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U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards

Report of the
58th National Conference
on
Weights and Measures
1973



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NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards¹ was established by an act of Congress March 3, 1901. The Bureau's overall goal is to strengthen and advance the Nation's science and technology and facilitate their effective application for public benefit. To this end, the Bureau conducts research and provides: (1) a basis for the Nation's physical measurement system, (2) scientific and technological services for industry and government, (3) a technical basis for equity in trade, and (4) technical services to promote public safety. The Bureau consists of the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Institute for Computer Sciences and Technology, and the Office for Information Programs.

THE INSTITUTE FOR BASIC STANDARDS provides the central basis within the United States of a complete and consistent system of physical measurement; coordinates that system with measurement systems of other nations; and furnishes essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry, and commerce. The Institute consists of a Center for Radiation Research, an Office of Measurement Services and the following divisions:

Applied Mathematics — Electricity — Mechanics — Heat — Optical Physics — Nuclear Sciences² — Applied Radiation² — Quantum Electronics³ — Electromagnetics³ — Time and Frequency³ — Laboratory Astrophysics³ — Cryogenics³.

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Office of Standard Reference Data — Office of Information Activities — Office of Technical Publications — Library — Office of International Relations.

¹ Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

² Part of the Center for Radiation Research.

³ Located at Boulder, Colorado 80302.

⁴ Part of the Center for Building Technology.

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58th National Conference on Weights and Measures 1973

*Sponsored by the National Bureau of Standards
Attended by Officials from the Various
States, Counties, and Cities, and
Representatives from U.S. Government,
Industry, and Consumer Organizations
Minneapolis, Minnesota, July 22-27, 1973*

Special publication no. 391

Report Editors: Sandra J. Wilson
Richard N. Smith



*United States Department of Commerce
Frederick B. Dent, Secretary*

*National Bureau of Standards
Richard W. Roberts, Director*

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Abstract

This is a report of the proceedings (edited) of the Fifty-Eighth National Conference on Weights and Measures, sponsored by the National Bureau of Standards, held in Minneapolis, Minnesota, July 22-27, 1973, and attended by state, county, and city weights and measures officials, the Federal Government, business, industry, and consumer organizations.

Key words: Administration; automated checkstand systems; Conference; consumers; laws and regulations; metrication; open dating; procedures; technical requirements; technology; universal product coding; weights and measures.

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OFFICERS OF THE CONFERENCE

- President:** RICHARD W. ROBERTS, Director, National Bureau of Standards.
Executive Secretary: H. F. WOLLIN, Chief, Office of Weights and Measures, National Bureau of Standards.
Chairman: G. L. JOHNSON, Director of Weights and Measures, Kentucky Department of Agriculture.
Vice Chairmen:
J. R. BIRD, Deputy State Superintendent, Office of Weights and Measures, New Jersey Department of Law and Public Safety.
G. L. DELANO, Administrator, Division of Weights and Measures, Montana Department of Business Regulation.
H. E. SMITH, Sealer of Weights and Measures, San Mateo County, California.
R. A. THARALSON, Inspector, Division of Weights and Measures, Minnesota Department of Public Service.
Treasurer: C. C. MORGAN, Sealer of Weights and Measures, Gary, Indiana.
Chaplain: J. I. MOORE, Superintendent, Weights and Measures Division, North Carolina Department of Agriculture.

APPOINTED OFFICIALS

Sergeants at Arms:

- L. H. DE GRANGE, Field Supervisor, Office of Weights and Measures, Maryland Board of Agriculture.
J. C. STEWART, Assistant Supervisor, Weights and Measures Section, Virginia Department of Agriculture and Commerce.
Parliamentarian: D. L. GRIFFITH, Director, Division of Consumer Protection, West Virginia Department of Labor.

EXECUTIVE COMMITTEE

J. C. BLACKWOOD	R. W. HORGER
J. C. BOYD	M. L. KINLAW
W. T. DELOGE	C. B. NOBLIN
S. E. FAVOUR	C. H. VINCENT
K. G. HAYDEN	R. W. WALKER

(All officers of the Conference are, ex officio, members of the Executive Committee.)

(Officers and Executive Committee members elected by the 58th National Conference to serve the 59th National Conference on Weights and Measures will be found in the report of the Nominating Committee, page 174.)

STANDING COMMITTEES

(The remaining term of office for each committee member, in years, is shown in parentheses.)

EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS

R. T. WILLIAMS, Texas, Chairman (3)
G. E. MATTIMOE, Hawaii
D. I. OFFNER, St. Louis, Missouri (2)
E. PRIDEAUX, Colorado (1)
S. VALTRI, Philadelphia, Pennsylvania (4)

(W. B. HARPER, Birmingham, Alabama, was appointed for a five-year term to replace G. E. Mattimoe, whose term expired. Mr. Offner replaced Mr. Williams as chairman.)

LAWS AND REGULATIONS

S. D. ANDREWS, Florida, Chairman (1)
M. DENNIS, Nebraska (4)
M. R. DETTLER, Seattle, Washington
R. M. LEACH, Michigan (2)
R. L. THOMPSON, Maryland (3)

(C. H. VINCENT, Dallas, Texas, was appointed for a five-year term to replace Mr. Dettler, whose term expired. J. L. O'NEILL, Kansas, was appointed to serve out the four-year unexpired term of Mr. Dennis, who resigned from public service. Mr. Leach replaced Mr. Andrews as chairman.)

LIAISON WITH THE FEDERAL GOVERNMENT

M. GREENSPAN, New York City, New York, Chairman
L. D. HOLLOWAY, Idaho (2)
A. SANDERS, Scale Manufacturers Association (1)
W. N. SEWARD, American Petroleum Institute (3)
J. SPEER, Milk Industry Foundation (4)

(E. H. STADOLNIK, Massachusetts, was appointed for a five-year term to replace Mr. Greenspan, whose term expired. Mr. Holloway replaced Mr. Greenspan as chairman.)

SPECIFICATIONS AND TOLERANCES

J. C. MAYS, Dade County, Florida, Chairman
T. F. BRINK, Vermont (1)
W. E. CZALA, Minnesota (4)
K. J. SIMILA, Oregon (3)
W. S. WATSON, California (2)

(M. L. KINLAW, North Carolina, was appointed for a five-year term to replace Mr. Mays, whose term expired. Mr. Brink replaced Mr. Mays as chairman.)

ANNUAL COMMITTEES

Nominations: E. H. BLACK, Ventura County, California, Chairman; J. E. BOWEN, Newton, Massachusetts; S. H. CHRISTIE, New Jersey; M. JENNINGS, Tennessee; C. C. MORGAN, Gary, Indiana; J. L. O'NEILL, Kansas; C. WOOTEN, Florida.

Resolutions: C. B. NOBLIN, Mississippi, Chairman; L. D. DRAGHIETTI, Agawam, Massachusetts; W. B. KELLEY, Connecticut; S. R. MILLER, San Diego County,

California; W. D. SCOTT, Allegheny County, Pennsylvania; A. HELGESON, North Dakota; J. F. TUCKER, New York.

Auditing: T. A. CONSIDINE, Baltimore, Maryland, Chairman; E. H. STADOLNIK, Massachusetts; W. B. HARPER, Birmingham, Alabama.

Associate Membership: L. J. MOREMEN, International Nonwovens & Disposables Association, Chairman; C. W. CAMPBELL, Reliance Electric Company; M. S. GODSMAN, Bennett Pump Incorporated; C. E. JOYCE, The Pillsbury Company; A. SANDERS, Scale Manufacturers Association; R. SOUTHERS, American Petroleum Institute; J. F. SPEER, Milk Industry Foundation; R. TOLLEY, National Canners Association; E. E. WOLSKI, Colgate-Palmolive Company; E. F. WEHMANN, Neptune Meter Company.

REGISTRATIONS

MRS. E. M. BURNETTE, MISS PATRICIA RASCHELLA, MRS. JOAN SCHNEIDER,
MRS. S. J. WILSON

LADIES' ARRANGEMENTS

MRS. H. F. WOLLIN

MONDAY, JULY 23, 1973

OPEN COMMITTEE MEETINGS

Monday was set aside for meetings of the four Conference standing committees. Notices of these meetings were carried in the Conference Announcement booklet, in all pre-Conference publicity, and in the printed Conference program. Many delegates participated in the committee meetings. The discussions which took place were particularly helpful to the members of each committee and played an important role in guiding the committees in their deliberation and preparation of their final reports. The final reports of the committees will be found beginning on page 171 and will reflect the discussion that took place and the actions taken by the Conference at the time the final reports were presented to the delegates.

MANUFACTURERS' EQUIPMENT DISPLAY

An informal display of new equipment by manufacturers was held on Monday evening from 5:00 to 7:00 p.m. for the education of the Conference delegates.

REPORT OF THE FIFTY-EIGHTH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

MORNING SESSION—TUESDAY, JULY 24, 1973

(GEORGE L. JOHNSON, *Chairman*, Presiding)

Mr. J. I. Moore, North Carolina, the Conference Chaplain, delivered the invocation and led the delegates in the Pledge of Allegiance.

MEASURES FOR PROGRESS

by GEORGE L. JOHNSON, *Conference Chairman*, Director of Weights and Measures, Kentucky Department of Agriculture



As Chairman of the 58th National Conference on Weights and Measures, I take pleasure in welcoming you to Minnesota and to the opening of our General Conference Session.

In the twenty-six years that I have been Director of Weights and Measures in Kentucky, I have always respected the efforts of this Conference. I can honestly say, however, that until this year I never really realized the tremendous behind-the-scenes planning and coordination that goes into this annual meeting. I sincerely wish that every weights and measures official could experience a year as Chairman so that you too could gain an insight into what makes the Conference so vital to our profession.

Experiences during my year as Chairman, which I shall detail in a minute, ranged from the thrill of appearing before the Senate Foreign Relations Committee to the dubious honor of being marooned for a day and a half with Earl Prideaux, Bob Williams, and Sam Valtri of the Education Committee in Austin, Texas, during the worst ice storm in the history of Texas. I might add that the reason we decided to hold the Interim Education Committee meeting in Austin was because Bob Williams assured us that Washington weather in January is terrible. That is the last time an honest Kentuckian like me will listen to a Texan.

In reporting to you on the activities of my office, I would like to focus on several significant areas.

1. *OIML*: On August 3, 1972, I appeared before the Senate Foreign Relations Committee, requesting that membership of the United States in the *OIML* be approved. In addition to my testimony, there were speakers in support of *OIML* from the State Department, the Ameri-

can Petroleum Institute, and the Scale Manufacturers Association. On August 11, the Senate gave approval to our membership by a vote of 79-0. Subsequently, a National Committee has been established under the aegis of NBS to assist the U.S. delegation to OIML on matters to be discussed at the International Meeting. This spring Mr. Jim Lyles of Virginia was appointed by your Executive Committee to serve as the Conference's representative to the National Committee for a period of two years.

Our membership in this organization will contribute greatly to uniformity of laws and regulations by helping bring about harmonization of weights and measures laws among all nations. We must realize that ours is a shrinking world. As we expand our world trade to Russia or China or other countries, we should recognize that commercial equity becomes an international responsibility. I believe the National Conference on Weights and Measures can stand as an example of what OIML can be internationally.

2. *Metric Conversion*: A second major area of interest to the Conference is the conversion to the metric system. Last year, Senate Bill 2483 was passed which provides for a national conversion program. However, the Bill did not have time to clear the House of Representatives. At present there are thirteen pieces of legislation that have been introduced in Congress, with over fifty Congressmen cosigning the proposals.

I do not believe there is a question as to whether or not this country will convert but a question of when this will come about. In my travels I have found a great interest in the metric system and I believe the majority of people would welcome the decision to get on with the conversion. This country is very fortunate in having Dr. Richard W. Roberts, Director of the National Bureau of Standards, supporting the idea in an active manner. When this comes about, there is no doubt but that we, the weights and measures officials, will have a very important role in the conversion.

I hope you will take the time to visit the metric information display sponsored by the Committee on Education, Administration, and Consumer Affairs. It is an excellent assemblage of metric education materials and will give you some good ideas on how to answer the many inquiries you are probably receiving on the metric system.

I would like to now turn to the theme of this year's Conference, "Measures for Progress." Webster offers sixteen acceptable definitions for the word "measure." However, I think that there are three which are pertinent to this Conference and what we are attempting to do:

1. First, we can look at the word as meaning the act or process of measurement itself, which carries a technical connotation. Both industry and our public rightfully consider us their experts in the field of measurement. We must retain that reputation by remaining abreast

of the many advancements in the field of precision measurement. It was our thought in planning this Conference that we should offer information on new measurement systems handled by some of the most knowledgeable technical people in our country to promote our understanding of these innovations and their impact upon our daily programs. I think that in reviewing the program you will be able to see that we are accomplishing that end.

At the present time we are faced with many problems, such as the testing of moisture meters, the measurement of liquid fertilizer, the measurement of liquid agriculture feeds, in-motion weighing, timing devices, and a better method for the testing of odometers to mention just a few. We must work through the Conference and the Office of Weights and Measures to solve these measurement questions.

2. A second definition of the word "measure" carries a legal connotation. It refers to a legislative enactment, statute, or law. In this context we can very well consider the many model laws and regulations promulgated by this Conference as "Measures for Progress" in that they are vital to our mission of promoting uniformity in weights and measures enforcement in this country and, indeed, with membership in OIML, in the world.

3. Thirdly, we can use the word "measure" in terms of an instrument for measuring—not in a technical sense—but in a programmatic sense, as in measuring the effectiveness of our programs. We all know that it is becoming increasingly difficult to compete with other government agencies for program resources. Here again, we have attempted to focus in on the problem by bringing knowledgeable people to the Conference to discuss these matters. I am particularly delighted that this year the Conference will initiate its first Survey of Weights and Measures Administration. I urge all of you to lend your support to this effort.

I have given my "full measure" of effort over the past year to this Conference. It is now up to you to do the same. I hope you have studied your program announcement and are familiar with the tentative recommendations that have been made by your respective committees. I have seen these committees labor long and hard during this past year in order to reach the decisions and recommendations that they present to you here. It now becomes your responsibility and mine to take the final actions. I promise you a favorable working climate. All meetings will start precisely on time, order will be maintained and, hopefully, meetings will close on time. This is your Conference. Please take advantage of every program presented.

ADDRESS

by ROBERT W. CARLSON, Commissioner, Public Service Commission,
Minnesota Department of Public Service, Saint Paul, Minnesota



I bring you greetings from Minnesota's Governor Wendell Anderson, from Minnesota's great food and tourist industries, from Minnesota's Public Service Commission and, of course, from all of the citizens in this land of 15,000 lakes.

I bring you further greetings from the Department of Public Service and its employees, particularly from Warren Czaia and the good people in our Division of Weights and Measures who are very pleased to host this, your 58th National Conference. Truly, we are exceedingly happy that you are here.

Minnesota, you know, is a State of many records, far and beyond the subzero temperatures and the heavy snows that you may read about in your hometown papers. We are proud of our mining industry. Our lumbering industry ranks high in the nation. Minnesota is headquarters for many of the nation's great electronic and scientific space-age companies. Our medical centers are known throughout the world, and all of them are dependent upon precise weights and measures.

Tourism is second only to agriculture among our Minnesota industries, and we do hope that you can arrange to extend your stay long enough to journey northward into our northern lake country for post-convention rest and relaxation; or at least saunter along the beautiful downtown malls in either Minneapolis or St. Paul—a great place to watch our beautiful Minnesota girls.

Hopefully, you will intermingle a little bit of fun with your business conference. From looking at your program, you do have many important matters coming before your business sessions. From the program, it is obvious that yours is a very highly specialized and highly technical field of endeavor.

It is particularly interesting to note the wide range of agencies of both Federal and State governments involved in providing public assurance of proper weights and measures. Even more significant is the wide range of people who represent business and industry who are here, providing something of a partnership with governments in fulfilling not only statutory obligations of proper weights, but also meeting sound, basic business obligations to the people they serve.

In each State I am sure the responsibilities of each weights and measures agency differ to some degree. The story of the Minnesota

Weights and Measures Division really began back in 1867 when a farmer by the name of Oliver Kelly joined with six associates to form the Patrons of Husbandry, a forerunner of the National Grange which still exists today.

Behind lofty goals to provide education and social and cultural opportunities for farmers, the group's principal objective was to bring railroads under some regulation. Back in 1868 the railroads set the rates, set the prices paid for the grain, they set the storage rates, they weighed the grain that they received at the market and there was no appeal from any decision that they made.

In 1871 Minnesota's Governor Austin told the legislature, "Freight and elevator charges and grain weighing procedures practiced by some of our railroads are unjustifiable, extortionate and oppressive to the last degree."

The result was the establishment of a railroad commissioner, one of the first State regulatory bodies in the entire nation. Alonzo J. Edgerton, a railroad civil war general, was hired for the job for a two-year term, at a salary of \$3,000 plus \$1,000 for clerk hire, office rent and all other expenses. That is a total of \$2,000 per year. Just to show you how a bureaucracy grows, the current budget for the Department of Public Service is about four and a half million dollars (\$4,500,000).

At any rate, one unit that was established by that first commission was the Minnesota Weighing Department, which was charged with the responsibility of overseeing the weighing of grain. The Division gained statutory authority from the Legislature in August of 1885. It soon became apparent that weight supervision was no better than the scales over which the weights were taken. To make certain that scales were properly constructed and maintained, several scale inspectors were put to work. One of those scale experts, Mr. C. E. Niel, was the first head of the agency which is now so effectively managed by Warren Czaia and his staff. We have come a long way from the dubious weighing practices of the 1870's; and with the advent of the metric system closer at hand each day, your work becomes even more important.

Yet, public concern about matters of weights and measures is not new. The Law as given to Moses in the 19th Chapter of Leviticus speaks to the standards of measures and length or standards of weight and capacity. In Moses' interpretation of the Law for the people in the 25th Chapter of Deuteronomy, the moral issue of true and just weights is clearly set forth. During the reign of Ahk-haid, the High King of Ireland in 1200-1400 B.C., the judgment of Creedne (a body of laws dealing with fine scales of weights and measures) was promulgated. Creedne seems to be the first sealer of weights and measures in recorded history and there is still preserved part of a biographical narrative

relating to how he was drowned while returning to Ireland from Spain with precious ore.

Leo Ambrose, former Commission Secretary and now head of our Warehouse Division, who researched some of these items for me, says that Creedne's death by drowning is quite significant in showing that the first weights and measures official of which we have had any knowledge was not born to be hanged.

I know you folks have a full and busy program that is keyed, as your Chairman has said, to "Measures for Progress." I know it will be a meaningful session. I hope that you won't be like that long unemployed school teacher who finally received a job opportunity and appeared before the school board for an interview. The school board, a rather crusty lot, peppered him with all sorts of questions, and merely stared back to each one of his answers. This lad desperately wanted this job. The longer the interview went, the more stone-faced the members of the board became. Finally, one board member said to him, "Young man, do you believe that the world is round or is it flat?" The young teacher hesitated for just a moment and then said, "Sir, I suggest the school board take a vote. I am prepared to teach it either way."

Those of you in this association are not, I am sure, in that position. I can just see the attitudes and the moods of the people will result in positive ideas that are going to be very meaningful to all of us. Those of us who are associated with matters that relate to the assurance of proper weights and measures to the people do recognize the importance of your work. Toward that end, it is very definitely your responsibility as part of this Conference and in your daily work to guide State Legislatures, the Congress, the State and the Federal agencies, and guide those of us in public office toward realistic programs and policies that keep us abreast of the times. There is need to explain your work, your tools and your activities in order to gain public support and public understanding. With your guidance, the services of government need not be, as they have been many times in the past, a day late and a dollar short of the needs and demands of the public.

Back in 1887 the public vociferously expressed intolerance of grain weighing practices here in Minnesota. Each year since that time, it is very likely that in Minnesota's as well as in the States that you reside, new technologies, new skills, new efforts and partner relationships between government agencies, industry and the public, have given us the very critical and highly effective standards of weights and measures that we know and benefit from today.

On behalf of Governor Anderson, my fellow commissioners, former Governor Carl Rolvaag (our Chairman), and Commissioner Ron Anderson, and more particularly on behalf of the citizens of the State of Minnesota, we thank you for your good work. We thank you, too, for this opportunity to be here for these few minutes. I know it is

going to be a stimulating and worthwhile session. We wish you well in all of your important endeavors at this Conference. Thanks sincerely for your contribution, for what I sincerely believe to be one of the vital people services of government and industry in assuring effective, accurate weights and measures. "Measures for Progress" is appropriately your theme.

ADDRESS OF THE CONFERENCE PRESIDENT

by DR. RICHARD W. ROBERTS, *Director, National Bureau of Standards*



It is a pleasure to be making my first appearance before you as your Conference President. I must admit that I was unaware of this honor when I accepted the position as Director of the National Bureau of Standards.

One of the first things I heard about when I joined NBS was the Office of Weights and Measures, and attending this Conference is an important part of my orientation as a new Director. Although when I told someone that I was on my way to Minneapolis for total immer-

sion they thought I was appearing at the Aquatennial.

I have found the history of weights and measures fascinating. I think most of you know that at the turn of the century there were five legal definitions of the foot in the Borough of Brooklyn. Trying to be a sprightly conversationalist at a party one night, I mentioned this to someone. He happened to be a baseball fan and was unimpressed. He said that when the Dodgers were there they once had six different feet all on third base.

