determining the weight of the carload lots and are not in the same class with retail dealers.⁵⁵

An ordinance requiring the weighing of heavy commodities, sold in bulk and by weight in the city limits, on the city scales, under an appropriate penalty, is not unreasonable and in restraint of trade. Such legislation is designed to prevent fraud and imposition upon the citizens, and is a legitimate market regulation.⁵⁶

An ordinance is not unreasonable which prohibits the sale of any fruit, vegetables, or nuts from cups, cans, or other receptacles other than sealed dry measures sealed by the city sealer, except when such commodities are sold in the original receptacles.⁵⁷

An ordinance requiring the true weight or measure to be stated on the container is not unreasonable because the true weight at the time of packing is necessarily more than the true weight after loss by evaporation, since it merely throws the loss upon the packer instead of the consumer.⁵⁸

An ordinance is not unreasonable in prohibiting the use of "short boxes" as original containers for the sale of vegetables, and requiring boxes for this purpose to be of the capacity of one-half and 1 bushel.⁵⁹

In connection with this last-mentioned case, it might be well to point out that the ordinance prescribed a bushel box of certain dimensions and a half-bushel box of certain other dimensions, but no penalty for the use of boxes of different dimensions, but only a penalty for the use of boxes of a different capacity. This ordinance was, therefore, held to be only advisory and not mandatory with

⁵² *State v. Armour & Co.*, 27 N. D. 177, 240 U. S., 510.

⁵³ *Chicago v. The Bowman Dairy Co.*, 234 Ill., 294.

⁵⁴ *Chicago v. Schmidinger*, 243 Ill. 167, 226 U. S. 578.

⁵⁵ *City of Chicago v. The Wisconsin Lime & Cement Co.*, 312 Ill., 520.

⁵⁶ *City of Carterville v. McGinnis*, 142 Ga. 71.

⁵⁷ *Rafetto v. Mott*, 60 N. J. Law Rep. 413.

⁵⁸ *Seattle v. Goldsmith*, 73 Wash. 54.

⁵⁹ *Stegmann v. Weeks*, 279 Mo. 140.

respect to the use of boxes of prescribed dimensions. The concurring opinion of Mr. Justice Faris holds that the ordinance is valid only because it prescribed no penalty for the use of boxes of different dimensions, and that the city had no power to prescribe that boxes should be of a required length, width, and depth.

It seems to be the plain conclusion in this case that the law, after fixing the dimensions of the boxes, should have provided for the use of boxes of other form, but of the same capacity. This course has been followed in some Federal and State legislation.⁶⁰

Unreasonable requirements.—We shall now consider a few decided cases in which certain requirements have been held to be unreasonable.

A statute requiring the marking of small packages of butter intended for sale with their weight in figures not less than a quarter of an inch high is an unconstitutional interference with liberty and property rights, and not a legitimate exercise of the police power.⁶¹

A municipal ordinance requiring bread to be made into loaves weighing not less than 1½ pounds, and imposing a penalty for its violation, was held to be an unreasonable exercise of the police power, and an interference with the rights of individuals engaged in selling 1-pound loaves of bread.⁶²

A tolerance in excess on loaves of bread of 2 ounces to the pound was held to be an unreasonable requirement by the Supreme Court of the United States in the Nebraska bread case.⁶³

A law arbitrarily fixing the weight of stays, standards, and supports, etc., for the shipment of lumber, at 1,000 pounds per car was found to be invalid, the court holding that any regulation of rates which arbitrarily fixes the weight of cars or equipment at more or less than the actual weight is unreasonable.⁶⁴

In a California case⁶⁵ it was held that "the marking of fruit packed for shipment with the locality in which it is grown, can not be required under the police power of the State." In considering this requirement, held to be unreasonable by the highest court of California, comparison is directed to one of the well-known cases decided by the Supreme Court of the United States nearly a half century ago.⁶⁶

This case arose under an old inspection law of Maryland⁶⁷ which required tobacco to be packed in hogsheads of a stated dimension, and these to be weighed, numbered, and marked with the name and address of the owner. Mr. Justice Blatchford, delivering the opinion of the court, said: "Fixing the identity and weight of tobacco alleged to have been grown in the State and thus preserving the reputation of the article in markets outside of the State, is a legitimate part of the inspection laws."

CONCLUSION

In conclusion it may be said that while the whole legal field applicable to rules and regulations has not been covered in this paper,

⁶⁰ See 38 U. S. Stats., ch. 158, p. 1186; 41 U. S. Stats., ch. 118, p. 1217, sec. 15; and B. S. Miscellaneous Publication No. 20, Federal and State Laws Relating to Weights and Measures, pp. 20, 147, 167, 214, 291, 364, 403, 609, 751, 837, 847, 888, and 902.

⁶¹ Ex parte Dietrich, 149 Calif. 104, 84 Pac. 770.