Seriously, I am impressed by the purposes of the National Conference on Weights and Measures and even more impressed by the way you have accomplished your purposes over the years. I was reminded, when I began to learn about you, of a line from "A Man for All Seasons." In that play, a boatman says of the fares fixed by law for transporting people on the river, "Chelsea to Hampton downstream a penny ha'penny, Hampton to Chelsea upstream a penny ha'penny; whoever makes the regulations doesn't row a boat."

I think it is true in virtually all fields. The men who make regulations and the men who enforce them are not the ones who row the boats. It is true in your field too. But here in this room together are men who make regulations, men who enforce them and the men who row. There is more communication among those groups in weights and measures administration than in any other field I know.

NBS Directors have taken various views of what to tell the Con-

ference in this ritual appearance. I would like to propose some new ideas to you.

Before I begin to talk of new ideas, let me assure you that I am well aware of the traditional needs of the weights and measures community, and of the National Bureau of Standards' traditional role in meeting those needs. Bud Wollin and Karl Willenbrock will get a sympathetic hearing from me in any effort to improve the Bureau's support of your work.

But, as a neophyte member here, I have the natural prerogative of making some suggestions of ways in which the Conference and the Bureau might improve the lot of the working weights and measures man. For example, I think it would be worthwhile for the Conference to develop a comprehensive blueprint for building an effective weights and measures enforcement program. Already there exist many basic tools that the Conference has developed. The model laws and handbooks 44 and 67 are essential to your everyday work. But there is no similar reference to guide the weights and measures supervisor in planning his operating program.

I can see some other ways that NBS could aid you in formulating and implementing your weights and measures programs at the state and local levels.

I think we could increase our assistance to you in five areas. First, there is a critical need for an overall look at the resources that you currently expend on weights and measures enforcement. To my knowledge, the Bureau has never attempted to document the total weights and measures effort in this country. Such information is crucial to us if we are to meet your needs. It is also vital to you in your own attempts to evaluate program efforts and to secure additional program resources. To this end, the Office of Weights and Measures recently forwarded to the states survey questionnaires designed to provide us with the first complete census of weights and measures officials. I urge that each one of you give careful attention to the census. It is the first step of a planned national survey covering all facets of weights and measures administration.

This effort is another example of our mutual cooperation. The Conference provided the leadership and the impetus to get this survey underway; NBS is supplying the expertise and follow-through necessary to bring this information together.

Second, it is important that we work together in the development of performance criteria with which you can measure your program output. It is difficult to comprehend how you or I can increase our program resources until we can demonstrate the importance and usefulness of what we are doing. The Office of Weights and Measures has made some important progress in finding ways for you to make such

evaluations. Two speeches later in the Conference will detail these efforts for you.

Third, keeping abreast of changing market conditions and changes in weighing and measuring devices and systems necessitates a continuing education program. You must look to sharing that responsibility with us by developing or expanding your own in-house training capability. We, in turn, can step up efforts to generate training materials and visual aids that can greatly assist you in this training effort. We will also continue to conduct training in jurisdictions as necessary as part of our ongoing education program.

Fourth, I am also aware that there are pressing engineering problems relating to commercial measurement being faced in most state and local jurisdictions. New technological developments such as the computerized checkstand weighing system or the electronic railway in-motion weighing system pose measurement problems that must be resolved. These are not the only measurement problems you face. There is currently no moisture measuring device on the market that can be depended upon to give accurate results at all times. The result is that there is no efficient method for testing grain moisture meters. Also, there is a need for solving similar problems in meters used to measure liquid feeds. This has been a long-standing problem and we are placing high priority on its solution.

Last, many of you would like to update your programs through revision to existing laws, regulations, and operating procedures. Many of these changes require some assistance, either through the analysis of existing laws and regulations or through appearance by experts before legislative hearings. The Bureau is willing to provide whatever assistance the Office of Weights and Measures can give.

Of course, I realize that new ideas usually have a price. One of my main interests will be to work with our Institute for Applied Technology to develop optimum allocations of their resources for the solution of these problems. I know that the National Conference will do its best to carry out its share of the effort. I think we can make progress if we will all think progressively.

Before presenting one more new idea, let me digress a minute on the interpretation of words. Men are too often confined by the way they explain the words used to explain their responsibilities. For example, I think the Department of Commerce, because of a misinterpretation of the word commerce, is known as the agency of business. But commerce is not synonymous with business. Commerce is an ecology, a tenuous balance of manufacturers, entrepreneurs, wholesalers, retailers, and consumers. No one part of that ecology is more important than the others; no part is more worthy of representation than the others; it is the balance that represents the health of commerce.

So it is up to the Department of Commerce to see that equity pre-

vails in this delicate ecology. And that brings me to the function of the weights and measures official. Your function depends as much on the definition of the word equity as the function of my Department depends on the definition of commerce. The last thought I would like to leave you would be an expanded idea of what equity in the marketplace is. I think you will find out that the times demand a new definition and that you will eventually have to accept it. If you begin thinking about it now, you will be that far ahead.

Equity. I have heard it said that a weights and measures official cannot assure equity in the marketplace by being neutral. Neutrality actually is bias against the consumer, because he is the most powerless participant. That concept jarred my thinking and I began to reconsider my own definitions of equity.

It occurred to me: Doesn't real equity require that the consumer have safe products? Doesn't real equity require that the consumer be protected from environmental pollution? Doesn't real equity demand that the consumer be protected against power and energy shortages?

I think so. And I think it is important for the weights and measures official to become an activist in these areas. You will not necessarily have direct responsibility. In most cases the State and local agencies which look after these matters are separate from the weights and measures operation. But you must be prepared to provide measurement support to them just as we at NBS are gearing up to help them.

In some cases you may have direct responsibility. I understand that one county in California has its weights and measures people checking noise pollution. Certainly you are into public safety when you check the accuracy of a service station air tower.

For the most part, you must play a supporting role, as you do in so many areas. But as State and local efforts expand rapidly in these fields, you must gear up to provide necessary services. If you do not have the broad view of equity and your responsibilities it is possible you will not be ready when the call comes.

At NBS we have seen this effect—this increased emphasis on consumer rights in the marketplace—and I think we have done a good job of staying with the trends. You are all familiar with your fair packaging program, and many of you have been an integral part of it.

But beyond this, consider product safety. NBS has been a leader for years in the determination of fabric flammability. The flammable fabrics laws grow stricter all the time as the Congress responds to the people's demand for protection. NBS has worked hard to keep the technical base for enforcing the laws up to the increasing levels of stringency.

It is not an easy job. It has been said that we know more about the surface of the moon than we know about why and how things burn. One of our fire scientists said that the reason there are more nuclear

physicists than combustion physicists is that nuclear physics is easier.

Also in product safety, consider the project NBS has been conducting to develop ways for measuring the danger of sharp points and edges in children's toys. Several simple and portable devices have been developed to enable inspectors in the field to aid manufacturers in assuring the safety of products.

The point is this: How many of you are familiar with measurement problems in fabric flammability or in sharp points and edges on toys? I think you should be. I think you should not only be ready to help other state and local officials with such problems, I think you should be seeking them out and telling them that you can help them. That is what I mean by taking an activist role in assuring equity.

I could easily turn this into an NBS commercial by listing all the measurement technology we are developing to combat air, water, and noise pollution and the like, but time does not permit. I could run down the list of things we are doing to aid in energy conservation. Incidentally, I think I will mention one of those. We are developing a voluntary labeling system for declaring the energy requirements of major household appliances. This system would enable consumers to select the most efficient appliances and thereby encourage manufacturers to produce more efficient appliances. Now I don't think I need to emphasize to this audience the measurement requirements for developing and operating any labeling system. What I want to emphasize is that I suspect very few of you are aware of this new program or equipped to aid local industries on it if you are requested to do so.

So this is my message. Equity is a very comprehensive and very complex concept. I think that we have not fully appreciated it and that we have not fully prepared for it. If the public demands for real equity are not to descend on your heads unexpected and unwanted, you must understand the full concept of equity and take positive action to meet it.

I pledge that the National Bureau of Standards will provide you full access to its work in all fields of public concern. I ask only that you begin to look at what it is that the public really wants from the marketplace and then to see to it that you are prepared to help them achieve it. If you can accomplish this, then equity will indeed prevail.

It is now my privilege to announce the appointment of individuals to serve on the four Conference standing committees. I am sure you are well aware how important the work and accomplishments of these committees are to the success of the Conference and to weights and measures administration throughout the nation.

In behalf of the Conference, I would like to express my sincere appreciation to all committee members for their valuable contributions over the year. To outgoing committee members I offer my special thanks for their loyal service to the Conference.

The appointment of new committee members is as follows:

Committee on Specifications and Tolerances:

Mr. Marion L. Kinlaw, Supervisor of Weights and Measures, North Carolina Department of Agriculture, is appointed for a five-year term to replace Mr. John C. Mays whose term is expiring.

Committee on Laws and Regulations:

Mr. Charles H. Vincent, Assistant Director, Department of Consumer Affairs, City of Dallas, Texas, is appointed for a five-year term to replace Mr. M. R. Dettler whose term is expiring.

Mr. John L. O'Neill, State Sealer of Weights and Measures, Kansas Board of Agriculture, is appointed for a four-year term to replace Mr. Mike Dennis who has found it necessary to resign from the Committee.

Committee on Education, Administration, and Consumer Affairs:

Mr. W. B. Harper, Chief Inspector of Weights and Measures, City of Birmingham, Alabama, is appointed for a five-year term to replace Mr. George E. Mattimoe whose term is expiring.

Committee on Liaison with the Federal Government:

Mr. Edward H. Stadolnik, Head Administrative Assistant, Division of Standards, Massachusetts Executive Office of Consumer Affairs, is appointed for a five-year term to replace Mr. Moe Greenspan whose term is expiring.

In closing, let me point out that as program managers we face common resource problems. There never will be enough funding to permit full scale attacks on all of our problems. In response, you must identify those problems that are most pressing, and we at NBS must arrange our priorities to ensure optimum interaction with you in seeking solutions. In this way we shall jointly contribute—as we have for nearly 70 years—to the achievement of true and total equity.

PRESENTATION OF HONOR AWARDS

Dr. Roberts presented Honor Awards to members of the Conference who, by attending the 57th Conference in 1972, reached one of the five attendance categories for which recognition is made—attendance at 10, 15, 20, 25, or 30 meetings.

Award Recipients

20 Years

C. E. JOYCE	Pillsbury Company
W. I. THOMPSON	Monmouth County, New Jersey
E. F. WEHMANN	Neptune Meter Company

15 Years

J. R. BIRD	New Jersey
M. E. BONE	Hobart Manufacturing Company
R. J. CORD	Prince George's County, Maryland
L. L. ELLIOTT	Everett, Massachusetts
E. C. KARP	Sanitary Scale Company
B. C. KEYSAR	National Bureau of Standards
F. W. LOVE	Dresser Industries
H. D. ROBINSON	Maine

10 Years

L. H. DEGRANGE	Maryland
G. HOPPER	Procter & Gamble Company
C. G. JOHNSON	Western Weighing & Inspection Bur.
D. E. KONSOER	Wisconsin
D. R. MACKAY	Food & Drug Administration
F. H. MEWHINNEY	Millers National Federation
J. F. SPEER	Milk Industry Foundation
T. M. STABLER	National Bureau of Standards
M. W. STEPHENS	Department of Agriculture
J. D. WALTON	Dallas, Texas

ADDRESS

by the Honorable KARL E. BAKKE, Acting General Counsel, U.S.
Department of Commerce



Representing the Department of Commerce, which is charged with promoting and encouraging our profit-motivated, private enterprise system, I always enjoy speaking to the scientists and technologists who have had so much to do with making this American economic system work so well.

The subject of my speech today is "Economic Policy of the Federal Government." To cover such broad terrain in a limited amount of time is a weighty responsibility—I know—and my hope to accomplish it results in part from my blind faith in Mark Twain's maxim: "Modesty is a vastly overrated virtue."

In part, too, my hope is justified by the fact that I have chosen to focus principally on that part of federal policy dealing with international economic matters since this area is such an important part of the Administration's economic policy at this time. The Trade Reform Act, multinational negotiations on textiles, a new era of commercial relations with the Soviet Union and with the Peoples Republic of China, the move toward conversion to the metric system of weights and measures and toward establishing international engineering standards, and a number of other significant initiatives in international economic policy have been—or are about to be—set in motion. The timing of these initiatives is a function, in large measure, of economic necessity. But their success will depend much upon the climate—or attitudes—of business leaders in this country and upon the ability of our science and technology to rise to the great challenge of increasing simultaneously both the productivity of our industry and the quality of the goods produced by that industry in order for America to maintain a competitive position in the world market. An oar is useless if no one pulls it.

Therefore, my theme today is that you in commercial science and technology, and within government whose concern is business, must be thinking internationally.

When I refer to "thinking internationally," I mean a realization of global interdependence, including our dependence on other nations. This will be a profound change from the habits of thought many of us have fallen into as a legacy of our early history as a nation.

And this is not simply the way I or others might believe things should be—this is the way things are, whether we like it or not. America can no longer be isolationist, either economically or politi-

cally. We're living internationally right now, and so we must be thinking internationally, too.

America is currently faced with many situations illustrating vividly why we must make this transition to thinking internationally. Not the least of these is the dependence upon imported petroleum for a good part of the energy needs of our nation. The textile and shoe industries, to take two more examples, have known for years that modern business is international business. In these and other industries, competition has been strongly affected by imports, technological advances of foreign firms, and the policies of foreign governments as well as our own. I should also mention tourism, trade with Canada, international banking, fishing and other commercial relationships that exemplify the nexus of international economics and federal policy in matters of particular importance to the American business community.

I. An Historical Perspective

Discovery Period

From the historical perspective, one thing we can say with certainty is that America was *discovered* by people who were thinking internationally. Whether you credit the discovery of America to Columbus or, as I would prefer from pride of ancestry, to Lief the Lucky, son of Eric the Red, we know that the first Europeans to reach our West Hemisphere shores were not motivated primarily by a sense of adventure, but by a desire for increased trade and commerce.

Columbus, in particular, was looking for trade routes to the Orient, not for America. He came here thinking internationally. As historian Samuel Eliot Morison has said:

"America was discovered accidentally by a great seaman who was looking for something else; when discovered, it was not wanted; and most of the exploration for the next fifty years was done in the hope of getting through or around it. . . . History is like that, very chancy."

One cannot help but note that many of you might cite technological discoveries which might indicate that science, too, "is like that, very chancy."

Colonial and Post-Revolutionary Periods

Those who came to our shores after Columbus were also thinking and living internationally. Throughout the colonial period and after the Revolution, lively trade both among growing east coast cities and across the Atlantic was a basic fabric of the new world existence. It was international in the sense of acknowledged interdependence.

This internationalism of the early American economy was built on necessity. We were not at that time a self-sufficient nation, and we were largely barred by the mountains, and by proclamation of the English Parliament, from proceeding beyond the coastal areas to the

great American frontier. A lively commerce had to be international commerce, so we started out thinking internationally.

America Turns Inward

We are all familiar with George Washington's dictum, "Tis our true policy to steer clear of permanent alliances, with any portion of the foreign world." This manifesto has been cited ever since to support isolationist political and economic arguments. I suggest that the Father of our Country has been badly used in this interpretation. In more modern terms, I think a fair rendering would be that nonalignment in international political affairs is essential for a small, new nation. This is far different from international isolationism.

The necessity of our new nation to trade, and the substantial help we received from others in obtaining our independence, belie a "go it alone" attitude or policy, either politically or economically.

However, as time passed, a strain of isolationism did develop in the United States—not so much from conscious choice. I believe, as from historical circumstance. The Louisiana Purchase and the opening up of the west turned us away from thinking internationally, because so much of our energy was directed toward our own magnificent domestic challenges. The "Manifest Destiny" to build America kept us thinking about ourselves through the Mexican War and the annexation of vast areas in the far west. We had the great American frontier to conquer—we had additional resources to exploit, and new markets to develop, right here at home. Then the Civil War, Reconstruction, and our own industrial and technological revolution kept our attention focused largely inward. Overall, our trade and political relations with other countries had become less important to us at this point in time.

Twentieth Century

This attitude of looking inward has, I believe, persisted for most Americans until very recently—and for many it still persists. Not even our involvement in two World Wars was sufficient to waken us fully as a nation to the need to begin thinking internationally again.

Since 1945, the thinking we have done about the world has, for the most part, not been on the basis of the recognized mutual interdependence which I would regard as international thinking. Instead, it has been based upon missionary zeal and a somewhat disingenuous faith in a cornucopia of economic resources, which allowed us to assist others from our own pockets to the extent of about \$150 billion. This has been commendable, but not what I would call thinking internationally—at least not realistic international thinking.

Let me point out some aspects of our generally held attitudes since the Second World War:

First, we have rested comfortably on our military superiority.

Second, notwithstanding the concern of the 50's, we have been basically impervious to foreign influence on our domestic political institutions, a luxury many nations have not enjoyed.

Third, we have allowed ourselves to believe that our superiority in international economic competition was unalterable.

Fourth, we have believed our resources are limitless—or at least have conveniently overlooked the limitations.

Fifth, as a result of our beliefs about our economic technological strength, we have not focused on improving our productivity, competitive position, and generally our own “plant” relative to the progress being made by others.

Sixth, we have not really thought through world security and economic arrangements in a world where developments in Japan and Western Europe have changed the basic facts of international relations.

Seventh, we have assumed the continued viability of old world trade and monetary systems.

Eighth, our substantial international involvement has been political—motivated by an admixture of moral, ethical, and security considerations—not a perceived economic dependence by us on others. We have basically seen ourselves as free agents to be involved or not to be involved—as we choose. In short, we have not had a sense of what I might call the international imperative.

II. A Practical Perspective: Where Do We Stand?

With that perhaps overly simplified view of our attitudes since World War II, let us consider the practical perspective of the present day.

Energy

If there is one issue that illustrates the new era in which we are internationally dependent, it is energy. To maintain and improve our standards of living, we need energy. And we must import to satisfy our energy demands for the foreseeable future.

Let me quantify the international implications of the energy problem for you. Based on estimates of United States energy demands, I am told that our projected trade deficit in energy could be in the range of 15 billion to 21 billion dollars by 1980. That is only six and one-half years away. The bulk of our energy imports will be crude oil, and most of it will come from a handful of Middle Eastern and African countries. To put this in perspective for you, these imports would be on the order of seven times the 2.5 billion dollars worth of energy we were importing annually at the beginning of this decade.

To pay for increased imports of anything even approaching this size, we must obviously increase our exports even more substantially.

This requires a new competitiveness and international perspective. We must have a desirable currency, and products which are desired and competitively priced abroad. Repeated dollar devaluations are not a desirable long-term answer, because devaluation cheapens the value of our labor and resources.

The energy issue has another facet which displays the need for thinking internationally. Western Europe and Japan will also find themselves in an energy deficit position. Western Europe's projected energy trade deficit could be in the range of from 20 billion to 26 billion dollars by 1980, a substantial increase from its net 8.5 billion of energy imports in 1970; and Japan is expected to experience an energy deficit of from 9 billion to 15 billion dollars, three to five times larger than in 1970.

Thus, the United States, Europe, and Japan might face an aggregate energy trade deficit of from 44 billion to 62 billion dollars by 1980. If this occurs without prior planning for its effects, it will have a severely traumatic impact on both the international economic and the political status of all parties involved. The major deficit countries could find themselves forced to engage in a wild and savage scramble, not only for energy but for external earnings to pay their energy bills.

The dimensions of the energy crisis also, therefore, pose a special challenge to the technologists of all the industrial nations to make more efficient use of current energy sources and—if possible—to discover and develop new sources. The ever-expanding needs for energy sources in a rapidly developing technological world underlines the necessity for international cooperation and exchange of energy sources, technology, and information.

I submit that the energy issue is not subject entirely to our internal resolution. This issue forces us, for perhaps the first time in recent history, to realize that we are economically and politically dependent on others for a vital ingredient of our society and lives. Put another way, energy requirements destroy even the possibility of economic and political isolationism for the foreseeable future.

I also submit for your consideration that when this fact becomes part of our working knowledge and part of the general consciousness of the United States, the consequences will be enormous for our position in world politics and economics, for our domestic affairs, and indeed, for our national psyche.

International Prices

Another facet of our necessary internationalism is the growing awareness that many prices, particularly of commodities, are international.

We all see public reactions, for instance, to high meat prices. The public is also aware of increased grain prices. We berate our public officials about this. The plain fact is that these prices merely reflect

international prices. For example, from December 1971 to December 1972, consumer prices for food rose by 4.8 percent in the United States. In France, the comparable increase was 8.7 percent, in Italy 8.4 percent, in Germany 8.0 percent, in Great Britain 7.9 percent and in Canada 7.7 percent. Thus, the food price phenomenon is worldwide. There is substantial growth in demand as a result of unparalleled consumer prosperity, not only in the United States, but also in Europe and Japan. As the greatest food producing nation in the world, we can benefit from this demand. But, the world demand has had, and will have, a great effect on our domestic lives, whether we like it or not.

The same is true of many other industrial and agricultural commodities which we as a nation buy or sell. As other nations in the world industrialize and prosper, they will demand—as we have done—more food and more and better technological progress. This increased worldwide demand must affect product availability here as well as abroad. Only redoubled efforts to increase productivity while holding down cost, to conserve and use wisely the world's irreplaceable resources, and to prevent the unwanted side effects of massive technology, will help to alleviate the resulting situation. Nothing can prevent it entirely.

Auto Pollution Controls

Let me give another example. We are told in order to clean up automobile emissions, we probably must use catalytic converters. However, these depend upon palladium and platinum—which are not attainable here. Thus, we must look internationally. We have no choice if we must use these sources. And how much graver will the problem be when the automobile is as common in all the world's nations as it now is in America, Europe, and Japan? We already see auto and industrial pollutants traveling over international boundaries, and again this situation cannot but increase.

In short, United States economic dependence on others will inevitably increase rather than decrease.

The Options

Given the realities of the situation, I believe we shall return to true international thinking. The real question is not whether or not we shall, but whether we do it constructively or masochistically.

I suggest that the masochistic approach would be an attempt to return to the high tariff, tight-quota days of Smoot-Hawley: A foot dragging approach, which refuses to accept the facts and blames politicians whenever international events impinge on domestic affairs. In the long run, this will not work. It is somewhat akin to playing the economic ostrich game and hiding our collective heads in the sand. But, proving it will not work through bitter experience would be excruciatingly painful.

On the other hand, the constructive approach would be to recognize the prime facts, and to create policies that accommodate these facts and which work to our advantage. This requires negotiating with other nations. And, as all businessmen and statesmen—even as all “armchair quarterbacks” who follow the off-season professional football trades—know, any negotiations in which just one side gains is, in the long run, a bad deal for all. Another thing we all know is that mutual advantage in negotiations is possible and desirable. Therefore, we must give and take to mutual advantage on the international front.

Let me review for you briefly some of the primary facts of the new international scene.

Reconstruction of Western Europe and Japan

For one thing, Europe and Japan have clearly come of economic and technological age. They, no less than we, must accept the facts. Desires to run constant large trades and payments surpluses for selfish advantage are not realistic. Desires to turn inward behind trade barriers are not realistic. Facing security problems affecting all is a necessity.

A second significant factor for us is the United States trade deficits for 1971 and 1972, unprecedented in this century after 70 years of trade surpluses. These have forced us into successive currency devaluations. To me, this clearly speaks of loss of American competitiveness. Also, as Robert Cairns, then Commerce Department Deputy Assistant Secretary for Science and Technology, pointed out to this conference last year:

“ . . . The old assumptions about the superiority of the United States technology are in serious question . . . The most critical and immediate problem for technology facing us today is that the United States is losing its dominant position in the markets of the world. . . . American productivity in its industrial output, quality, and quantity, and in the service sector of our economy in particular, is woefully weak and being challenged by a number of nations we helped put back in business after World War II.”

To avoid further large trade deficits and further currency devaluations will require a greater international trade involvement. In 1971, American business exported 14 percent of its goods produced—considerably less than our major trading partners. For example, Japan exported 34 percent of goods produced, West Germany 35 percent, the United Kingdom 52 percent, and Canada 56 percent.

Compare rates of export growth in the decade of the 1960's. This is a recent, reasonably long period whose base year—1960—involves fewer distortions than earlier years. The results of the comparison are not encouraging. During this period United States exports of manufactured goods increased by 110 percent, but those of West Germany doubled and Japanese exports rose by 400 percent. Of the other major

industrialized countries of the world, only the exports of the United Kingdom showed less growth than we did.

Our relative trade position has also been declining. The six members of the European Community, and Japan, have registered the biggest gains. The European Community has become the largest trading area in the world. As for Japan, its share of world output and exports has risen in 20 years from about one to six percent, and its domestic economy has grown at over 10 percent per year in real terms. This is by far the most dramatic rate of economic progress in the world.

New Relationships with the East

With Japan and Western Europe at the fore as strong economic factors, another facet of the world economy is beginning to be important for us. We have created, and reached through, cracks in the iron curtain to build new relationships and trade opportunities with countries we have heretofore regarded as adversaries. This has been a monumental accomplishment on President Nixon's part.

Significant advances have been made in our relationship with the Soviet Union, built on a careful foundation of prior negotiations. In the area of trade alone, within the last year the United States and the Soviet Union have signed a Grain Credit Agreement, a Maritime Agreement, a general Trade Agreement, and an agreement to make Eximbank credits available for U.S. exports.

In addition, efforts are being made to increase trade relations with Poland, Bulgaria, Romania, Czechoslovakia, and Hungary.

Of potentially large, but of longer range, significance we are also moving toward the development of a commercial follow-up to President Nixon's visit to China. Business executives have established the National Council for United States-China Trade, for persons who are interested in exploring the possibilities of profitable trade with China.

Constructive International Involvement

Certainly, our developing trade relations with the Eastern Bloc and the Peoples Republic of China are a constructive approach to our new internationalism. This is a realistic policy, geared to an international world. Another example, is President Nixon's Trade Bill. This proposal has the flexibility necessary for us to negotiate from strength and to keep trade walls from being built. The major proposals of the Trade Bill are designed to furnish the President with broad, flexible authority in order to negotiate the lowering of tariff barriers intrinsic to a more open and equitable trading system.

There are also other significant, but less publicized, examples of constructive international thinking. Two of these instances are directly related to the work of this conference. One is the proposal to convert to a predominantly metric system of weights and measures. The other is the fostering of our participation in international standards-setting

activities. These standards can affect billions of dollars a year of our export trade. American commercial technologists and scientists should be deeply interested in such activities and committed to understanding the proposals and to communicating to businessmen and legislators their implications, should they be adopted. Your Committees on Education, Administration, and Consumer Affairs and on Liaison with the Federal Government refer in their Tentative Reports to this Conference the need for your organization to be both informed of and involved in the problems, especially of metrication.

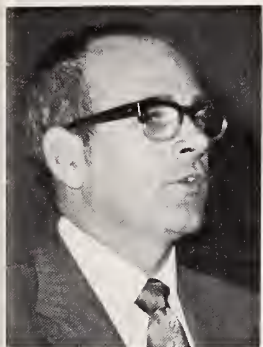
III. Conclusion

The major countries of the world are in an era of relationships in which trade and commerce are increasingly important. This means that American businessmen as well as the scientists and technologists upon whom they have always depended to help them maintain America's superior competitive position as a trade nation, will be thrust even more into international roles. This will also put all of you into the forefront of encouraging international thinking. It will take some time—and there will be some pain and anguish along the way—before thinking international becomes a habit with Americans generally. But, businessmen and business technology can help to minimize the pain and to maximize the benefits of this process for the United States, by becoming missionaries of the new faith and by demonstrating, where it counts—on the bottom line—that it works.

One of the most outstanding aspects of America's almost 200 years as an independent nation has been her ability not only to survive, but to thrive upon, crisis. The source of this strength has largely been the healthy streak of pragmatism which makes her free enterprise system such a viable one. Like a cat, she has always seemed to be able to land on her feet by operating on the principle that—in matters economic—what works is right. With their scientific dedication to the constant empirical testing of theories and procedure and their willingness to discard those which are disproven or become outmoded, the technological community which you represent is uniquely qualified to play a leadership role in this country's transition from essentially domestic to thoroughly international thinking in the economic arena. It is not an overstatement to say that our economic survival may very well depend upon our ability, as a nation, to make such a transition.

GREETINGS FROM AUSTRALIA

by JAMES A. SERVIN, Warden of Standards,
Department of Lands, Standards, Weights and Measures Branch,
Adelaide, Australia



There are a few things I would like to say. First of all when I was asked if I cared to say something this morning, I was reminded very much of a story that I read several years ago. It concerned a church secretary in a little church in Glasgow, where the minister of the church was suddenly taken ill. The minister's wife asked the secretary if he would preach the morning service. The secretary, who had never done that before, stood up in the pulpit and wondered what to say. He suddenly realized that above

his head was a stained glass window with a portion of it broken. In place of the broken glass was a piece of cardboard. So, pointing to the glass window above his head he said to the congregation, "See that window up there? See that piece of cardboard? The cardboard is not a pane of glass, it is a substitute; and so am I this morning, our minister is very ill."

After the service, as he was shaking hands with everyone, one of the dear old ladies came up to him and said, "Son, you are no substitute, you are a real pain."

Well, I hope that I will not be a real pain this morning. Yes, I thought that I might be. I might add, in all honesty, that the same situation, not the bit about being called a real pain, but the same situation did happen to me. I do not know if any of you have ever been a church secretary, or if you have ever had a phone call at eight o'clock at night and lifted up the phone and heard a croaky voice say, "Jim, I cannot preach. Would you take the service tomorrow morning?" It is a wonderful feeling.

I would be failing in my duty if I did not bring you three greetings, particularly after the very fine welcome that you had this morning from Commissioner Carlson of the State of Minnesota. The first greeting I must bring you is from a man who is a friend of many of you here. He has attended your Conference; he has addressed you. I refer to my good friend, Addie Van Male, the Chief Director of the Dutch Service of Metrology and the President of the International Organization of Legal Metrology (OIML). When he knew that I was coming here, he asked me to bring a greeting to this meeting if it was at all possible, and so I must do that. He very much remembers his visit to the United States and his addressing your Conference.

Secondly, after hearing that this is the Land of the North Star, I would be failing in my duty as an Australian if I did not bring you a greeting from the Land of the Southern Cross, which is the greatest constellation under heaven.

Thirdly, after hearing the greeting from the Land of the 15,000 Lakes, I would be failing in my duty if I did not bring you a greeting from a land which could be described as the Land of One Thousand Dry Lakes, but which is unique for two reasons. First, South Australia, the state from which I come, is the driest state on the driest continent on Earth. Secondly, it is unique for another reason. It has a place in history because it gave to all people the secret ballot which we all use in our election processes. So, I must bring you a greeting from my own home state.

The members of my organization were very thrilled when they found out their Warden was going to visit around the world. It has been 97 years since the last Warden went overseas. They all thought it was about time one went again, and all wanted to form a queue to be the "bag" carrier.

Also, it seems the custom this morning that someone mentions a bit of scripture. The Scripture Verse in connection with weights and measures that I like most of all is not the verse in the Old Testament that refers to weights and measures, but a verse in one of the Gospels. I must confess I cannot remember whether it was Mark, Luke or John, but anyway to paraphrase the verse: "Give and it shall be given unto you. With what measure you measure to others that same measure will be used to measure unto you." It is one that needs a lot of thought in our transactions with other people.

The purpose of my visit around the world has been to see how weighing and measuring is being done in other countries and to see how it compares with what we do. Probably most important, as far as I am personally concerned, is to look at what new approaches there are in weights and measures because ours is a very conventional weights and measures program. We would spend, I suppose like many of you, 80 percent of our manpower to see that the instrument is correct to the nth degree, and 20 percent of our manpower to see that the people get what they pay for. I am not convinced that is the best way.

In going around the world, I have visited Germany, Holland, Denmark, the United Kingdom, and this fair land. I have yet to visit Canada and then come back and visit Mr. Watson in California.

It seems to me in going around the world that weights and measures generally falls into one of three categories, and I am going to try to tie this in with your motto.

As you go around the world and you ask not only the weights and measures organizations, but the business people and the people on the street, what they think of their weights and measures, it seems to me

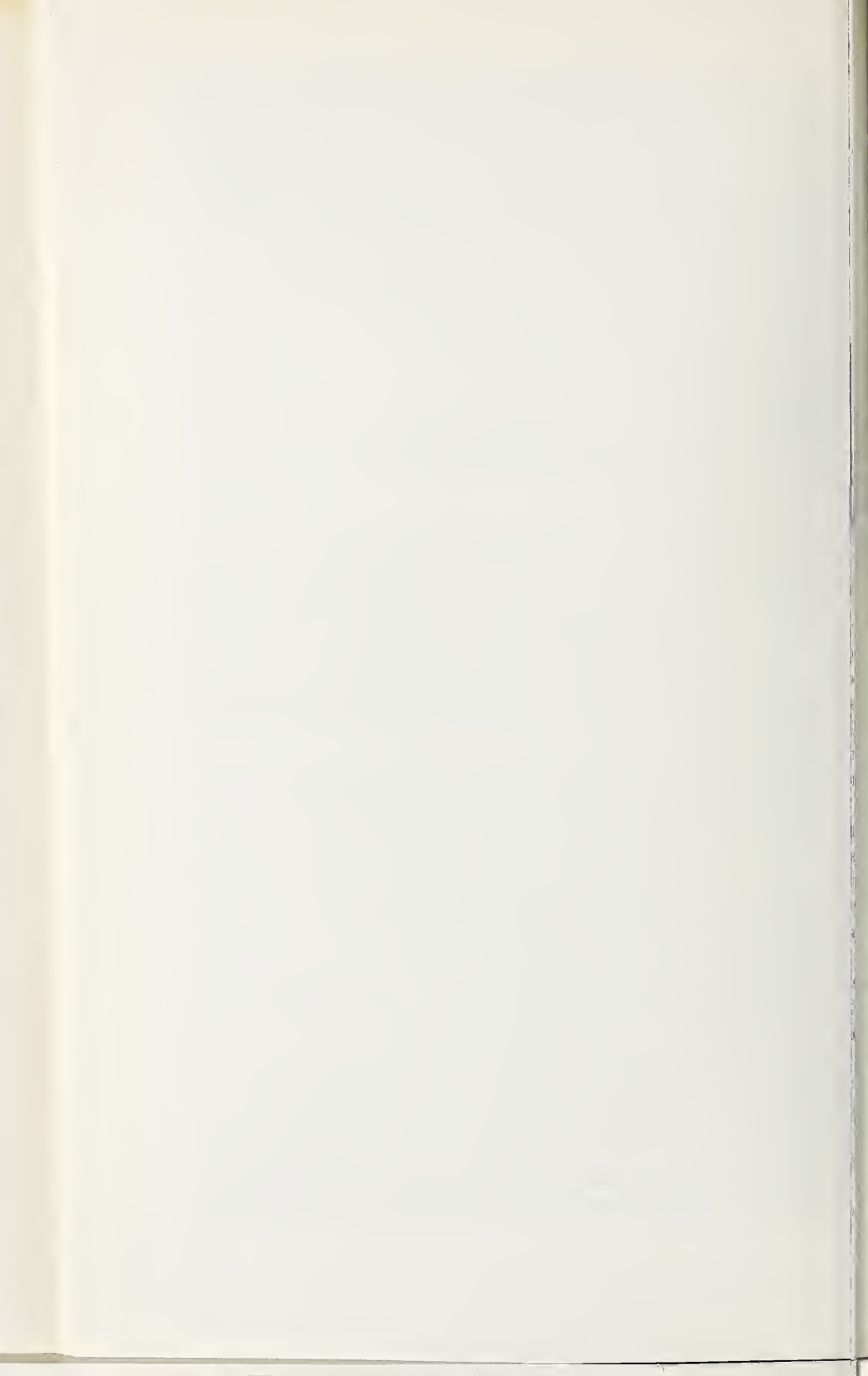
that their views fall into one of three categories. Either the business people think of the weights and measures administration as a laugh, because it never does anything but worry them—you find in these countries that the man in the street does not even know there is such a thing as a weights and measures organization—or you can go to the other extreme and go to a country where, if you mention weights and measures to a businessman, he starts to shudder, I mean literally starts to shudder. He fears his weights and measures organization.

If you talk to the man in the street in these countries, he knows the Weights and Measures Department exists. He looks on it as sort of a “father confessor,” someone that he could come to with all of his problems, and he expects to get service. To me, that type of weights and measures system is just as wrong as the first one. However, you can go to places where the weights and measures organization is held in respect and high esteem by everyone—by the man in the street, by the businessman. I must confess that is the weights and measures organization I like to look at the closest of all, because it seems to me it is the one fulfilling its purpose.

I very much like your motto “That Equity May Prevail.” In going around the world it seems to me that people who have gotten deeply involved in consumer protection have lost some of the old principles upon which weights and measures was established. It seems to me that consumer protection is a very real thing to the consumer, but it is not the “be all” and “end all” of weights and measures. In weights and measures you do have a very real role to play to see that the consumer gets what he pays for but no more, and that the seller gives that for which he has been paid but no more.

I would suggest to you, particularly as you face metric conversion in the years ahead—and in this respect the “Land From Down Under” is going in front of you—that you will need to hold that concept very real in your mind. It will not be only the consumer that comes to you for advice. You will find in the years that lie ahead of you in metric conversion that all aspects of industry will come to you for advice as to how, when and where to plan a conversion. Unless you are neutral and unless you are respected by the whole community, you will fail in this tremendous duty in a period I am sure will take only ten years of your life. In that ten years of your life, you will have more opportunity to establish the good name and the good standing of the department for which you work than you would have had in any other period of your life, because every member of the public will be very conscious of weights and measures for that ten-year period of their lives.

I suggest to you at this Conference, and the ones in the future as you come closer to getting your feet wet in metric conversion, that you should hold very close to you your motto, “That Equity May Prevail.”



AFTERNOON SESSION—TUESDAY, JULY 24, 1973

(RAYMOND A. THARALSON, *Vice Chairman*, Presiding)

UNIVERSAL PRODUCT CODE IN THE GROCERY INDUSTRY

Effect of UPC on Supermarket Operations and Equipment

by ROBERT H. SLOAT, *Vice President*, Operations,
Foodarama Supermarkets, Inc., Freehold, New Jersey



My part of the program is extremely easy. I am going to be talking to you about the need. The only way I can identify the need is that if over the next fifteen or twenty minutes I could make most of you into grocery clerks, think like grocerymen, and understand what some of the problems are.

The problem is caused by a conflict—a conflict that exists between a shopper and a store manager. A shopper spends thirty to forty-five minutes in the supermarket, and selects many items. She now has one desire and one ambition, and that is to get out of the store as rapidly as she can for the least amount of money. On the other hand, we have a store manager who has some 12,000 items in his store and that customer has bought only a portion of them. He would like to know what the shopper has in the basket and what the relationship is to her selection of product versus his merchandising of those products in the store.

Another problem is he would like to receive just an accurate payment for everything that is in that basket. With that basic understanding and with that conflict being representative of the problems that we are facing in the industry today, I would like to have you think not about revolutionary change, but think about some of the evolutionary changes that you are more familiar with.

Let us start with the automobile. The automobile has evolved from early models on a year-by-year basis on through the modern General Motors prototype of a small Cadillac, made to compete with the Mercedes. Now that is an evolutionary trend—one that we accept. The telephone has gone through an evolutionary change from the early crank models on through the modern pushbutton telephone. The coffee mill has gone through an evolutionary growth to a point that has brought it to extinction, replaced by new technology and processing of food.

Merchandising standards have changed from the early behind-the-counter clerk service to the first modern A&P central checkout system,

where customers could select products and take them to a central checkout, on through the modern supermarket of today with some 35,000 to 40,000 square feet of space and modern equipment. That, again, is an evolutionary growth that we have come to live with and accept as a standard way of life.

But let us get back to that customer, and let us get to the point of dissatisfaction. That has to do with equipment—equipment at the front end of the supermarket.

Now let us look at the evolutionary growth of the cash register field. From the early models we evolved into the bronze caste models that allowed the clerk to register the total amount of the sale and also tell the customer what it did.

Now, because we are all grocery clerks, we have to understand that we have to maintain our competitive advantage and have a drawing card for our customers. As operators, we have forced the cash register people to make some changes. One case we added automatically, but we had to handcrank to do it. Others decided that as long as we were recording sales, the customer no longer had the brown paper bag to take home with all the figures on it and we should give the customer a tape.

Again, with any company, if something is being given to the customer, the auditors want to know what. We ended up going to one for the customer and one for the auditor.

We also have what we call cashier accountability—one cash drawer is good, maybe two would be better. In this way we could keep track of who does what. As we all know, if two are good, how about having ten? These are evolutionary growth patterns.

Somebody decided that he did not like the bronze caste so we went to mahogany. The mahogany models also underwent an evolutionary change, on through some of them that may be familiar. Again, somebody decided that we should have communications between the front end of the store and the back of the store. At that time the only way to do it was over the telephone.

During World War I we learned how to bend metal very effectively and very efficiently. We went from the bronze caste and the mahogany models on into the steel models. These, too, have undergone changes to the modern workhorse of the industry—Class 5 made by NCR.

So, you can see that we have gone from bronze caste to mahogany to steel. There is something very common to all three. I would like to say that it is the *key* to the problem because every one of the registers we have discussed has required the depression of a key, and it is truly the “key” to the problem.

Some of the problems that exist in the supermarket today are, indeed, satisfactory customer service. There are high labor costs. Some 40 percent of the total store labor is represented at the front end of the

store, believe it or not. Ring-up errors are not in favor of the store, as public opinion surveys would tell you, but in favor of the customer. There is high employee turnover, averaging some 173 percent a year, and difficult work scheduling. When I say difficult work scheduling, we do some 55 percent to 60 percent of our total weekly volume during two days—Friday and Saturday. If we could only get people to shop the way they do in Europe—three times a day, six days a week—we would not have the problems that we have today.

Let us take a look at the supermarket that has tried to evolve with front end equipment. What has happened to that supermarket itself? In 1960 the average supermarket was doing a business of \$1,208,000; in 1970 it was doing approximately \$2,000,000. That is a 61 percent or 62 percent increase in sales. The net operating profit as a percent of sales for that individual store and its contribution back towards corporate profits has decreased from 1.47 percent down to .45 percent. In hard dollars it means that the supermarket was contributing some \$18,000 a year toward corporate profits in 1960 and less than \$9,000 in 1970. That .45 percent in 1971 dropped down to .19 percent. We made less money than what we gave away on under-rings and misrings.

Productivity is the name of the game. In the food industry we use sales per man hour as a guide. In 1960 we were averaging \$25 per man hour; in 1970 some \$35. A lot of people tell you that is not bad, that is a 40 percent increase. Is it really? Wages during the same period of time rose from \$1.74 to \$2.77, or a 59 percent increase. A lot of people will tell you that a 50-40 or 60-40 ratio is not all that bad. But, if you would look at the consumer food price index during the same period of time, you would see that it increased some 31 percent. My contention is that productivity has increased in the neighborhood of 8 percent over a ten-year period, while wages have gone up 60 percent.