⁶² City of Buffalo v. Collins Baking Co., 39 N. Y. App. Div. 432.

⁶³ Jay Burns Baking Co. v. Bryan, 264 U. S. 504.

⁶⁴ State ex rel. Washington Mill Co. v. Great Northern R. Co., 43 Wash. 658.

⁶⁵ Ex parte Charles E. Hayden, 147 Calif. 649.

⁶⁶ Turner v. Maryland, 107 U. S. 38, 51.

⁶⁷ See sec. 41, act of 1864, ch. 346, as modified by act of 1870, ch. 291.

enough has been pointed out to warrant the statement that the subject should commend itself to the weights and measures official as one of no small importance, and that in the preparation of rules and regulations great care should be taken on every hand to make them effective in bringing about the desired results, and at the same time to keep them within the scope of authority under which they are promulgated and reasonable in their application.

REPORT OF COMMITTEE ON NOMINATIONS, PRESENTED BY WILLIAM F. CLUETT, CHAIRMAN, AND ELECTION OF OFFICERS

Mr. Chairman and delegates, your committee on nominations has met and presents for your consideration the names of the following members to act as officers, and members of the executive committee for the ensuing year:

Honorary president, S. W. Stratton; president, George K. Burgess; first vice president, Francis Meredith; second vice president, H. S. Jarrett; secretary, F. S. Holbrook; treasurer, George F. Austin; members of the executive committee, all of the officers ex officio, M. A. Bridge, W. F. Cluett, H. N. Davis, C. V. Fickett, Thomas Flaherty, J. H. Foley, William Foster, S. T. Griffith, W. A. Graham, T. F. Mahoney, E. J. Maroney, I. L. Miller, W. A. Payne, B. W. Ragland, G. M. Roberts, A. B. Smith, W. F. Steinel, H. A. Webster, S. H. Wilson.

(Signed)

WM. F. CLUETT, *Chairman*,
GEO. B. NEBINGER,
J. HARRY FOLEY,
I. L. MILLER,
H. S. JARRETT,
Committee on Nominations.

The CHAIRMAN. Gentleman, you have heard the report of the committee on nominations.

Mr. SCHWARTZ. Mr. Chairman, I move the report of the committee on nominations be received, and that the secretary be directed to cast the ballot of the conference for the election of the officers nominated.

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

Accordingly, the secretary cast the ballot of the conference for the officers and members of the executive committee, as nominated by the committee on nominations, and they were declared duly elected.)

REPORT OF COMMITTEE ON RESOLUTIONS, PRESENTED BY P. D. DUKESHERER, CHAIRMAN

Mr. Chairman and members of the conference, your committee on resolutions offers for your consideration the following resolutions and moves their adoption:

SPECIFICATIONS FOR OVERHAULING AND REPAIR OF HEAVY-CAPACITY SCALES

Whereas the National Scale Men's Association at its annual meeting held in Milwaukee, Wis., April 9 to 11, 1929, approved a set of specifications developed by a committee thereof, entitled "Specifications for Overhauling and

Repair of Heavy-Capacity Scales," National Scale Men's Association, Bulletin No. 1, and continued this committee for the purpose of further perfecting them; and

Whereas these specifications have been called to the attention of the National Conference on Weights and Measures by the National Scale Men's Association for any action which may be deemed appropriate at this time: Therefore be it

Resolved, That the National Conference on Weights and Measures at its twenty-second meeting held in Washington, D. C., June 4 to 7, 1929, hereby records its conviction that the National Scale Men's Association has evolved an excellent code of specifications in a new and important field heretofore neglected; and be it further

Resolved, That we tender our full moral support to the National Scale Men's Association in any further development work necessary in their endeavor and through our committee on specifications and tolerances pledge our active cooperation along these lines.

SYMPATHY FOR NORMAN L. KNAUSS

Resolved, That the Twenty-second National Conference on Weights and Measures extends its deepest and sincerest sympathy to our official stenographer, Norman L. Knauss, in his very great bereavement in the recent tragic death by accident of his son, and expresses its very great appreciation to Mr. Knauss for his faithfulness in reporting our meeting in spite of this.

RECEPTION BY PRESIDENT HOOVER

Resolved, That the deep appreciation of the Twenty-second National Conference on Weights and Measures be expressed to the Chief Executive of the United States, President Hoover, for his courtesy extended in receiving the members and guests of the conference.

ADDRESS OF THE SECRETARY OF COMMERCE

Resolved, That the Twenty-second National Conference on Weights and Measures expresses its appreciation to the Hon. Robert P. Lamont for his attendance at the conference and his excellent address.

APPRECIATION TO PRESIDING OFFICER

Resolved, That the Twenty-second National Conference on Weights and Measures extend to our president, Doctor Burgess, sincere appreciation for his interest and guidance in the deliberations of the conference, and we hereby acknowledge with appreciation the advice and cooperation of our presiding officer and his able staff who always so willingly tender us their services.