In 1971 that \$2.77 went to \$3.97 an hour. That is a \$1.20 increase in one year—greater than the total increase we have experienced over the preceding ten years. Figures right now show that this year we will average \$5.05 an hour; next year \$5.55; and in 1975, \$6.11. If any of you gentlemen are thinking of sending your wives to work, do not send her to work in a steel mill. Send her to work in a supermarket; she can make more money.

Some of the problems are expected to get worse. As I indicated, wages and fringe benefits continue to rise to the \$6.11 figure. Part-time help is being fought; proliferation of new products continues to strain the store space. What products should I stock? Where should I put them? Will the customers buy them, and how am I going to know? The high employee turnover is expected to continue. Ask any supermarket operator; he will confide that one of his biggest problems is finding people who are willing to work in our industry.

The evolutionary growth of the register has only led us through changes in styling, not in functions. We as operators have tried many

different things. We have tried mounting stamp and coin-dispensing equipment over the checkstand, at a cost of \$800 per lane. Why? To save 6 seconds per customer transaction. That is what it is worth to us—6 miserable seconds—We have tried recessing cash registers to develop a better touch, a touch comparable to what you have in an office machine. We have tried going to nested plastic bags where some of the functions can be combined at the front end—ringing and bagging directly into the bag. We have tried eliminating the checkstand. None of these things have been truly effective for us, but we have tried.

Millions of dollars have been spent over the past ten or fifteen years in aerospace, developing recreational facilities, and medicine. Not one penny has really been spent on the retailing industry and, more specifically, in retail food. What we need is some control. Only research can tell us where we can get it.

In 1960 we said that what the grocer expects of the checkstand of the future is increased productivity, better accuracy, and better customer service. Now comes the mystic age of the computer. The computer hit the retail food industry in about 1967—now we have the answer to all of our problems, but what is the computer? Computer to most retail food operators at that time was half human, half machine, something that was constantly telling us what we did wrong. But, we have harnessed it.

A computer or a controller, if the terminology fits, is the memory and the driving unit for many registers up at the front end, called electronic cash registers or terminals. Any one of these terminals can have added to it a coin dispenser, a stamp dispenser and an electronic scale. That is all the system is.

There are many of these systems that are installed, such as the Pitney-Bowes System; Singer; Esis, made by Nuclear Data; Data Checker. But these systems, too, have something in common. We have talked about the evolutionary growth, but what are we doing now with the electronic cash registers? We are still keying in. Every item has to be manually entered through the keyboard.

You might ask what the difference is. The difference is that we are adding much more information through the register than we have ever done before. This information is automatically accumulated by the controller, or that computer in the back room, and allows us to operate much more efficiently by getting the information out on a more timely basis to the merchandisers, to warehousing, to the people who are responsible for scheduling the stores so that we can do a better job.

Our problem is how to take the store manager of today, the food chain president of today, and match him with the computer technology of today. How do we involve you and store people through the computer technology? It is a very difficult problem.

Quite frankly, I can tell you that most of the retail food people are looking at the electronic cash registers and trying to decide which way

to go and what to do. Should they continue along the evolutionary path that really does not solve their problems; should they go to electronic cash registers that will allow them to get more information without any real sacrifice in productivity; or should they cross over into the new, greener fields of tomorrow, the revolutionary area?

What does that mean? It means that with that same basic system you had of electronic cash registers, all you do is add a new type of checkout counter at the front end, one with the light source reading device. You could also have handreaders that could be worked in conjunction with it. The beauty of it is that the checkers can now scan as fast as they like. They can scan the standard product that is on the shelf today, but it has a standard symbol—no price—a standard symbol that is read by that machine as fast as the checker can pass it across. Three things are needed: a Universal Product Code, a Standard Symbol, and Automated Checkouts. Gentlemen, I can tell you that all three are here.

In summary, I would like to say that you accept the evolutionary growth of the automobile and the telephone, with the year-by-year changes. You accept what we do in the store to improve the shopping patterns and the product mix for you. Our mission here today is to make you aware of the Universal Product Code (UPC) revolutionary change that is coming not five years from now, not seven years from now, but within the next three years. I sincerely hope that you are fully prepared for it.

(Mr. Sloat's talk was liberally illustrated with slides.)

UNIVERSAL PRODUCT CODE IN THE GROCERY INDUSTRY

Computerized Checkstand Weighing System

by WILLIAM N. SHANNON

Manager, Special Projects, Hobart Manufacturing Company,
Troy, Ohio



The supermarket industry has really moved. Let's take a look at how this tremendous effort in the supermarket industry relates to weights and measures enforcement. The final report of the Specifications and Tolerances Committee covers two distinct situations which we should review: The first is selling bulk produce at the checkstand on a scale. The second is the Universal Product Code symbol on a random weight package. These two situations are distinctly different. The bulk produce sale at the checkstand, weighed on a checkstand scale, does not require a Universal Product Code.

Referring specifically to Item 7 on the S & T report, I would like to quote:

The first consideration to be dealt with is the application of Handbook 44 requirements to the weighing device and the cash register with which it is associated at the checkout stand in the supermarket.

When commodities are weighed at the checkout stand with this type equipment, as is the case with use of existing equipment, it is a direct sale situation. All of the requirements of the Model State Weights and Measures Law and Handbook 44 directed to computing scales used for over-the-counter sales, as in the delicatessen section, for example, are applicable.

On the electronic cash register keyboard, there is a button that says 'scale.' The product is placed on the electronic checkstand scale. The checkstand operator pushes a button or key on the electronic cash register—in this case, the scale key—that will tell the computer to read the scale electronically; the information goes into the computer. Then the checkstand operator enters the price per pound, or a code number that represents the price per pound in the computer memory. The computer does the computation and the total price display is on the electronic cash register.

So far, we have not talked about weight indication. The electronic cash register is extracting the weight information from the electronic scale.

Again, quoting from the report :

G-S.5.1. Indicating the Recording Elements, General.—All weighing and measuring devices shall be provided with indicating or recording elements appropriate in design and adequate in amount. Primary indications and recorded representations shall be clear, definite, accurate, and easily read under any conditions of normal operation of the device.

The philosophy expressed in this requirement is that the indications of weighing and measuring devices are easily and readily understood by those affected. The key words in this paragraph are: clear, definite, and easily read. Consequently, the equipment must be so designed that the indication and printed representations must meet this criteria.

G-UR.3.2 Position of Equipment also applies.

A device equipped with a primary indicating element and used in retail trade, except a prepackaging, checkweighing or prescription scale, shall be so positioned that its indications may be accurately read and the weighing or measuring operation may be observed from some reasonable "customer" position. The permissible distance between the equipment and a reasonable customer position shall be determined in each case upon the basis of the individual circumstances, particularly the size and character of the indicating elements.

Let me go on to read the Committee's statement :

This section requires that the user locate the equipment in such a manner that all of the "clarity," etc., of the indications required in the design by the manufacturer are readily observable to the customer and the customer has the opportunity to fully view the weighing operation from that same position. Consequently, the indications of the electronic cash register or scale indications and the load receiving element (platter) of the scale must be in full view of the customer when commodities are weighed.

In some electronic checkstand scales, there is no weight indication. The indication of weight becomes part of the electronic cash register. Another way of obtaining weight indication is when the weight indication is an 'analog' indication on top of the electronic checkstand scale. Another approach to provide weight information from the scale is one in which remote digital weight display is associated with an electronic checkstand scale.

An electronic cash register, manufactured by the Bunker Remo Esis Company, has a weight display and a small keyboard where there is a key labeled 'scale' or 'produce.' The National Cash Register Model 255 Electronic Terminal is a unit which is connected to a computer in the back of a supermarket and is already interfaced or electronically connected to an electronic checkstand scale.

Another offering of the National Cash Register Company is the Model 250 Electronic Cash Register, and this unit stands by itself. It is not connected to a small computer in the back, but has a computing capability within the device. Another one is the Victor Series 560 Electronic Cash Register.

The inside of an electronic checkstand scale looks different from some of the cylinder and counterline scales that we have known in the past.

I would like to again refer to the S & T report, section 8, which reads as follows:

S.1.5.3. Customer indications.—Weight indication shall be shown on the customer's side of computing scales when these are used for direct sales to retail customers. Computing scales equipped on the operator's side with digital indications, such as the net weight, price per pound, or total price, shall be similarly equipped on the customer's side (nonretroactive as of 1971).

Quoting the Committee:

The philosophy expressed here is that the customer is provided the information specified (net weight, unit price, and total price) when bulk commodities are weighed in his presence for a sale when the device used is of a computing type. This philosophy is consistent with the intent of Congress when that body passed the Fair Packaging and Labeling Act. Section 2 of that Act stipulated that the intent of Congress is to provide accurate quantity information and to facilitate value comparisons. The question then arises as to the method that can be utilized to provide the customer this information when purchasing commodities from bulk to be weighed at the checkout stand.

The unit price information can be provided either by visual display or recorded on the cash register receipt. However, the unit price must be clearly identified as the unit price and should be based on a price per pound, not per quarter pound or half pound. The total price would normally be displayed and printed. The quantity should be indicated and printed. However, in a system utilizing an analog weight display, it would be acceptable to indicate a gross weight if the net weight were printed and there was inherent in the system adequate safeguards to make certain that the total price is based only on the net weight.

In the Astro System the words 'bananas' or 'apples' can be indicated. It has a total value display, and it can also indicate weight. They have an automatic checkwriter, where the standard blank bank check of a customer is inserted, the name of the supermarket and the amount due are printed, and the check is automatically endorsed to the supermarket.

Another version of the electronic cash register point-of-sale system is the Singer terminal. You will see this terminal in Sears, Roebuck & Co. stores, where Singer has more than 10,000 of them installed. They have obtained an order for an additional 10,000 from J. C. Penney. To give you an idea of the size of this industry, Montgomery Ward ordered more than sixty million dollars (\$60,000,000) worth of cash registers, all electronic, from National Cash Register Company.

The Pitney Bowes-Alpex is interfaced, or electronically connected, to an electronic checkstand scale. It is also equipped with an analog display, and a display of total price.

This concludes the discussion of selling produce in bulk at a checkstand scale, when used with a point-of-sale electronic cash register system. We will now consider the second part of the S & T report where the Universal Product Code symbol placed on random weight packages

is used for reading in the package price at the automated checkstand by one of the scanning devices.

Reading from the report: "Other Enforcement Considerations 1. Variable Measure Code Symbol." Variable measure is the grocery industry reference to what we know as random weight. They have set up in their code guidelines a version of the Universal Product Code, a group of numbers identified as #2, for random weight packages, but referred to as variable measure.

The Committee's report reads as follows :

Variable Measure Code Symbol. If an existing prepacked scale, which issues a random label, also issues a VMC symbol, the requirements of Handbook 44 apply ; and this symbol (label) must accurately reflect the total price indicated on the random label. Inclusion of other information in the VMC symbol is optional.

For purposes of illustration, during the testing, before the Universal Product Code symbol was selected, there was a large number of manufacturers who spent millions of dollars developing a symbol and doing store tests. One of those companies was the Dymo Company, now associated in its efforts with Data General.

RCA and Kroger have an operational store in Cincinnati, Ohio, where they use the RCA proposed symbol. RCA and Kroger are to be given much credit for the in-store testing and the many millions of dollars in man hours that were spent in promoting the feasibility aspects of Universal Product Code symbol utilization. Delegates to this Conference, George Johnson, Rojer Bowers, and John Chohamin, have visited this installation and have seen the label being affixed to a random weight package, and then going across an automated checkstand. Otto Warnlof, in his advisory capacity to the S & T Committee, has also visited this installation.

In the back room of this supermarket there is a Hobart 3000 labeler. The label is affixed to the bottom of the package and represents, at this time, total price to be read by the scanner. The scanner replaces the eye of the checkstand operator in reading total price.

I want you to keep in mind very clearly one thing—this is the Universal Product Code symbol, the symbol that will be printed on all packages for the grocery industry. The reason that I mention this is because we have shown you slides of proposed labels, and we are going to see a movie that was developed by RCA before the final decision of the Universal Product Code. It discusses the features of their Bullseye Label. Many of the concepts of this label were considered and studied by Mr. Haberman's Committee before making its final selection.

Much of the manner in which the Universal Code label operates is represented in this RCA movie only to give you an illustration of how it might work in a supermarket environment, but the symbol is the Universal Product Code symbol that you see here.

Gentlemen, as you can see, this very much relates to weights and measures enforcement and involvement. The report of the S & T Committee should give you some indication of the areas of activity and interest.

(Mr. Shannon's remarks were liberally illustrated with slides. A movie was also shown.)

DIGITAL DESIGNS IN WEIGHING SYSTEMS

Applications in Retail Trade

by ROBERT O. BRADLEY, Chief Scale Engineer, Toledo Scale Division,
Reliance Electric Company, Toledo, Ohio

Digital scale designs for the retail scale trade are applied primarily to three areas of usage: First, the prepack scale is a digital scale with electronic computer and label printer. This is designed to be used manually, or mounted in an automatic wrapping and labeling production line. Second, a scale with electronic computer for over-the-counter sales, is provided with double indication for merchant and customer, and has an optional label printer. Third, a scale for checkout counter use which supplies digital weight information to a computer-cash register system for value computation and printout.

The mechanical portions of each of the three types of digital scales are close copies of tried and true analog scales made for many years by the digital scale manufacturers.

To understand digital designs we must first understand the meaning of the words digital and analog in reference to scales. To start with, the output of a basic weight sensing mechanism must be analog, or continuous, from zero to the maximum reading. However, for this output to be useful for calculating or printing it must be converted to finite steps, or to digital form. In the case of the scale, the finite step is the minimum graduation, or increment. In a digital scale, then, as weight is added to the platter, the digitizing means makes a decision when to change from one digit to the next, just as a person makes that decision when reading an analog chart. Then, when we buy a digital device we are paying to have decisions made for us electronically.

All of the scales we are discussing here are basically mechanical analog scales with electronic digital converters. We should explore how the digital converter works. The scales are equipped with coded optical charts which are read by photocells or photo diodes. These charts have clear and opaque sections, and the photocells are arranged, with amplifiers, to indicate "light" or "dark" conditions seen through the chart. It takes four photocells to make up a binary coded decimal (BCD) signal of each of the digits to be read (figure 1b). Thus for these four digit scales it takes sixteen photocells to do the digitiz-

ing. The most commonly used BCD uses the values One, Two, Four and Eight for the values of the four bits of information per digit. Using this information it is easy to see that if we made our coded charts to basic BCD information we would have difficulty making them work. It would be necessary to have an extremely high degree of perfection in charts, lighting, photocell uniformity, and so forth, because all sixteen photocells would have to change condition (light to dark or dark to light) in order to avoid ambiguity. This problem is avoided by use of the "Gray" code (figure 1a) which is arranged so that only one of the sixteen photocells changes condition (light to dark or dark to light) in order to change indication from one graduation to the next one. In other words, it is always one photocell that makes the decision for you at a given incremental break, whether that be from zero to one or from nineteen ninety nine to two thousand.

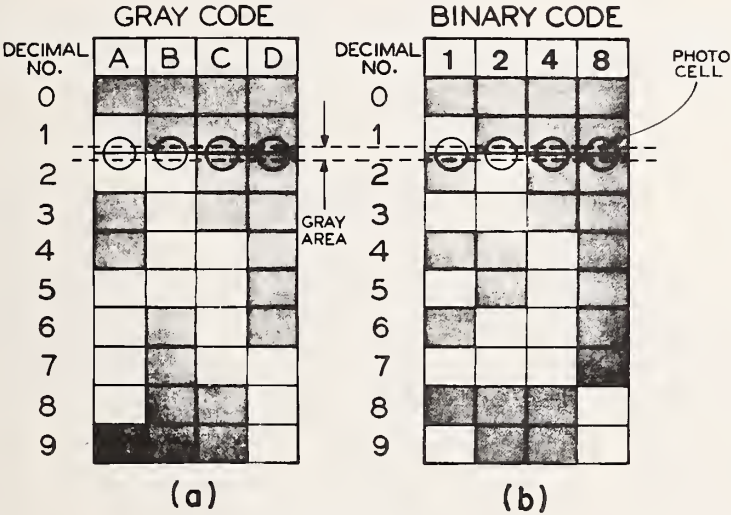


FIGURE 1

After the coded information is read from the scale, it must be immediately translated to BCD (binary coded decimal) because that is the basic language of most electronic computers. The reason for this is simple, since computers can only recognize on or off signals, and not numbers as such, and since four wires, with the BCD system can transmit all ten numerical characters, and more. The typical scale block diagram is then shown in figure 2. The translator block translates the gray code to the 1-2-4-8 code or BCD.

The BCD system relates to the decade counter which consists basically of four stages of bi-stable flip flops. Bi-stable flip flop merely

COMPUTING SCALE SIMPLIFIED BLOCK DIAGRAM

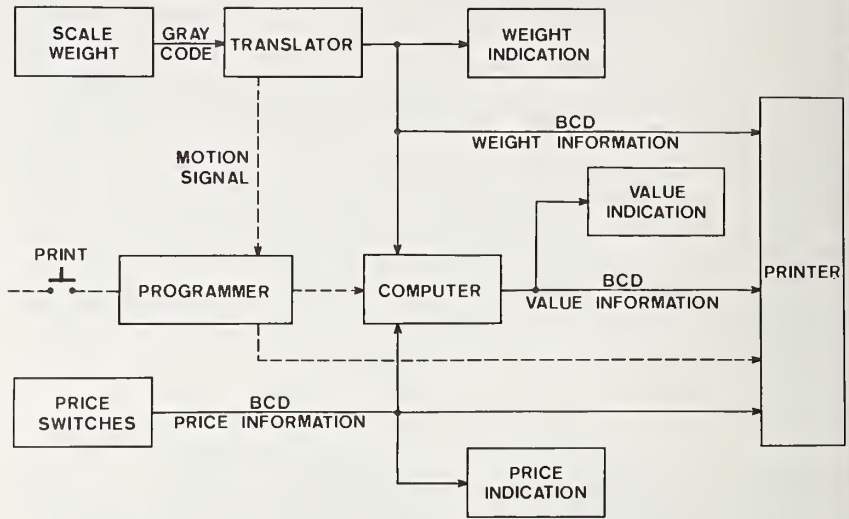


FIGURE 2

3 DECADE ELECTRONIC COUNTER

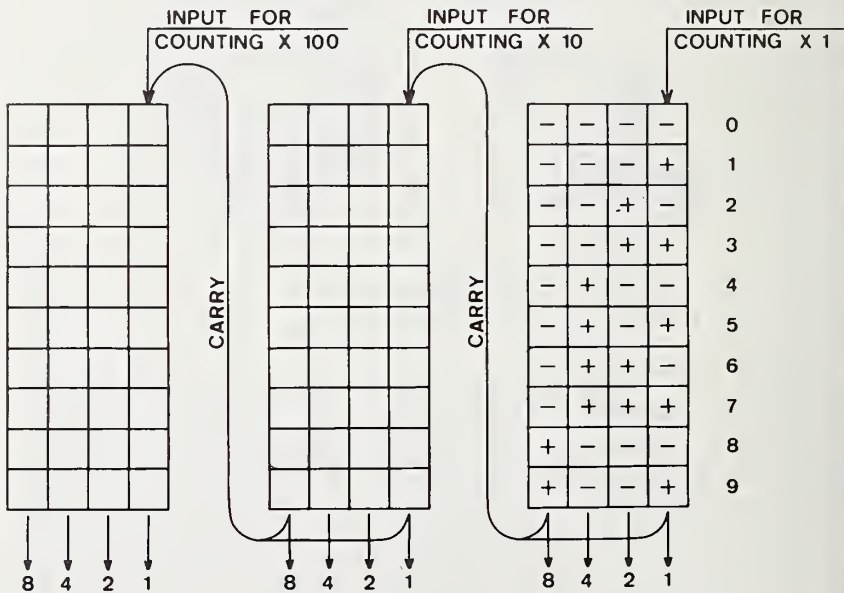


FIGURE 3

means that if any one of the four stages is energized to a plus state or a minus state it will remain that way until changed. The first stage of the decade represents a one value bit, the second a two value bit, the third a four value bit, and the fourth an eight value bit. Figure 3 represents a typical three decade electronic counter. The four bi-stable flip flops could be considered as toggle switches connected together in such a way that when the input switch is turned on and off once, it turns the next switch on. The second switch does likewise for the third, and the third likewise for the fourth. The four output leads from a decade can thus be sensed at any time to determine the numerical value stored in the decade.

SLOW ELECTRONIC MULTIPLIER

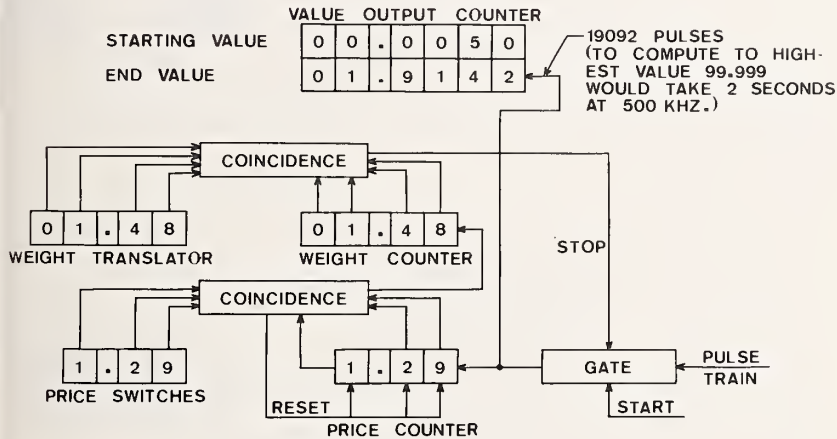


FIGURE 4

The simplest configuration of a computer for these scales, shown in figure 4, consists basically of a three decade price counter, a four decade weight counter, and a six digit value counter and the related circuitry to program the pulses from a pulse train or oscillator. In order to compute, the gate would be opened to allow pulses into the price and value counters. When 129 pulses have passed, the price counter would be in coincidence with the price switches. One pulse would go into the weight counter, and the price counter would be reset to zero. The price counter would count to 129 in this manner 148 times until the weight counter reached coincidence with the scale weight translator. At this time 19092 pulses would be counted in the value

counter. This counter never resets to zero, but resets to 50 counts to round off the price to the nearest cent. However, this computer would be rather slow, since the maximum count required to fill the six decades of computed value would be one million pulses. Even at 500 kilohertz this would take two seconds to compute the largest value.

For this reason a device called a shift register is used to multiply each digit of the multiplier by each digit of the multiplicand. This enters the answer to each simple two digit multiplication problem into the proper decade. Figure 5 depicts a computer using a shift register. This computer would put 148 pulses into the weight and value counters nine times; then shift one decade left in the price and value counters and count 148 pulses 2 times; then again shift one decade left in the price and value counters and count 148 one time. This only takes 1776 pulses total and is, therefore, ten times as fast as the computer of figure 4. The shift register, then, minimizes the number of "carrys" necessary, and derives the answer to the problem in a minimum of time. The multiplication of a four digit number of a three digit number to a maximum of six digit answer can then be performed in less than two one-hundreds of a second (0.02 s), using less than one thousand pulses, when the shift register is used more effectively than in figure 5.

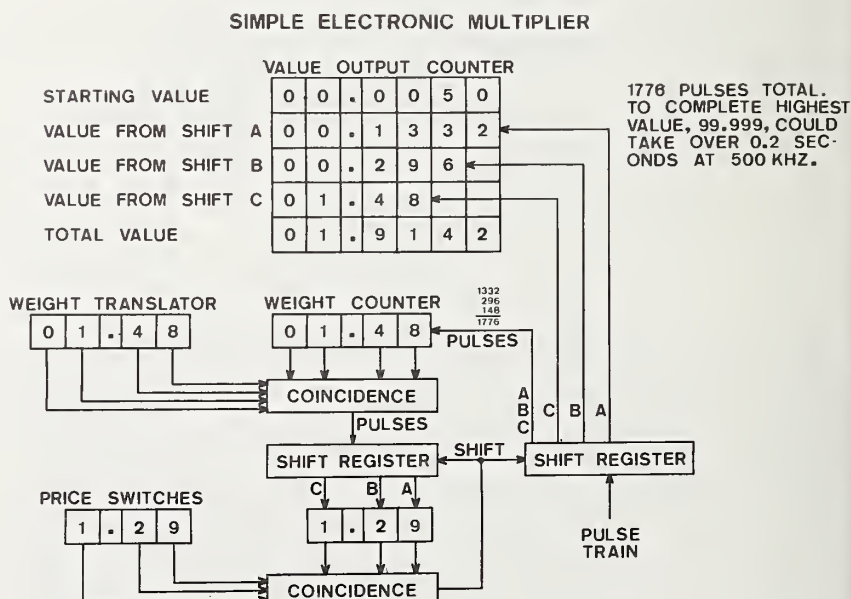


FIGURE 5

DIGITAL DESIGNS IN WEIGHING SYSTEMS

Large Capacity Scale Designs

by TAYLOR G. SOPER, *Vice President*, Marketing,
Fairbanks Morse, St. Johnsbury, Vermont

Definition of Scope



My comments will apply to digital electronic scales currently on the market from at least 20 manufacturers, and sold for all industrial and commercial applications, excluding retail food stores.

First, let's define what we mean by a digital scale. All electronic scales are not necessarily digital and all scales that present a digital display are not necessarily digital.

Many electronic scales in use today are analog scales actuated by a load cell and servo motor. Other scales present a digital display of weight such as a projection indication scale, or a conveyor scale. However, these scales are analog devices in that the weight values being sensed are never converted to digital electronic pulses. My presentation will not cover these scales. Instead, we will be talking about scales that include analog to digital electronic converters. Digital indicators are being used today in conjunction with the following types of scales in all types of commercial, industrial, transportation and agricultural applications: These scales typically consist of at least 3 basic parts:

1. A load sensing platform or receiver
2. A weight force transducer or load cell
3. An analog to digital conversion and display instrument or weight indicator.

History

Digital weighing systems were first developed in the late 1950's and early 1960's. The first sale recorded by Fairbanks was in 1961 to Pennsylvania Glass Sand Company for installation in Newport, New Jersey of a single draft uncoupled in-motion railroad scale. We believe this installation was the first sale of a digital scale in the U.S. and is still in operation.

Perhaps other sales were made earlier, of which we have no knowledge. But, I think we can say that modern digital electronic weighing is not much more than 12 years old.

Customer Benefits

We have seen a rapid growth in the use of digital scales during the last ten years, and particularly during the last 3 years. During the

next five years we will see a literal explosion in the usage of digital weight indicators as more scale users recognize the very real benefits offered by electronic digital weighing.

What are these benefits? Why are so many digital indicators being sold today?

First, Digital Scales Offer the Ability to Locate a Weight Indicator Remotely from the Scale Platform.

The digital scale user realizes the benefits of extreme flexibility with regard to indicator location relative to the scale platform. Scale platforms or load sensors can be placed in relatively inaccessible locations, such as high in grain elevators, while the cable connected indicator can be conveniently placed for operator control on ground level or in other convenient locations. Similarly, a truck scale platform may be placed at an entry gate to weigh incoming trucks. The indicator, no longer mechanically linked to the platform, can be placed in offices two or three stories above the truck scale platform allowing the weighmaster to perform other duties during slack periods, thus saving labor.

Second, Digital Scales Provide Reduced Weighing Errors Through Improved Readability.

Improved readability of digital displays offer important benefits to scale users:

The scale operator no longer must worry about parallax and can stand in virtually any position facing the indicator within 20-30 feet and accurately read the digital weight indication. This allows savings in material handling time as well as insuring more accurate weight readings. After all, the accuracy of the scale is really only as good as the operator's ability to read and record the weight indication. In this manner digital scales are producing more accurate weighments even though the digital hardware is in many cases no more accurate than its mechanical counterparts.

Third, Digital Scales Offer Improved Speed of Weighments.

Digital scale users realize two benefits relating to the faster operation of digital scales:

1. Scale settling time is usually $\frac{1}{3}$ to $\frac{1}{2}$ or better compared to mechanical dial indicators, and even more significantly better than beam indicators.

2. Operator reading time is faster with digital scales. The operator does not have to interpolate weight readings, or make mental additions to arrive at a weight.

Speed is of increasing importance as scale user production increases because of increasing labor costs per hour and because of higher capital investment in the commodity bearing equipment.

Digital Scales Offer a Number of Other Important Benefits.

Digital indicators are much smaller in physical dimensions than mechanical dials or beams and thus offer the digital scale user a great deal of convenience in placement of indicator, often in crowded office areas.

Digital indicators have of necessity converted analog weight signals into digital pulses in a form ready for direct acceptance by data processing and/or control devices such as adding machines, computers, sequencers and the like. These benefits are very real.

The primary deterrent to more widespread use of digital weighing has been the high price of digital indicators.

In 1962-65 digital indicators alone were selling for \$5,000 and more. In the interim, mechanical indicators, dials, and beams have risen in price while digital indicators have declined in price. This decline has been due to development of transistors, then integrated circuits.

Within the last three years, digital indicator prices have become competitive with mechanical indicator prices in many applications.

In summary, the end user benefits of remote location of indicator, reduced errors through improved readability of indicator, and the speed of digital weighing which allows a higher frequency of weighments in a given time period are now available at prices competitive with mechanical dial indicators.

These then are the reasons for accelerating use of digital indicators, and that brings us to the purpose of my talk today.

Specifications and Tolerances for Digital Scales.

Our responsibility at this Conference is to recognize this very pronounced trend towards use of digital indicators. Our responsibility is to understand the differences between digital and analog weighing.

Our responsibility is to establish recommended performance specifications and tolerances for digital scales that will protect the integrity of our past standards but which will also allow scale users to realize the substantial benefits now available through digital weighing.

Last year, a resolution was introduced to establish tolerances for digital scales at zero. That resolution was tabled largely due to lack of understanding of digital scales within the National Conference. This year a number of other changes in H-44 are recommended by the S & T Committee, including a zero tolerance recommendation.

The following are the proposed changes as I see them :

1. G-S.5.2.2. now reads :

G-S.5.2.2. Graduations shall not be required in connection with digital indications or recorded digital representations.

The proposed change is :

G-S.5.2.2. Digital indication and representation digital elements shall be so designed that :

- a. All digital values in a system agree with one another.
- b. A digital value coincides with its associated analog value to the nearest minimum graduation.
- c. A digital value is (presented or rounded off) to the nearest minimum unit that can be indicated or recorded.

(a) means that if a digital scale is operated with more than one digital display they must agree, i.e., display the same digital value.

(b) means that if a digital slave indicator, for example, is used in conjunction with an analog dial scale as in a scoreboard conversion, that the dial when read to the nearest whole graduation must agree with the digital display.

(c) means that a digital scale must round its display upwards and downwards to the nearest whole graduation.

Further changes are proposed for *S.1.1. Zero Indication*.—Provision shall be made on a scale equipped with indicating or recording elements to either indicate or record a zero balance condition, and on an automatic-indicating scale or balance indicator to indicate or record an out-of-balance condition on both sides of zero.

It is proposed that the following additions be made :

A digital indication shall represent a zero balance condition within plus or minus one-half the value of the minimum increment that can be indicated or recorded.

This in effect means that a digital scale must round up or down to zero within ± 0.5 of a graduation. Chuck Campbell of Toledo made a very revealing comparison of mechanical dials and digital displays in Portland with regard to the tolerance around zero. We have been used to thinking that there is no tolerance around zero on a mechanical dial. But, Chuck pointed out that in practice this may not always be true. Under worst case conditions, that is, with poor lighting, dirty dial face and some parallax, a scale inspector might judge a mechanical indicator to be on zero when the trailing edge of the index is coincident with the leading edge of the zero mark. With a total distance from the center line of the zero mark to the center line of the first graduation of $0.050''$ the index could conceivably be off zero an amount equal to half of the zero mark width and half of the index width or $0.020''$ or $.4$ of a graduation and still be judged to be on zero.

Most digital indicators display a resolution in excess of 1,000 graduations, commonly 5,000, 10,000, or 20,000 graduations, because the manufacturing cost differences to display greater resolutions are not significant.

It is clear that when comparing a mechanical dial with $1,000 \times 1\#$ graduations with a digital scale of $1,000 \times 0.2\#$ graduations that a $\frac{1}{2}$

graduation tolerance around zero on that digital scale would be 0.1# compared to 40% of one graduation on the mechanical dial in worst case of 0.4#. What this means is that by establishing a 0.5 graduation tolerance around zero for digital scales will in some, if not most, cases be establishing a tighter actual tolerance than that currently applied in practice to mechanical dials in the field today.

Some of us may argue that the example that Chuck Campbell used was extreme in that judgment errors as to when the index is exactly on zero are not often that large. However, who among us would argue that judgment errors or allowances one quarter as large are not commonly made in the field? No more than that is being proposed as the digital tolerance around zero in the above example.

These recommended additions appear straightforward and necessary. The majority of digital instrument manufacturers support them. Perhaps the least understood proposed change to H-44 consists of an addition to *S.2.1. Zero-Load Adjustment*. The following new nonretroactive paragraph to be *S.2.1.3.* reads:

S.2.1.3. For Scales Over 5,000 Pounds Capacity Other than Livestock and Grain Hopper.—A scale designed with automatic means to maintain a digital load zero-balance indication shall be provided with means to meet the requirements of *S.1.1.—Zero Indication*; however, with the automatic balancing mechanism in operation a digital zero indication may represent a zero balance condition of not more than plus or minus one minimum increment.

To understand this proposed change, let's consider the very idea of zero. If you weren't privileged to hear Sam Christie's talk at Portland on this subject, I would urge that you have him repeat it for you. It was a masterful piece of prose that I won't attempt to duplicate. But, recognize that in scales, zero is not nothing. The zero to which we refer is usually the dead weight of a platform and any other unbalanced elements of the suspension system, which represent the starting point for the weighing of objects applied to the platform. In heavy capacity scales, that dead weight can be as little as $\frac{1}{10}$ or as much as 2 times the stated capacity of the scale. Or, when we consider a properly applied load cell, that dead weight can represent from $\frac{1}{3}$ to $\frac{2}{3}$ of the active load cell capacity.

Consider that platform dead weight. It is really a very live load. During a period of time such as five minutes, many things can affect the apparent and real weight of that platform as it is indicated on the digital displays. Temperatures at the load cells, around the electronic instrumentation and within the electronic instrumentation are constantly changing as a function of the time of day, sun and cloud conditions, breezes and moisture evaporation. Those of you experienced with truck scales and their large platforms recognize that wind conditions create positive and negative pressure differentials on the top and bottom of the platforms with significant effects upon their apparent weight.

And, certainly atmospheric conditions affect the water content of the typical wood and concrete decks of truck scales. Rain falling on the platform will actually increase its weight as a function of time. A wet platform exposed to dry air, light breezes, and direct sun will rapidly lose moisture (and hence weight) as a result of seepage to the pit and as a result of evaporation from the top surface of the platform.

In this circumstance of constantly changing actual and apparent weights of the active load receiver, the primary question becomes "what is zero?" I believe the answer to that question depends upon your purpose on reading a zero indication.

Further, I believe there are two primary purposes for an interest in zero. First is the need to use an unloaded platform and one or more test loads applied to the platform in order to establish or verify the "span" of the scale. A typical motor truck scale can have a capacity of 120,000 pounds live applied load. A typical inspector might have a 40,000 pound maximum calibrated test load available. Using 20-pound graduations, if the 40,000 pound test load were precisely measured without error, and a 1 graduation or 20-pound error were made in the zero determination, then a 2 graduation span error at capacity would be created. Conversely, if the zero determination were made without any error and a 1 graduation error existed in applying the test load, then a 3 graduation span error at capacity would be created. If a -1 graduation error was made in assessing zero and a +1 graduation error were made in assessing the 40,000 pound test load, then a 6 graduation span error would be created at capacity. This is the primary and classic reason for a desire to be able to set zero without error.

The second reason for interest in zero measurement is derived from the fact that weighing is, in fact, a differential process. We weigh an empty platform and effectively subtract its weight from the weight of the loaded platform. Typically we do this by forcing the scale to read zero for the empty platform and we only read the weight of the applied object. This is true for beam and dial indicators as well as modern digital electronics. But we have previously demonstrated that the load of the platform changes with time and many of the sources of change apply as well to beam and dial scales as to electronic scales. Our recourse has been to impose upon the scale operator a requirement that he maintain the scale at zero.

But does he? It is my experience that often he does not. And, in fact, not maintaining the zero balance is a possible means of conscious fraud. In the case of a buyer operated scale, any drift behind zero presents the opportunity for understated weights and low cash outputs for the commodity received. Positive zero drift of scale (that is, the empty platform now indicates +3 graduations) is known to operate to this buyer's disadvantage and he is entitled (in fact, required) to bring the scale back to a zero balance condition.

So those are the two reasons for an interest in zero. First, to allow proper spanning of a scale as it is set up and subsequently checked; and second, to assure freedom from the arithmetic error of subtraction when the platform itself is treated as the zero condition. Now let's examine the S.2.1.3. in the light of those two uses.

In considering S.2.1.3., concerning the automatic maintenance of the zero balance condition, recognize first that this does not have to do with the span problem. Spanning is accomplished at initial setup. Subsequent tests should be made with the automatic zero balance feature switched off. It is not operable at that time. Having spanned the scale properly the "automatic zero tracking" circuits of the instrument are then switched on for actual use. What happens?

Any proper means of automatically achieving a zero balance effectively shifts the whole measurement scale, with respect to the changing zero of the platform. If, over a period of time, say five minutes, the platform gains 2 graduations in weight, then zero goes up by 2 graduations but so do all other points on the measurement scale. Zero is not floating around by itself. Zero remains 5,000 pounds away from an indicated 5,000 pounds and it remains 120,000 from an indicated 120,000 pounds. Because we call it "automatic zero tracking" don't think that only zero changes. The whole reference of the scale changes with time. And, it does this without operator control or even knowledge.

The AZT mechanism operates best with a one graduation "window" and only readjusts the indicator to zero load balance when the real or apparent forces on the platform exceed the value of one graduation during a time period of longer than 1 second. (Real or apparent loads applied at a faster rate than 1 graduation per second disable the AZT circuits and the weights being applied are displayed as in the case of all normal weighments.)

What happens when a real or apparent force is applied to the platform; that is, say, $\frac{3}{4}$ of a grad? Does this not introduce a $\frac{3}{4}$ grad error up scale on subsequent weighments? The answer is no. This value is noted and stored by the instrument even though the instrument does not change its digital display. If a 1,000 graduation weight is then applied to the scale, the digital instrument will see a total weight applied of 1,000 and $\frac{3}{4}$ graduations. It will then subtract the $\frac{3}{4}$ graduation apparent force that it previously memorized to arrive at the true weight of the object being weighed of 1,000 graduation. This is the weight that would be displayed.

What I am saying is that in properly designed AZT systems, there is a need for a 1 graduation tolerance around zero to keep apparent forces from appearing as valid weighments, but that this tolerance does not, in fact, create ANY weighing errors which will cause the scale to be out of tolerance. Quite the contrary, it helps prevent weighing errors that do occur when scale operators forget to rezero their scales prior

to weighments. This echoes the thoughts of Walter Watson of California who said recently "Zero tolerance is not important as long as indication up scale is within tolerance."

It is apparent from our earlier discussion that this is truly a new feature, not commercially available before in any significant quantity for widespread application. Today more than half of all digital instrument manufacturers offer automatic zero tracking (AZT) either as standard equipment or as an extra cost option. The allowance of 1 graduation uncertainty of zero load adjustment in S.2.1.3. does not represent the "loosening of tolerance" I have sometimes heard described. It is a tolerance on a new feature not previously recognized in H-44 which provides better maintenance of zero balance in practice than has, in fact, existed.

For this reason, we have proposed that the qualification in S.2.1.3. limiting the use of automatic means for maintaining zero balance to scales over 5,000 pounds capacity other than livestock and grain hopper scales has no relevance. We have offered an amendment to S.2.1.3. deleting this limitation.

In summary, we will see an explosive increase in the use of digital weighing indicators due to real user benefits which include speed, flexibility and compatibility with automation controls and data processing equipment.

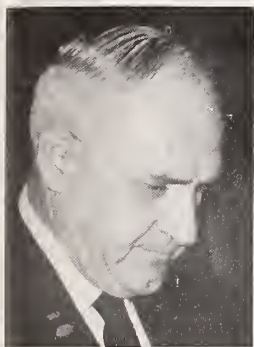
It is our responsibility to educate ourselves as to the differences between analog and digital weighing and to develop specifications and tolerances to protect the integrity of our past standards but to also make possible to the scale user benefits possible through digital weighing.

Among the changes in H-44 presented to the Conference this year by the S & T Committee, the most difficult change to understand thoroughly has been the tolerance around zero. In this area, another difficult to understand concept has involved automatic means for maintaining zero balance in digital scales. It is important to remember that there are two main reasons for interest in zero. One is that zero must be established to properly set the span of a digital scale upon calibration. The second is that zero must be established since it is the difference between zero and up-scale weight values that produce weighments. Automatic zero tracking has nothing to do with setting the span of a digital scale. It is critical to remember that during actual weighing, the factors that cause zero drift such as temperature, platform moisture, etc., are eliminated by automatic zero tracking as sources of errors, thus relieving the scale operator of the duty of constantly rezeroing his scale, thus producing a better total weighing result. The tolerance of ± 1 graduation around zero allows the scale users to realize a more accurate weighing result without the sacrifice of current accuracy.

Thank you for this opportunity to address you. I would be glad to respond to any questions.

DYNAMIC WEIGHING IN THE RAILROAD INDUSTRY

by EARL W. HODGKINS, Executive Director, Engineering Division,
American Railway Engineering Association, Chicago, Illinois



When Harold Wollin invited me to give a talk on Dynamic Weighing in the Railroad Industry at the Fifty-Eighth National Conference on Weights and Measures, I was pleased and honored to accept his invitation. I am a firm believer in cooperative efforts between people working together on any specific or general problem and in areas of mutual concern. It is unlikely today that any individual or organization would be completely successful in any sphere of endeavor by working alone in a

vacuum when others are also working in the same area.

Positive and sincere cooperative efforts and the resulting cross-fertilization is the route to follow today in a technological explosion now going on and the proliferation of organizations having the same general areas of interest. It is my sincere belief that all organizations involved in heavy vehicle scales should put their own houses in order, then meet together to iron out the problems and differences.

Such positive effort would include each organization making a detailed review and refinement of its own documents and position in advance of the meeting. This is what the AREA Scales Committee has been doing during 1972-1973 and defining the problems and differences during the meeting or meetings. The subject of high capacity scales and the weighing of heavy vehicles on them is not simple. In fact, it is most complicated, multifaceted, and in a constant state of flux due to technological advancement. However, in the real world in which you and I operate, it is sometimes very difficult to translate ideas into positive action, but it must be accomplished somehow and soon.