APPRECIATION TO THE PRESS

Resolved, That the Twenty-second National Conference on Weights and Measures express its appreciation to the press of Washington, D. C., for so comprehensively reporting the proceedings of the conference.

(Signed)

P. D. DUKESHERER, *Chairman*,
H. A. WEBSTER,
S. B. SHAW,
V. A. BRADLEY,
W. F. STEINEL,
RICHARD HARDING,
W. H. GREEN,

Committee on Resolutions.

(As each of the above resolutions was read it was duly adopted.)

REPORT OF THE TREASURER, GEORGE F. AUSTIN

Gentlemen of the conference, I herewith submit my report as treasurer of the National Conference on Weights and Measures for the year ending June 3, 1929:

Receipts:

| | |
|--------------------------------------|----------|
| Balance on hand May 21, 1928 | \$222.55 |
| Received through fees from delegates | 129.00 |
| Received account of interest | 4.44 |

Total receipts 355.99

Disbursements:

| | |
|----------------------------------|---------|
| Flowers in memory of Mr. Fischer | \$10.00 |
| Fees, two messengers, at \$5 | 10.00 |
| Cigars for reporter and guards | 15.00 |
| Candy for stenographers | 8.00 |
| Delegates and guests' cards | 5.00 |
| Receipt blanks | 1.75 |

Total disbursements 49.75

Balance on hand June 3, 1929 \$306.24

Respectfully submitted.

(Signed)

GEO. F. AUSTIN, *Treasurer.*

Mr. MILLER. I move the adoption of the report.

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

ANNOUNCEMENTS AND MOTIONS

Mr. HOLBROOK. I would like to advise the conference that inasmuch as this meeting is being held after Memorial Day I took the same steps this year as have been taken formerly in relation to the decoration of Mr. Fischer's grave in Arlington Cemetery. Mr. Smith and I went over there the day before Memorial Day and placed a wreath on Mr. Fischer's grave. I have a note from Mrs. Fischer which states her very great appreciation of that token of the affection of the conference for its former secretary.

The CHAIRMAN. Is there any unfinished business?

Mr. CLUETT. Mr. Chairman, I move that the secretary of the conference be authorized to make the customary and necessary expenditures incident to this meeting, and to draw upon the treasurer for the amounts so expended.

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

SUGGESTIONS AS TO PROGRAM AND DATE OF TWENTY-THIRD CONFERENCE

The CHAIRMAN. Is there any new business to come up? Are there any suggestions from anyone regarding the program of the twenty-third conference? If there are no suggestions at the present time, the executive committee would be very glad, indeed, to receive from the members of the conference and others in attendance, any suggestions regarding items to go on the program next year. It is very important, of course, in making up the program, that the wishes of

the members of the conference are met. The executive committee, of course, has the job of putting it into shape, but it is your program.

Mr. HOLBROOK. Mr. Chairman, I think that under this item it might be well for the members of the conference to express their feeling in regard to the proper time for the meetings. This conference, as you know, is being held two weeks later than formerly and that has resulted in a very great saving for some of the delegates from the Pacific coast, who were enabled to get reduced tourist rates. While I am on the subject, I would like to make a statement somewhat in the nature of an apology, if I may be permitted. We arranged with the railroads on the validation certificate plan to secure a fare and a half round-trip rate, provided 150 certificates were turned in to the secretary. The registration at this conference is certainly not small—it is not a disappointment. I have figures that show that some 250 people have registered. I would have supposed that out of that number of people registered we would certainly have received in excess of 150 certificates. How you men got down here I do not know—unless, perhaps, you walked. I suggested that to one man the other day and he said that while he did not walk down, if he did not get that certificate validated he might have to walk back. Of course, the original announcement was that the rates would be given only if 150 certificates were received—therefore, we are within the letter of our proposal. We fully expected to get that number but have failed to do so. Therefore, we announce with regret that you must pay full fare back to your home towns. We can only say that we exerted our best efforts to save the delegates some money, but that, unfortunately, we have been unsuccessful in our endeavor.

Mr. FULLER. Mr. Chairman, I would like to say we appreciate your setting this conference two weeks later. It made a very material difference in our attendance. We have had very wonderful weather this year, and I would like to suggest that the setting of it over until after the 1st of June be continued. I take it from the experiences here that there will be no objections if the executive committee desires to hold the next conference in the early part of June.

The CHAIRMAN. Is there anything else to come up this morning before we adjourn? If not, I want to thank the members of the conference for their cooperation and the committees for the very able and painstaking work they have done. I congratulate the conference on its really great success. I think it has been one of the very best conferences it has been my pleasure to attend.

If there is nothing further, a motion to adjourn is in order.

(A motion to adjourn was made and seconded, the question was taken, and the motion was agreed to.)

(Thereupon, at 11.45 o'clock a. m., the Twenty-second National Conference on Weights and Measures, adjourned sine die.)