In the tentative report of your Specifications and Tolerances Committee, it recommended that Handbook 44 be amended to make Paragraphs N.2. and UR.2.8. require that the test installation adjustment of railway track scale be in accordance with the 1973 edition of the AREA-AAR Scales Handbook.

Now, you know that the AREA refers to the American Railway Engineering Association, because I have been introduced as Executive Manager of that organization. You also know that the AAR is the Association of American Railroads. However, I expect some questions exist on the relationship between the two associations and why both names are used on the so-called Scales Handbook.

Briefly, here is the story. The American Railway Engineering Association is a separate, independent professional-type technical association or society of individual dues-paying members, about 80 percent of

which are railroad engineering officers and supervisors and officers from other departments on railroads. The remaining 20 percent consists of university professors, consulting engineers, construction contractors, technical editors, officers from the various level of government—federal, state, and city—officers from other professional or technical organizations, and railway suppliers. The AREA has no railroad or other company membership category *per se*. It was organized in 1899, making this its 75th year, and was incorporated in the State of Illinois as a non-profit organization, with the object being the advancement of knowledge pertaining to the scientific, economic, location, construction, operation and maintenance of railroads; specifically, railroad fixed properties and allied services and facilities.

The President of the Association is a railroad engineering officer who serves a one-year term and is not eligible for reelection under the current AREA Constitution. The Vice Presidents serve two-year terms, and the Directors serve three-year terms. The Executive Manager is the Association's executive officer and chief administrative officer, and his term is continuous.

The AREA has approximately 3500 members, and accomplishes its work by the use of technical committees; currently, twenty standing committees and one special committee. One of these standing technical committees is Committee Fourteen, Yards and Terminals, which is the parent group of the AREA Scales Committee.

The Association of American Railroads is, as its name implies, an association of railroad companies, and was organized in 1936 by combining a number of associations. Its President's term is continuous and Vice Presidents head each of its several departments. Each department is subdivided in divisions and sections. The Engineering Division, of which I am Executive Director, in addition to being AREA Executive Manager, is a part of the Operations and Maintenance Department. The Operating Transportation Division also is in that Department. John Robinson, who spoke at the meeting yesterday, is Executive Director of the OT Division.

The American Railway Engineering Association was a successful, growing specification writing organization in the fixed property engineering construction and maintenance of weighing structures field, when the AAR predecessor, the American Railway Association, was formed about 1912. Because of this, the AAR entered into an agreement with the AREA, whereby the AREA would function as its civil engineering arm in addition to its own existence as an independent association of individual dues-paying members.

Since 1905 the AREA has issued an engineering manual, now entitled the "AREA Manual for Railway Engineering Fixed Properties," which has contained since the early 1920's, specifications and rules relating to scales. These have been part of Chapter 14, Yards and

Terminals. However, Part 5 has been completely reviewed, revised, and reorganized by the Scales Committee during the past year and approved by the AREA Board of Directors for issuance in the 1973 Manual Supplement. It will now be designated as Part S and is in a decimal format. It is my intention to hold up the publication of the 1973 Supplement a little longer so that we may incorporate in the AREA's Field Specs and Rules such amendments to Handbook 44 as the Fifty-Eighth National Conference may adopt.

I feel strongly that this will be mutually beneficial and in the best interests of all concerned. When in final form, Part S will be submitted by letter ballot to the voting members of the AAR Engineering Division. If approved, this material then can be issued in a self-contained AREA-AAR Scales Handbook, similar to the so-called Brown Handbook published for so many years, but which has been out of print for about five years. However, the same material is in the current Part 5, Chapter 14 of the AREA Manual and has been, and still is, available for purchase from my office at Chicago, as will the new Part S in time.

One of the most important sections in the new Part S is a procedure for testing motion weighing railroad track scales. Testing procedures and the accompanying tolerances have been sorely needed by all concerned since the AAR National Code, governing the weighing and reweighing of carload freight, was amended about twelve years ago to permit coupled and uncoupled and coupled-in-motion weighing of railroad freight cars. Actually, it is said that single draft in-motion weighing, both coupled and uncoupled, by gravity down a hump has been done since 1889. However, the procedure was restricted to cars having essentially the same wheel base and coupled dimensions.

After World War II several mechanisms and strain gages developed during that period began to be applied to weighing applications using load cells. Although there are a great many variables, it **has been** estimated by others that the average cost of weighing coupled-in-motion is about one-half the cost of two draft static weighing methods. In addition, it requires about three minutes to weigh a car statically, but only about eight seconds to weigh it dynamically. Imagine the impact of those factors on the time and cost of transporting goods on both the railroads and the ultimate consumer of those goods. Currently, the car fleet in the United States consists of about one and three-quarter million (1,750,000) cars of which more than 200,000 cars are weighed almost daily.

In 1972 the railroads moved slightly more than 26 million revenue cars over a railroad plant that consists of about 204,000 miles of road, or about 330,000 miles of track. In that year, the total freight traffic moved by rail amounted to 778 billion ton miles, and in the twelve-month period, ending on June 30, 1973, an all time twelve-month record of 809.1 billion ton miles.

The rate of return on investment in 1972 was only 2.95 percent, about half of the six percent the Interstate Commerce Commission has determined is necessary if our country's railroads are to provide needed services.

I believe it was former Department of Transportation Secretary Volpe who predicted that by the mid-1980's the total level of transportation required by the Nation will double from what it is now. Is it any wonder that the railroads are looking for faster, less costly means of weighing freight cars, but without any sacrifice in the accuracy of weights to move cars and trains out of classification yards and to interchange points and into and out of industrial plants where the cars have to be weighed.

Fortunately for the railroads and certain shippers, something over 80 percent of the freight cars handled move under weight agreements where the cars either are not weighed at all or weighed light and then loaded on industry owned scales. The usual weighing process on a hump is to release one car at a time over a scale long enough to contain all the wheels of the car at one time. The ticket-printing mechanism, either mechanical or electrical, is attached to the scale house weighbeam to give a printed record of the gross weight of each car as it rolls down the hump. However, there is at least one short electronic scale that weighs coupled cars as they move up the hump.

A great many railroads have been using the single draft method of weighing with a mechanical scale as a basic scale platform. The mechanical scale has been essentially either a straight-knife edge lever system with many lever points connected together to give a single scale house weighbeam reading, or instead of levers a plate fulcrum scale.

In the past fifteen years these systems for dynamic weighing have been revolutionized by placing electronic load cells at the four ends of the weighbridge. The cells make an input to a computer and an automatic printer or teletypewriter. Such fully electronic systems have replaced practically every hump scale in service, or are installed in new hump scales and in other locations, such as flat switching yards in industrial tracks and in other railroad trackage. The load cells provide fast response time which permits cars to cross a scale at higher speeds and gives a rapid printout. Car line scales are 80 to 125 feet long and have four weighbridge spans, each span having load cells at each end. However, there are now available four to five-foot scales for weighing individual car axles, and twelve to twenty-five-foot scales for weighing single trucks. The separate weights are then electronically added together to give the weight of the car. The key to this addition is provided by limit switches or sensors located in the track to detect and send to the computer the spacing of the wheels of the car being weighed.

Most of the weighing systems just discussed require a concrete scale pit, the load cells to be on a very stable foundation and almost perfectly maintained approach tracks. Instead of using a weighbridge, one weighing system utilizes a single heavy steel boxed beam under each rail, with a load cell under the ends of each beam. Thus, in effect, each beam is a separate weighing mechanism. This scale requires a minimum pit and is claimed to hold its calibration on firm ballasted track.

Experience has shown that good approaches to certain motion scales play a vital role in achieving accurate weights. This includes constant grade, tangent alignment and uniform cross level. In addition, the engineer at the throttle is a most important factor in the weighing procedure. The train speed must be kept constant to keep the coupler action uniform. To assist the engineer, signal lights are used to indicate correct speed, usually by a steady white light. Over-speed is indicated when the light starts to blink. Other signal systems utilize the familiar green, yellow, and red lights.

I understand that one railroad uses a beep in the engine cab radio when over-speed occurs, and this beep also may be heard in the general yardmaster's office, the division superintendent's office, and even at the railroad's headquarters. This is legal and within FCC regulations.

Using the sophisticated electronic scale system now available and in service, a train of 240 cars can be weighed in 35 to 50 minutes, with the weights being within specification tolerance.

Although they are still important, advances in electronics have reduced the affect on weighing results of coupler action, long and straight approaches and load cell fluctuations. You may be sure that the state of the art of dynamic weighing of railroad freight cars will continue to be improved by railroads and the manufacturers of weighing systems, working both individually and collectively.

So far as I know, there are five manufacturers of motion weighing systems. In alphabetical order, they are: Fairbanks Morse, Inc., Colt Industries, St. Johnsbury, Vermont; Railweight Incorporated, Northfield, Illinois; Sands Measurement Corporation, Dallas, Texas; Streeter Amet, Division of Mangood Corporation, Grayslake, Illinois; Toledo Scales and Systems, Reliance Electric Company, Toledo, Ohio.

In closing, I want to thank Fred Day of the Penn Central, who is Chairman of AREA Scales Committee, Vance Freygang of the Ches-sie System, also a member of the Scales Committee, and the scale manufacturers for their assistance in preparing this talk.

I hope you now have a good picture in your mind of what railroad weighing in-motion is, and the systems used to accomplish the work.

(Mr. Hodgkins' remarks were liberally illustrated with slides. The unique features of each of the five in-motion scale manufacturer's equipment were pointed out.)

TUESDAY EVENING—JULY 24, 1973

ASSOCIATE MEMBERSHIP RECEPTION

Conference delegates enjoyed a delightful reception on Tuesday evening, which was sponsored by contributors of the associate membership.

MORNING SESSION—WEDNESDAY, JULY 25, 1973

(GARY L. DELANO, *Vice Chairman*, Presiding)

GASOLINE MEASUREMENT AND MARKETING

Changing Systems and Designs

by WALTER F. GERDOM, Manager, Customer Service,
Tokheim Corporation, Fort Wayne, Indiana



As far back in history as the Old Testament some thousands of years B.C., the Prophet Ezekiel recorded a vision in which he saw "the spirit of the living creature" within four wheels which were cutting up such capers that, were it in 1973 A.D., we would think one had blown out a tire at 70 miles per hour.

Ezekiel's vision was not very clear. There was nothing in it about crankshafts, power steering, or service stations. If there were any high compression or internal combustion, it must have been within Ezekiel. But there was a mention of "rings," and a suggestion of steering, or maybe it was the first recorded skid—"and they turned not when they went."

That may have been the first vision of an automobile, but if so it lacked numerous specifications. Absolutely nothing was done about it. Those Israelites who could raise what served the purpose of the modern down payment continued to ride in chariots, at times fiery in their dreams but extremely bumpy in service. That aristocratic form of conveyance, occasionally supplemented by a slave borne sedan, continued in vogue through many centuries. So perhaps any impression of Ezekiel as the man who thought up the automobile should be written off.

Charles E. Duryea made the first gas motored automobile in America to run on the road in 1892.

Thus came the need for equipment to service these monsters of the road.

The first "fueling" stations appeared at the curb side. Curb side equipment was very popular as it provided for easy servicing of the automobiles.

As the production of cars increased, the demand for more modern and up-to-date equipment also increased. This brought about the elimination of curb side fueling equipment and replacement by "filling stations." Generally the architecture consisted of a small building with a roof structure extending over the "pump island." Popular equipment in those days was the "visible pump"—the one with a

five-gallon fish bowl mounted atop a massive cylindrical structure. No doubt many present here today can remember those pumps quite vividly, as well as remembering the problems encountered with testing and sealing them.

As the styling of cars or automobiles changed, the styling of the filling station equipment also changed. Also during this period, the term "filling" station passed out of the picture and the term "service station" took its place. Because of customer demand, twin pumps and twin dispensers were introduced into the pump manufacturers' line of equipment. When first introduced, the twin units were literally and figuratively two pumps bolted or welded together under a single housing. They were in many cases large and bulky; however, as time progressed the overall size of twins was reduced and today they occupy the same island space as a single unit.

This history, however brief, shows where we have been; now let us take a look at where we are today.

A growing trend in America today is "Do it yourself." Take a look around and you will find many such products available. Precut homes for the person who wants to erect or build his own home. Supermarkets are another form of "Do it yourself." Years ago you would present your list of needed items to your friendly grocer, he would fill the list—not today. You now go to your favorite supermarket, take a cart and walk the aisles comparing and picking the items you want.

This same trend has carried over to the service station where today we have basically three types of service available.

1. The full-service station—this is where the attendant greets you, takes your order, puts in the fuel, cleans your windshield, and checks your oil, etc.

2. The mini-service station—here the attendant greets you and places the product in your car. No extra services, such as washing your windshield or checking your oil, are offered.

3. Self-service station—where you as the motorist perform the tasks of putting the product in your tank, cleaning your own windshield, etc., then drive to a cashier's booth to pay.

These types of stations are the ones which we will review for you today. First, let us take a look at the equipment which is in use today in the United States and then we will look at some equipment which is in use overseas.

There is a Tokheim AFC (Post Pay) system at San Leandro, California with six Twin Dispensers. Intercom speakers are mounted atop each dispenser with a master intercom located in the cashier's booth permitting an instant two-way communication between pump island and cashier booth—between customer and cashier. The 12 Automatic Fill Control consoles (AFC) are mounted conveniently in two rows in the cashier booth with the master intercom at the right of the control consoles. The dispensers are standard service

station type to which a pulser has been added to the analog computer, thereby allowing a digital remote readout console to be used in the cashier's booth.

Another form of self-service, formally known as Automatic Preset Control (APC), is a type of system used industry-wide and called "Prepay." A prepay installation is located at a convenience food store in El Cerrito, California. At the in-store counter, the control console is mounted on a shelf underneath the glass counter top. The intercom is on top of the counter. After the customer pays for his fuel, the cashier activates the pump to dispense the predetermined and preset amount of fuel. The customer then fuels his vehicle.

Yet another type of self-service equipment is the sales ticket printing dispenser. This unique equipment prints out a sales ticket showing gallons, dollars and cents, and sales sequence number, all within six seconds after the pump is turned off. The mechanism will print a single three-inch by three-inch ticket. The customer takes the printed ticket, which has been deposited in a chute next to the operating handle, to the central cashier. The installation utilizes a sliding cash drawer similar to those used at drive-in bank teller windows. A feature of these installations is the easily read and clearly illustrated instructions.

Let us now turn our attention to some self-service equipment and installations in Europe.

A specially designed service station has been installed in the forecourt of the Esso Motor Hotel in Amsterdam. Esso needed a service station that would complement the beauty of the motor hotel and would be compatible with the overall garden effect. A close view of the device shows a flower box containing the meter and the hose/nozzle boot.

Multi-key, key controlled self-service dispensers with the key controls housed in a separate console are also used in Europe. Another type of self-service unit in operation is a post pay, blender pump made in England. It is equipped with a swinging arm on top that rotates 360°. The delivery hose is suspended from the swinging arm making it easier for the motorist to serve himself. Swing arm installations are also in use here in the United States.

(Mr. Gerdorn's remarks were liberally illustrated with slides.)

GASOLINE MEASUREMENT AND MARKETING

Electronic Components and Applications

by R. J. McCrory, Vice President, Gilbarco, Inc.



The present gasoline pump that we are all so familiar with is the result of decades of evolution. Today's essential similarity between the pumps offered by any manufacturer can be attributed to the narrow constraints placed upon the design of the pump by safety authorities, the uniformity in mechanical computers, the accuracy characteristics of the positive displacement meter, weights and measures authorities, and the virtual identity of oil companies' specifications except for cosmetics. With the exception of occasional significant changes—specifically the computing head, remote pumping unit, and most recently the electric computer reset—the only differences between the 1970 and the 1940 pumps are increased reliability, reduced cost, and aesthetic styling.

Starting about 1970, a profound period of change in the gasoline dispensing system began. Although it can be argued which came first, the two factors triggering this period of change were, and continue to be, the advent of self-service marketing in Europe and the United States and, second, the advent of economical and reliable commercial-grade solid state electronic components, especially the integrated circuit package. This situation of rapid change has in turn brought with it the switch from thinking of a gasoline pump as an integrated product, mass produced on an assembly line, to a system made up of modular subsystems combined according to the requirements of the system purchaser. This modular approach may mean that there will be no further new models of pumps introduced by pump manufacturers.

Figure 1 is a schematic portrayal of a familiar conventional gasoline pump. The lower section containing the pump and meter can, under the modular concept, be considered the hydraulic module. The upper portion would then logically be the computer module. The mechanical computer must be driven by the meter, so the two modules are stacked vertically.

To communicate with the outside world, a pulser transmitter can be mounted on the computer; one for money, one for gallons, or two if you want both. Pulses from the transmitters can be used as data links to a variety of control, data acquisition, and readout modules as shown in figure 2, and the ways in which these modular building blocks are plugged together determines the capabilities of the dispensing system. These capabilities could conceivably include remote readouts and

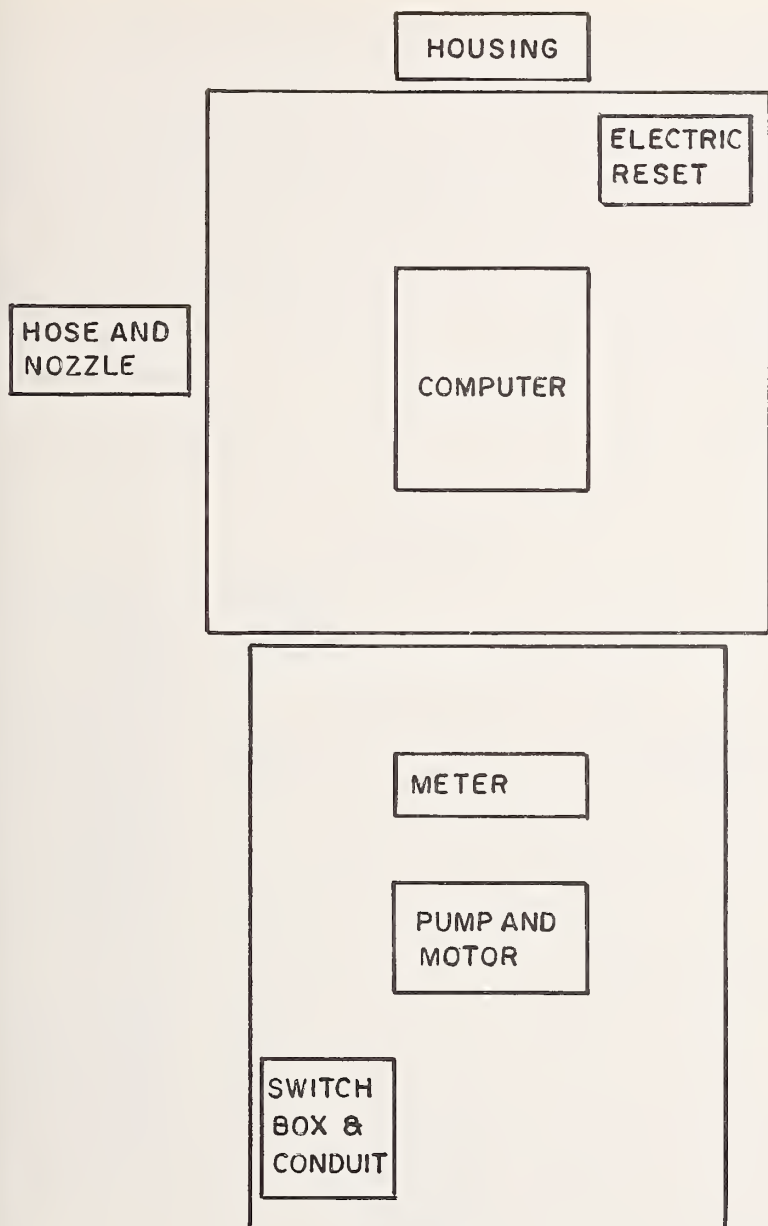


FIGURE 1

printers for self-service, remote dispensing controls, presets, currency acceptors, transaction memories, totalizers, data entry keyboards, data transmitters, credit card reader, etc.

The initial developments in the modular approach involved elemental systems consisting of magnetic read switch pulsers and remote control, and readout consoles using electromechanical components such as relays and solenoid-operated mechanical counters. The use of electro-mechanical subsystems encountered certain limitations, including:

1. A low counting rate of the electromechanical counters which effectively prevents remote gallon readouts to 0.01-gallon increments.
2. Limited life of mechanical components.
3. Difficulty of interfacing with electronic add-on modules as would be required in data acquisition systems.
4. Excessive space requirements of electromechanical circuitry.

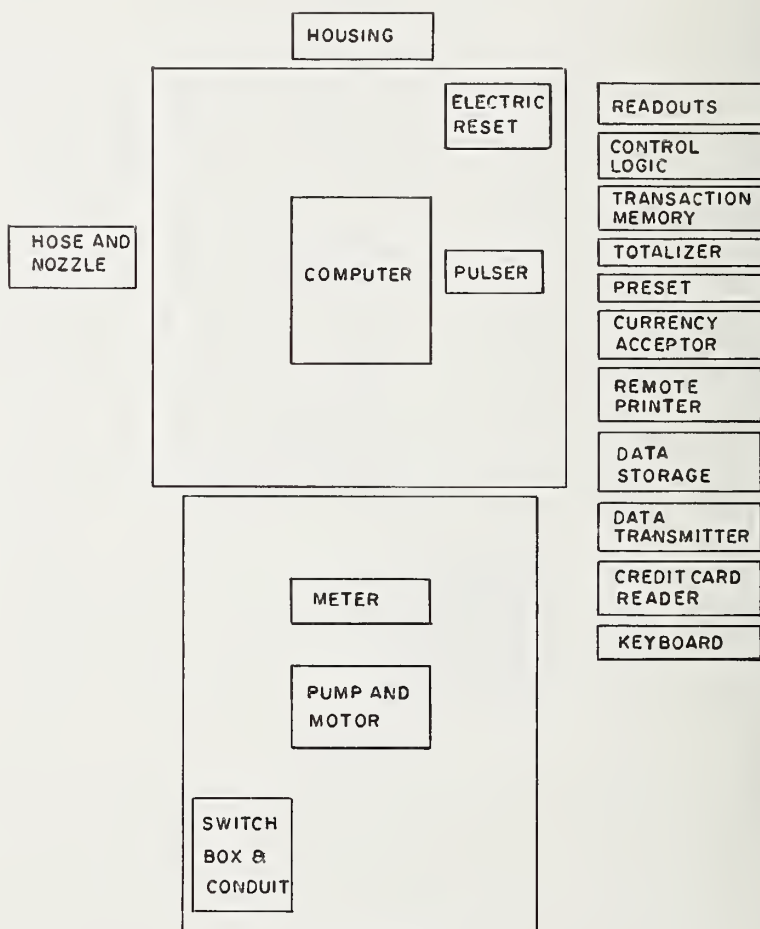


FIGURE 2

In view of these limitations of electromechanical systems, it was apparent that further progress to solid state electronic subsystems was inevitable. This progress had to begin with the pulser. The pulser found to be effective with electronic systems is represented by the optical pulser in which light from a LED (light emitting diode) is interrupted by a slotted disc and pulses are generated by a photo-transistor. There is no practical limit to the pulsing frequency of this type of solid state pulser, and pulsing rates can be selected to be so high that accuracy requirements can easily be met, even when the pulser is driven by a nonresettable shaft of the computer. Further, the electronic pulses can be generated so they are insensitive to mechanical jitter which is to be expected from a mechanical computer and which can cause pulsing errors.

The type of solid state self-service consoles which have recently become available is represented by the TRANSAC series being manufactured by Gilbarco. In the basic versions (TRANSACS I and II), a compact desk-top console contains all the memory, controls, and displays required to serve up to twelve pumps. The display of transaction information is by command of the operator with interlocks provided to prevent reuse of a given pump until the transaction data has been displayed at least once. Data is held in memory simultaneously for all pumps, and the memory for any given pump is retained until the pump is in use on the next transaction. TRANSAC I displays in money only; TRANSAC II in both money and volume to an increment of 0.01 gallons. TRANSAC III is an electronic integrating totalizing module which plugs into TRANSAC I or II and provides station totalization data in various forms. TRANSAC V is a plug-in printing module which prints money, gallons, and other transaction data when the TRANSAC II is commanded to display. TRANSAC VI is a truck stop version of the printer module. Following the modular building block approach, it is not hard to anticipate other TRANSAC subsystems that will be available to the gasoline marketer in the future.

In the meantime, substantial attention is being centered on the computer module and the prospects for electronic computation and display at the island. In figure 3, the mechanical computer module is removed and a computer/display module (or modules) is substituted. The solid state pulser is mounted directly on the meter, and gallon pulses at high frequencies (perhaps 1,000 pulses per gallon) are transmitted to a variator where they are electronically multiplied by the price per gallon to generate a pulse train representing money. These gallon and money pulses are coded and used in an appropriate display. Simultaneously they can be stored in memory for interfacing with a TRANSAC-type module.

To place the question of electronic gasoline pump computation into perspective, the following list of incentives that exist in the United

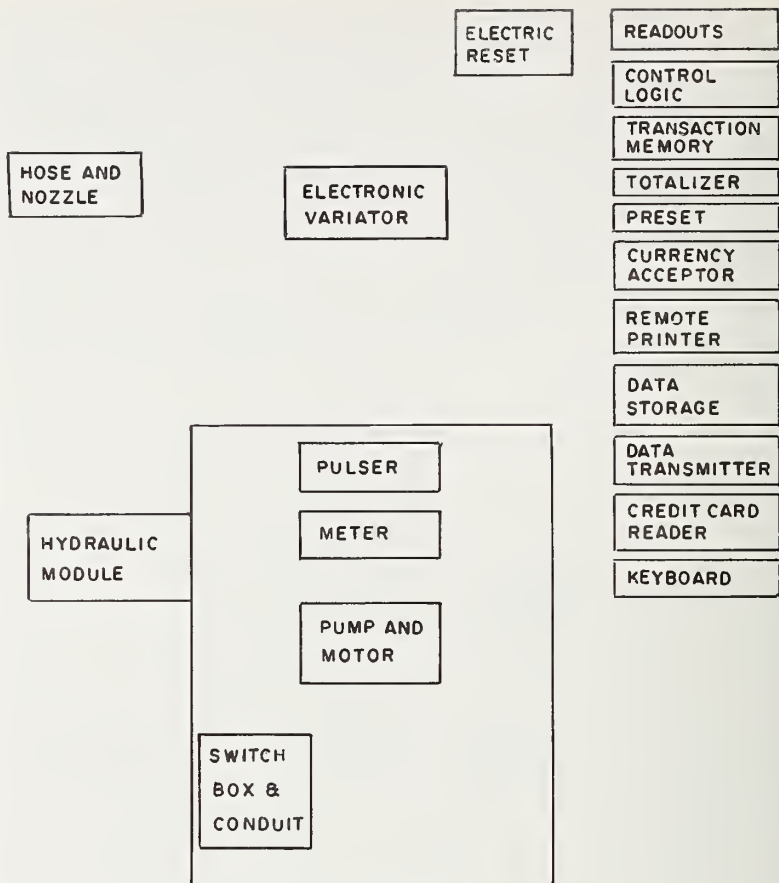


FIGURE 3

States and/or Europe for electronic computation may be helpful:

- Freedom to separate computer/display from the meter.
- Compatibility with data acquisition systems.
- Increased reliability and reduced maintenance costs.
- Ease of operation by self-service users.
- Prospects of providing multiple product capability.
- Ease of price changing.
- Pricing and blend ratio latitude in blenders.
- Improved meter accuracy because of low torque requirement of pulser.
- Progressive image by gasoline marketer.
- Ease of metrification.
- Prospects for 4-digit price settings.

These incentives must be balanced against the first cost of an electronic computer versus a mechanical computer. Although the claim cannot be made that the costs are equal, there is reason to believe that the cost effectiveness of an installation using electronic computers will be superior to one with conventional pumps, and also that the cost trend of electronic components is more favorable than that of mechanical computers.

Various equipment manufacturers and gasoline marketers have conducted extensive experiments with electronic computer systems. In mid-1973, there are sufficient systems in use to identify, as experience is gained, certain characteristics of electronic computation. Some highlights as interpreted by the writer are these, again sourcing information from both the United States and Europe:

- The computational and control circuits are dependent upon the use of integrated circuit devices, and the displays are electronic rather than mechanical.
- Computation and displays are digital rather than analog, and the displays use numerals of the 7-segment type.
- Either central price setting for an entire installation or individual price setting at each computer module is used, and the selection is largely dependent upon installation requirements.
- Although there has been some use of computers without interlocked price per gallon displays, it is now clear that price per gallon displays must display the price set into the computer logic for that transaction.
- Servicing will be done by replacing components rather than repairing them at the site, and diagnostic equipment usable by service personnel is required.
- Presuming that sufficient attention is devoted to circuit engineering, equipment packaging, quality control, and avoidance of component infant mortality, the reliability of electronic computation promises to be superior.
- Consideration of safety and visual requirements lead to substantially different design configurations of the island dispensing point, and the potential of electronic computation is unlikely to be realized by the direct substitution in a pump of the normal mechanical computer with an electronic computer.

Finally, a significant lesson learned by developers of electronic equipment for service station use is this: new and different technology inevitably means reinterpretation of regulatory standards such that the basic characteristics of the new technology will be beneficial. To the developer, this means a willingness to work closely with the authorities in order to substantiate that application of new technical approaches will, in fact, serve the public. With the authorities, there

has been exhibited a willingness to recognize the value of new technology despite the complications this must present to the authorities in administering their functions. The type of exchange represented by this session is invaluable in coping with the advent of electronics in gasoline measurement and marketing, and I appreciate being asked to take part.

WEIGHTING ON THE MAIL

by ARTHUR SMITH, Director, Office of Retailing,
Customer Services Group, U.S. Postal Service, Washington, D.C.



Thank you for inviting me here today. Weighting on the Mail is really a provocative subject. In preparing for my talk on weights and measures, I was reminded of one of my favorite postal cartoons. It shows a clerk with a cage of canaries on the scale in front of him. In each hand the clerk has a stick with which he is beating on the sides of the cage, all the while saying, "Fly, damn it, fly." That's quite a departure from the one with the butcher's thumb on the meat scale!

In the two years since the Postal Service has assumed control over the old Post Office Department, we have taken a hard look at postal weights and measures systems and have made some startling discoveries. Distressing is probably a better word. Your committee seemed surprised that we were not aware of the problems. Seems they called them to our attention in the "old" days. In any event, I want you all to know that we are rectifying our weights and measures problems. And, that is the main part of my discussion.

Before I do get into the specifics of weights and measures in the post office, I want to let you know that we have made substantial progress in all areas of improving postal services . . . to a measurable degree . . . and that we are continuing to make progress.

Most people I talk to are not aware that compared to other nation's postal services, ours is better in nearly every measurable way. We deliver local first class mail overnight consistently about 95 percent. Within the continental United States nearly all first class letters are delivered within two or three days. No other country can match that speed of service in comparable distance. As an example, England's postal system takes up to two days to deliver letters throughout that country—a country the size of one of our New England states. Postal customers in this country marvel at being able to get a letter from Germany in two or three days, and they are dismayed because it sometimes takes that long for a letter to go from coast to coast. Well,

don't praise Germany too highly. Remember, our postal system takes that mail to its destination in this country. As a matter of fact, speed of foreign mail coming to this country is a result of speed in our system, not theirs. So, the person to thank for speed of foreign mail is your own postman.

More importantly, we are able to move the mail with great speed without the tremendous subsidies most foreign postal systems enjoy—subsidies coming from their national telegraph and telephone services.

There is good reason for our improved service. That is the change in status from the old Post Office Department to the new United States Postal Service, a public-private corporation which is charged with making the postal services more modern and pay-as-you-go.

Since we have taken over the management of what some folks claim is an unmanageable business, a lot of stories have been circulating about our performance. Many of these are unfriendly. Most of them are untrue.

One of the more recent of these says that the so-called "fat cats" from industry have been given the top jobs in the new Postal Service—that the men and women who worked long and diligently in the government service were simply passed over or thrown out. I hope I don't give the impression of being an old "fat cat." The fact is that I and a large percentage of the other people in headquarters are career employees. Almost all top field managers have come up through the postal ranks.

Another concerns a heartless disregard for free expression of ideas. This is a scene wherein we are driving magazines and newspapers out of business because of unbelievable high postal rate increases. The facts belie the myth. The Magazine Publishers Association said that 160 magazines were sold, merged or discontinued from 1962 to 1972. In that time 753 new ones were started.

The claims of rate increases made by magazine publishers use the misleading term of a 170 percent increase in postage costs. What does this mean in cents per copy? LIFE Magazine, when it folded last December, was paying about three cents per copy for postage. Further, the parent organization, Time, Inc., said that their 1970 expenditures for postage in 1972 were just 2.9 percent of operating expenses.

Now, these two examples are not of much concern to you, insofar as you do not publish magazines, nor are you executives in the Postal Service. But, you surely understand the need for accuracy—perhaps more so than any other group that we might have the opportunity to talk to. Another inaccurate tale making the rounds is that we are supposedly not going to reach the break-even point until 1984 . . . the Postmaster General is discouraged . . . Congress is going to crack down . . . the potential is there for a total breakdown in postal services. All untrue.

The truth is that 1984 only comes into play as an important date because that is the time under Congressional mandate that we must become a break-even operation. This was set so mailers would have ample time to adjust for subsidy loss. Not that we are against subsidies, but we are for open subsidies that are not really a double burden to you—in the form of higher postage as well as higher taxes. Our subsidy from the taxpayers through Congress is being continually reduced. Why? Because we are able to more and more meet our own obligations. We are making the Postal Reorganization Act work and no one, least of all the Postmaster General, is discouraged.

We are undertaking great things—and have accomplished many others—to make sure that your Postal Service will meet your demands today and in the future.

We have made great gains in capital inventory and expenditures over the past two years—last June 30 we had \$175 million of fixed assets on order, more than double the amount of the previous year—but capital expenditures are not the only answer.

In the old days (and unfortunately I can speak with authority on the old days) a postmaster was responsible to one of 15 regional directors: who in turn were responsible to a Deputy Assistant Postmaster General, etc. To put it bluntly, as long as the postmaster kept his nose clean and did not steal a letter or, more importantly, got along with his Congressman, his job was safe and he could do pretty much as he wanted.

That kind of management could mean disaster. In fact, the President's Commission felt we were on the brink of it in 1970. Today, we have decentralized authority and have placed a sensible, workable management structure in the field—a management structure in the hands of veteran postal officials.

The changes we have made in two years are just a beginning. We are constantly improving our products and our services. How? Through new product development, through marketing, through research and development.

Every change we are making has just one goal in mind. We want our customer's business and we are doing everything possible to deserve it.

To offer some proof that we have become competitive, that we want your business and are willing to compete for it, we have told the President and Congress that we are willing to change some of the procedures that gave us the exclusive right of delivery of some types of letter mail.

We feel that by directly facing this challenge we will have to either meet or beat any kind of competition.

Overriding everything else we are doing is our commitment to service—service that meets the needs of the customer as well as service at a cost that is both competitive and fair.

In the line of service, we are proud of what we have been able to accomplish in a relatively short period of time. Remember, we took over an organization that was many, many years old. A lot of systems had developed in that period. And, with the lethargy that normally sets in in an organization that is responsible to many politicians, these systems were not changed—at least not very much—in many, many years.

Our measurable service, backed up with facts and figures, is a lot better than when the Postal Service came into existence. For example, on a national basis complaints reported to and by postmasters and post offices are down a lot—over 16 percent since the beginning of the year! (ODIS Figures)

So, in my view and in the view of the real rather than imagined experts who are constantly watching the Postal Service, our service is better today than when we took over.

The Postal Service is a communications organization. Our function is to get letters and parcels from one point to another in the fastest, most inexpensive way.

The nation and, indeed, the world is in the midst of a communications explosion. More and more information is being printed and published and distributed than ever before, and it is not about to stop.

So, we have to come up with alternate methods of getting the mail shipped; methods to better support the good old letter carrier. We have been working on these new forms of delivery—our product so to speak.

Express Mail is one area where we have developed a product in competition with existing forwarding services. Express Mail is the Postal Service's answer to air freight. We offer many options for our service—door to door, door to receiving airport, departure airport to addressee, and airport to airport. This is a service designed to meet a specific market. It offers overnight delivery or, in some cases, same-day delivery. It is fast. It is accurate. Best of all, it is competitively priced. The service has been tested and it is successful. It operates in over 50 cities right now, with overseas expansion planned in the near future. We feel we will be able to make a significant dent in our competitor's service with Express Mail.

Lockbox Service is a second service development and improvement. I am sure you all know what a lockbox is. It is that little box in a nest of little boxes along the wall of your local post office. But, in reality that is only a small part of lockbox service. You have all mailed orders and bills and questionnaires back to Post Office Box "whatever" in "whatever" city. Well, this is lockbox service for major mail receivers. The mail is bagged (never really getting into one box) and prepared for delivery. In many instances a lot of Post Office Box numbers are for one customer, so all the mail has to be prepared for that mailer to either be picked up or delivered. In this service we have separated his mail for him precluding the need for a mail room. The Postal

Service has been studying lockbox service to make it more adaptable for customers, and we have come up with some changes, such as restructuring the costs of lockbox service to make it more equitable; providing a forwarding service so mail can be sent to one central location from several cities; allowing for utilization of special box numbers so the customer can use an historic or interesting location for his return mail—something which is precluded under present postal regulations.

Automation is another area in which the Postal Service has made a heavy commitment. We have developed sorting machines which take mail to a destination without its being distributed by hand. It is faster and more accurate.

To accommodate those machines, or rather to better utilize them, we have come up with a thing called bar coding. Basically, a bar code is a series of vertical lines of different heights. A machine can read this code, which can contain a full address, and sort it right to its destination bin.

These are just some of the products we have developed which can revolutionize the Postal Service. There are others either in the test stage or on the drawing board; products like facsimile mail, which get a letter from one city to another in a matter of hours. In the future, we can see the telephone being utilized more as a mail communications device, wherein a terminal at one phone could receive a letter from another phone.

What this all adds up to is a deep commitment to the American public that the Postal Service will continue to provide new and better service utilizing the most modern techniques at the most affordable cost.

I hope I have convinced you that the Postal Service has not had a “fair measure” by its critics. Now, I would like to tell you about what we are doing to give our customers a “fair measure” with our products.

I think we should start this discussion by pointing out that the present state of weights and measures in the post office is not good. Our scales are not the best, and, frankly, they are not the most accurate. There are reasons why they are not either the best or the most accurate. Primarily, it is because there are no Postal Service-wide standards for scales and weights and measures. Local postmasters, in most cases, are responsible for the accuracy of scales which means simply that many scales often go unchecked for long periods, which is bad, or they are not checked scientifically which often is worse.

What does this mean to the average postal user? A lot. Almost all of our revenue, in fact, 99 percent of it, comes from measured mail. That is, mail which is charged for on the basis of weight or distance traveled or both. This is true today; it was true two years ago when the Postal Service came into being. Knowing this, you can all imagine

our surprise in learning that there was no real check and balance system in the post office. It was, in effect, up to the local postal people to make sure that they were getting the correct revenue from measured mail.

There are two ways to look at the possible results of this makeshift checking procedure. One is that the customer is like that person who enters a butcher shop to buy a steak and pays for a steak and one butcher's thumb—a thumb which he cannot take home. The other is that the customers are getting a real bargain because there is no way to check if the prices charged are correct.

It is important to point out here just what weights and measures mean in the post office. What do we measure? All mail that goes through our system is measured at one point or another. Why do we measure? To determine the rate which the customer is charged for the item being mailed. To illustrate, first class mail is charged at the rate of eight cents per ounce anywhere in the United States, Canada, or Mexico. Air mail is charged at eleven cents per ounce. Foreign mail is based on the country in both cases.

Parcel Post is a little different. Here the rates are based on both a weight and distance factor. So, a package weighing at least one pound and less than two pounds being sent locally by surface mail costs the customer sixty cents. If that parcel is traveling into the first or second contiguous zone, the cost is sixty-five cents and so forth. Priority mail—the parcel post classification which moves the quickest—costs one dollar for a package weighing between nine ounces and one pound everywhere in the United States. As the weight increases, so do the rates.

When we get into third class mail, the rates become even more complicated; so complicated, in fact, that the charts and regulations fill several pages in the postal manual. You can readily see that weights and measures is the life blood of our business.

How is all this mail measured? With scales—scales in the customer's office; scales in the lobby of each post office; truck scales on loading docks of major postal installations throughout the country; platform scales for entire loads from a customer vehicle; self-service scales in both post offices and unmanned postal stations.

Incidentally, rates are not the only thing determined by weights and measures in the post office. Our employee productivity is measured by the amount of mail handled by weight. So, there is an added dimension to the importance of measurement in the postal service.

Now that you know the real importance of scales in the post office, let me get back to where we are today in our weights and measures program. Let's examine how weights and measures are determined today and who makes those decisions.

The majority of the mail which is handled by the post office already has the postage affixed. This is true for parcels as well as letters. Here,

the customer is responsible for accuracy if he puts the stamp on the parcel or letter. If it is incorrect on the low side, that postage must be recovered, which is the reason we have developed that interesting little stamp "postage due." So, the addressee cannot get the mail until the extra money has been paid.

On the other hand, if the postage is too much, it is also the customer's responsibility. Simply stated, that incident is a shame, but there is nothing we can do to rectify it. We haven't developed a "refund due" stamp yet—nor do we really plan to.

Now, you ask, how do we check to make sure the postage is right. On package mail there is a minimal check. Packages are pulled on a routine spot to weigh them and find out if the customer owes the Postal Service more postage. This is a very spotty operation at best. Letters are seldom checked, unless they obviously look or feel as if the postage is not correct.

Since 60 to 80 percent of all postage is affixed by the customer, you can see that a complete checking operation would be difficult, if not impossible. Can you imagine the outcry from customers if we stopped and weighed each parcel and letter to make sure that the postage was right. If you think the complaints about frequency and speed of service are heavy now, let your mind wonder to that time when we would be spending more time weighing than sorting and delivering.

I am not intimating that the customers try to squeeze the Postal Service pocketbook. The vast majority of our customers who are responsible for putting postage on their mail is honest. After all, it is in the customer's best interest that the Postal Service get to the point of being pay-as-you-go. No one, except maybe some of our competitors, want to see the Postal Service go under. After all, what would we do with those thousands of red, white and blue boxes?

Customer responsibility, therefore, is not our problem. The weights and measures problems of the Postal Service can be found in each post office at the scale by each window and on each loading dock. This is where some one-third of our revenue is collected, and this is where we fall down in our checking. The responsibility here for postage lies with each postal clerk. As he weighs each item, he affixes the postage and lets the customer know how much the item will cost to mail. If the scales are correct, the post office receives the correct postage, obviously. If there is error on either the customer's or the post office's side, then the correct money is not received. Therein lies the problem.

As noted before, we know for a fact that scales in each post office are not checked on a regular scientific basis.

We assume, as I pointed out earlier, that the amount of money lost is outweighed by the money gained by inaccurate scales. We assume that. But, consider for example the Chicago Post Office—the largest in the world. If every scale in the main post office in Chicago was off by an ounce, or in dollars and cents, 8 cents, and that error was not in

the post office's favor, consider the amount of money lost to the Postal Service in one single day when our average daily revenue is \$1.1 million for Chicago alone! Or, conversely, consider if that error was in the post office's favor. Consider the amount of money we would be taking in that was not rightfully ours.

The money here boggles the mind. And, with all the problems we have encountered in the first two years of our changeover from government to quasi-private corporate status, we don't need our minds boggled any more than they already are.

Well, that is where we are today—and where we were in the past. All in all, it is not the brightest picture in the business world. Even in the Postal Service, however, hope springs eternal. Knowing the problems we have had since the Postal Service came into existence, we have had many people studying the areas where we can improve service and make the service more of a break-even proposition.

One of the primary areas of concern has been in our weights and measures efforts. We have, therefore, put out for a bid a research and development contract for development of a uniform scale allowing minimal variance (0-70 pounds). We have been looking at this problem for the past two years, and I am pleased to report that we have made considerable progress.

A contract has been awarded to Fairbanks Morse, and in just 14 months we will have completed the research and development phase of the contract and will be in a position to go into production of scales for every post office in the country. When completed, it will be the most accurate scale available, combining the age-old science of weights and measures with the technology of the transistor. This blending of traditional and new technology will result in a scale that is really a minicomputer, which will give us computerized postage—a digital readout scale that both the clerk and the customer will be able to see. The scale will also compute special services automatically; i.e., special delivery, air mail, priority mail and the like. This scale will leave no room for error on the part of the clerk. Our new scale will also take into account the metric system so it will be as good in the future as it is today. That is what we will have. But, even the finest precision scale will be of little use if it is not properly used and tested.

To answer the needs for precise instruments which will always be in tune, we have developed a scale operations and maintenance handbook, and a Postal Service Scale Inspection and Test Program.

In the unparalleled language of the bureaucracy, "The specifications, tolerances and other technical requirements for commercial weighing and measuring devices, as recommended by the National Conference on Weights and Measures and published in the current editions of the National Bureau of Standards Handbook 44, shall be the specifications, tolerances and other technical requirements for weighing and measuring devices used in the United States Postal

Service except insofar as specifically modified, amended or rejected by regulations issued by the Postmaster General or his designated representative."

What this means, simply, is that for the first time in post office or Postal Service or even Pony Express history, the scales used by post offices will be standardized on a national basis to conform with those in use by industry and government. But, even more important, we are going to have a regular, detailed procedure for making sure that these scales are correct. We plan to use the services of an independent testing service or the state weights and measures people on a regular basis—at least twice a year—to test and seal every scale in every post office. Additionally, our manual provides instructions for the scale user—the clerk—to test his scale on a once-a-week basis.

Now, with all the work which has gone into our scale program, we hope to come up with a scale that is virtually trouble-free and quite accurate. On the chance, however, that it is not, a notice of "scale non-conformance" will be issued to the postal authorities. The scale will not be used until it is repaired, which will be done within one month of test date. Then, the scale will be retested to make sure it does comply with normal operating procedure.

Testing is just one part of our new scale program. Of equal importance are our planned maintenance procedures. A complete program of routine cleaning and adjustment is spelled out in the manual. This work will be done by the clerk using the scale after a training session. If the maintenance involves taking the scale apart in any manner, this will be done in the post office by qualified scale maintenance personnel.

The clerk's work involves external checking, adjustment of zero balance and making sure the platform is free to move. This is to be done weekly.

What I have outlined is a program of scale development, maintenance and testing which will finally bring the Postal Service weights and measures practices, equipment, and procedures in line with those of industry and other government agencies.

We feel we will have the finest scale that money can buy and research can develop, and the best maintenance program.

The best way to sum up, therefore, is to tell you that in the old days the weights and measures procedures of the post office provided no check for us nor did it provide a check for our customer.

Within the next 14 months, we will finally have developed a program which will give us a new scale and, more importantly, provide a check on our performance and a check for you. It is a really exciting program. I hope you will lend the Postal Service your support.

I thank you for your time. I hope that what I have outlined has been both informative and useful. If you have any questions, I will be happy to try to answer them.

DISCUSSION

MR. M. TRUJILLO (Puerto Rico) : I would like to know how we can deal with a situation where a customer who happens to have a scale at home weighs his package and then goes to the post office. He then has to pay more because there is apparently an inconsistency between his scale and the post office scale. It may be that his scale is the one that is wrong, but what can we do in those instances? How do you plan to coordinate this with the weights and measures program?

MR. SMITH: Well, if I understand your question correctly, do we intend to insist on using our scale as the official weighing device? The answer to that is yes; it is now. The only thing we can do along that line is to make sure, to better make sure, that our scales are accurate and are correct. Does that answer your question?

MR. TRUJILLO: Yes. Are you contemplating the possibility of having our people certify the scales that you are going to use?

MR. SMITH: We intend having an independent agency check our scales. The possibility exists that your people might be that independent testing agency. To be honest with you, we are working now with Agriculture; we are working with our own Office of Audits, which is a separate organization; and with your people in trying to develop this testing method.

MR. TRUJILLO: Are you aware that the Armed Forces already uses our services?

MR. SMITH: Yes, I am.

MR. P. NICHOLS (Alameda County, California) : On occasion we have had requests by the Postal Service to check your devices and when we find them incorrect, nothing is done to correct these devices. We will call back in a thirty- or sixty-day period, but we have not had any cooperation from your people on the repair of these devices. My question is what can we do now to alleviate this problem?

MR. SMITH: First, let me explain to you what you are suffering from. We have gone recently from an organization that is completely governed and directed from Headquarters to one that is run by the local sectional center postmaster. We have given him a great deal of independence in doing that. We have had a lot of false starts on a lot of programs, including scales. I am familiar with the fact that in some of the southern states we have an active testing program going which was instituted about two years ago.

We are now pulling those into one national program. Parts are ready to go now, other parts will not be ready to go for fourteen months. When they are instituted, they will be instituted with teeth. In other words, once a scale is tagged, it is out of service automatically and we will police that ourselves—with your help.

MR. NICHOLS: Our problem then is in the interim period between now and fourteen months from now.

MR. SMITH: In the interim period you are still faced with the fact that we are an independent Government agency not subject to the legislative or other resources of other Government agencies, and that has not changed, unfortunately.

MR. NICHOLS: We will look forward to the change in fourteen months then.

MR. SMITH: You and I too, Pat.

MR. L. D. HOLLOWAY (Idaho): We had discussed in our interim Liaison Committee meeting, in relation to this pilot program, that I was to communicate with, or receive communications from, Mr. Schoonover. Was that his name?

MR. SMITH: Bill Schoonover, that is correct.

MR. HOLLOWAY: Could you give me at this time any information as to this pilot program that we had tentatively scheduled?

MR. SMITH: Yes. First, I will offer my apologies for not getting back to you directly, but we have gone through this reorganization and it has occupied our time. That is a lame excuse. We ran into one snag, as you know, in our deliberations; that is, you, I, and the other fellows, on the possibility of being charged for the services of the weights and measures people by certain states which caused us to stop and take a look at the alternatives available to us. If certain states are going to charge us to perform a service which another independent agency might give us free, we need to look at both those things at the same time.

So, what I am trying to do is arrange with the Office of Audits, with Agriculture, and with weights and measures to do a simultaneous test. And, again, I apologize for not getting back to you at any time.

MR. HOLLOWAY: What independent agency is going to do it for you for free?

MR. SMITH: Either Audit or perhaps Agriculture agents, with our equipment perhaps.

MR. HOLLOWAY: A normal weights and measures test, are you saying?

MR. SMITH: Yes.

MR. HOLLOWAY: Now, to be specific, are we going ahead with this pilot program?

MR. SMITH: Yes, sir—with all three pilots.

MR. C. WOOTEN (Florida): You mentioned some exemptions from Handbook 44. Will there be many exemptions, do you know?

MR. SMITH: The exemptions do not deal with tolerances and the like. The exemptions deal with the manner that H-44 states that the scales will be taken out of service and that type of thing. In other words, there are certain things in Handbook 44 that would take away the autonomy of the Postal Service, which we just cannot tolerate, but the specifications and the procedures used in Handbook 44, except those kind of procedures, will be followed to the letter.

MR. WOOTEN: Would one of these exclusions be the customer position of the scale?

MR. SMITH: No, sir, our plan is that every scale in the Postal Service will be visible from the customer's viewpoint as well as from our postal clerk's viewpoint—every scale.

MR. WOOTEN: There will be a change of your present counter setup?

MR. SMITH: Yes, sir. The fan-type scale will have a window on the back until it is phased out.

MR. R. L. THOMPSON (Maryland): What are your plans, if any, to require this independent agency to have their standards traceable to perhaps the Federal or state standards?

MR. SMITH: We hope to run our handbook through your weights and measures people and through the National Bureau of Standards. Once it is approved, the only document that we care to have to conform to will be that document itself.

MR. THOMPSON: I am sorry, I did not make my question clear. I am talking about the secondary standards of weight that they will use to verify that these scales are correct, their test kits.

MR. SMITH: Oh, the test kits will be approved by the National Bureau of Standards.

MR. L. D. DRAGHETTI (Agawam, Massachusetts): What recourse will the consumer have if he feels the weight is wrong on the package?

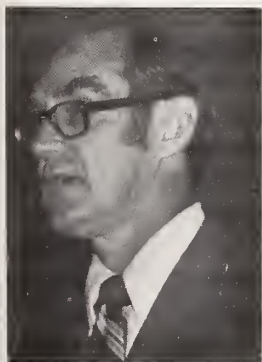
MR. SMITH: If the consumers feel the weight is wrong on the package, they will have recourse to the Office of Audit. They have that now, and that will be continued.

Again, thank you very much for inviting me.

NET QUANTITY—DIRECTIONS AND DETERMINATIONS

Viewpoint on Net Weight Variations

by GEORGE M. BURDITT, Partner, Burditt and Calkins, Chicago, Illinois



It is a pleasure to be with you at the 58th National Conference. I have been with you almost every year for the last twenty years or so, and every year it seems that government and industry are jointly continuing to seek answers to new problems which did not even exist a year or two before. The National Conference itself, the interim committee meetings, the regional and state weights and measures conferences, and the frequent contacts first with Bill Bussey, then with Mac Jensen, and now with Harold Wollin and Eric Vadelund and with you as state officials have enabled us both to do a better job in serving the consumer by assuring the accuracy and currency of our weights and measures system.

In addition to the multitude of new problems for which government and industry have jointly sought answers over the years, there is at least one old problem which continues to warrant our mutual consideration: the problem of unavoidable gain or loss in weight or measure caused by ordinary and customary exposure to conditions that normally occur in good distribution practice. For example, as long ago as 1958, at the 43rd National Conference, Arthur C. O'Meara, then Assistant General Counsel of Swift & Company, spoke to us on "Shrinkage Losses in Food Products." Mr. O'Meara concluded that allowance for unavoidable shrinkage

accomplishes the purposes for which net weight laws are enacted when you consider the necessity of having a law which protects the public, is fair to the manufacturer, and provides the public official with an efficient vehicle for enforcement.

This is, of course, the position which the National Conference has consistently taken.

This problem of shrinkage loss or gain faces virtually every food manufacturer in one form or another. The most common form of the problem is loss in weight due to evaporation of moisture. Another fairly common form is loss of volume caused by settling or the escape of tiny air bubbles originally entrapped in the product.

Discussion of the Facts

It is extremely important for consumers and for us in government and industry to understand and appreciate four facts which are common to all forms of this shrinkage problem.

First, the loss does not in any way affect the nutritional value of the food. In other words, the loss in weight or volume is caused solely by the evaporation of non-nutritional moisture or by the escape of non-nutritional air, or by the simple rearrangement of the food itself within the package. In no case of which I am aware does the consumer receive one iota less nutritional value simply because of the small loss of water, escape of air, or settling.

Second, the amount of shrinkage or gain varies rather substantially depending on a number of different factors, most of which are completely beyond the control of government and industry. Atmospheric conditions—humidity, temperature, and altitude—all have a direct effect on moisture gain or loss. Other factors, such as proper packaging, are within the manufacturer's control, and still others, such as length of time in the channels of distribution, are at least partly within the manufacturer's control. Immense strides have been made in these last two areas—packaging and distribution—over the last several years, and we have even been able to do something about humidity and temperature by improved methods of distribution and retail display. Nevertheless, there remains the unavoidable and reasonable variations which can occur during the course of good distribution practice.

Third, any change in our present laws which would eliminate the time-honored allowance for reasonable variations caused by loss or gain of moisture would increase the cost to consumers. Depending on the particular circumstance, new containers would have to be manufactured, or new labels would have to be used, or both. Costs for these changes must necessarily be borne by consumers. Furthermore, and even more importantly, overpacking or moisture-proof packaging would result in increased cost which also would have to be passed on to consumers.

Fourth, for many years every version of the Model Law and Model Regulation has made provision for allowance of weight variations caused by exposure to varying atmospheric conditions. The current Model Law provides in Section 5.15. that the director shall

Allow reasonable variations from the stated quantity of contents, which shall include those caused by loss or gain of moisture during the course of good distribution practice or by unavoidable deviations in good manufacturing practice only after the commodity has entered intrastate commerce.

The current Model Regulation provides in Section 12.1.2. that

Variations from the declared weight or measure *shall be permitted when caused by ordinary and customary exposure to conditions that normally occur in good distribution practice* and that unavoidably result in change of weight or measure, but only after the commodity is introduced into intrastate commerce: . . . (Emphasis added)

Federal and state statutes and regulations applicable to packaged commodities have made similar allowance for such variations.

Discussion of the Law

With this background of four incontrovertible facts, let me turn to a review of the law concerning this important subject. This law is found partly in our federal and state constitutions, partly in our federal and state statutes, partly in our federal and state regulations, and partly in the decisions handed down by a number of courts all over the United States. Taken together, this body of law is quite extensive, and it leads to one conclusion: reasonable variations caused by loss or gain of moisture during the course of the distribution practice are required to support the constitutionality of a statute or regulation.

Due Process of Law

Let me start with the constitutional requirement of due process of law. The basic constitutional principle is this:

A state or local statute, ordinance or regulation requiring a label statement of net weight of contents of packaged commodities which fails to make allowance for reasonable variations resulting from loss or gain of moisture in the course of good distribution practice is so harsh and oppressive as to violate the Fifth and Fourteenth Amendments to the Constitution of the United States.

The Fifth Amendment provides in pertinent part that

No person shall . . . be deprived of life, liberty, or property, without due process of law. . . .

The Fourteenth Amendment provides, in relevant part:

No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

The landmark case establishing this basic principle as applied to packages of hygroscopic foods is *Overt v. State*, 260 S.W. 856, decided by the Texas Court of Criminal Appeals in 1924 in reversing a lower court conviction of A. C. Overt, manager of Diamond Mill & Elevator Company, for violation of the Texas Net Container Act. As manager, he was engaged in manufacturing wheat flour, packing it in sacks and offering it for sale. It appeared that on January 2, 1924 he packed a sack of flour containing exactly 48 pounds net, at 13.5 percent moisture content. The sack was placed in Diamond's "perfectly dry" warehouse and thereafter exposed for sale. At the time of sale it weighed 47 pounds 9 ounces net, having lost 7 ounces in weight due to evaporation of approximately 6.75 percent of the moisture content.¹ Its food value was, of course, unchanged. The Texas statute did not provide for variations from stated net weight due to exposure to differing climatic and atmospheric conditions. In reversing Overt's conviction the court concluded that:

The restrictions and conditions attempted to be imposed by the law (the Net Container Act) are harsh and oppressive to such an extent as to render it practically incapable of enforcement and violative of the Fourteenth Amendment to the Federal Constitution and Section 13 Article 13 of our State Constitution.

The court defined the question to be decided as:

Whether the makers and sellers of flour, meal, rice, peas, beans, dried fruits, cereals, etc., such as are ordinarily sold in packages and sacks, and which are within common knowledge subject to variations in weight, dependent on climatic and atmospheric conditions, can be penalized for selling, offering or exposing for sale such articles in packages when the net weight of the package is not plainly and accurately marked thereon.

In deciding no penalty could legitimately be imposed under the Texas statute, the court observed that:

... to attempt to penalize him who sells, offers for sale or exposes for sale a package of such stuff, because it has not plainly marked on the container the exact weight of the package, would be to place before any dealer in such stuffs his choice of being punished often and continually, or else going out of business. There appear in this law no tolerances, no variations, no questions of knowledge, willfulness, intent to defraud, etc. It appears inevitable that the dealer in such articles would perforce have to weigh each package in his store every day and put thereon a new brand after each weighing setting out the weight as of that day, according to whether the contents of

¹The court's statement that the moisture content had diminished one percent by evaporation was obviously inaccurate. Instead, the weight of the total contents had diminished by approximately one percent.

such package had been *increased* or *diminished* in weight by the absorption of moisture. (Emphasis added)

For further discussion of the principle stated in *Overt* that exercise of the police power in regulating the production, manufacture, distribution and sale of food products must be reasonable in order to comply with the Fifth and Fourteenth Amendments, reference is made to *Jay Burns Baking Co. v. Bryan*, 264 U.S. 504, 68 L. ed. 813; *Holsum Baking Co. v. Green*, 45 F. 2d 238; *State v. Curran*, 124 So. 909; and *U.S. v. Kraft Phenix Cheese Corp.*, 18 F. Supp. 60.

In *Overt* the commodity was wheat flour. The manufacture and distribution of wheat flour furnishes a good illustration of the soundness of and the necessity for the constitutional principle announced in *Overt*. Wheat flour is a hygroscopic substance that will vary in moisture content depending on the differing relative humidities and temperatures to which it is exposed. Wheat flour must comply with a federal definition and standard of identity that prescribes a maximum moisture content of 15 percent. The amount of moisture in most flour as it flows from the mill into packages is about 13½ percent to 14 percent, depending upon the amount of moisture required for the best milling results from the particular wheat being milled.

A staple item in the American diet, wheat flour is packaged in paper bags of standard sizes for sale at retail at economical prices. The bags, which are relatively inexpensive, are not moisture proof. When evaporation occurs, nothing is lost but moisture. The full nutritional contents of the package remain and the consumer gets full value.

When a mill sets up to produce flour for retail sale, economic considerations require a run of substantial quantities for distribution anywhere, in any state and any direction, that can be economically served from that mill. Special runs for separate localities are economically unsound. There is no way that the mill can determine at the time of packaging where the package will go or what atmospheric conditions it will encounter.

Although flour has been used for purposes of illustration, the relevant facts relating to other packaged foods and commodities in general are similar. The same constitutional requirements and the same need for allowance of variations for loss of weight by evaporation apply.

To prevent loss of moisture in packaged commodities of hygroscopic character between date of packaging and date of retail sale under varying atmospheric conditions to which they may be exposed would require packaging in moisture-proof containers. This would substantially increase the packaging costs and transportation costs. The increase would have to be passed on to the consumer, with no resulting benefit to the consumer. This extra expense would have to be added to the price of every package manufactured for retail sale—not merely to those packages that actually will happen to lose moisture by evaporation. Furthermore, many foods would be adversely affected technologically by moisture-proof packaging.

In addition, a strong case can be made in support of the theory that a state law or local ordinance that would result in the addition of unnecessary expense to the retail purchase price of every package of a commodity sold throughout the nation, merely in order to avoid evaporation in a relatively small percentage of the packages sold, would constitute a burden on interstate commerce in violation of the interstate commerce clause of the United States Constitution.

In exercising its right to regulate interstate commerce, Congress has the power to regulate the labeling of foods up to the time such food is sold at retail. See *United States v. Sullivan*, 332 U.S. 689, 68 S. Ct. 331, 92 L. Ed. 297 (1948). Nor can it be disputed that Congress has exercised this power to the fullest with the passage of the Food, Drug and Cosmetic Act, 21 U.S.C. Section 301 *et seq.*, and the Fair Packaging and Labeling Act, 15 U.S.C. Section 1451, *et seq.* These acts control the packaging of foods throughout the United States. The Food and Drug Act states that a food package shall be deemed to be "misbranded,"

unless it bears a label containing . . . (2) an accurate statement of the quantity of the contents in terms of weight, measure, or numerical count: Provided, that under clause (2) of this paragraph reasonable variations shall be permitted, and exemptions as to small packages shall be established, by regulations. . . . 21 U.S.C. 343(e) (Emphasis added)

Similarly, the Fair Packaging and Labeling Act prohibits the distribution in interstate commerce of any food package unless the package is in conformity with regulations promulgated by the Secretary of Health, Education and Welfare. 15 U.S.C. 1453 and 1454. Note that this direction in the Food and Drug Act is *mandatory*, and the Fair Packaging and Labeling Act specifically provides that it does not supersede the Food and Drug Act. 15 U.S.C. 1460. Under this authority granted in both the Food and Drug Act and in FPLA, the Commissioner of Food and Drugs, by delegation from the Secretary of Health, Education and Welfare, has promulgated a regulation carrying out this Congressional mandate. Section 1.8b(q) of federal regulation (21 C.F.R. 1.8b(q)), promulgated under both acts, provides:

The declaration of net quantity of contents shall express an accurate statement of the quantity of contents of the package. *Reasonable variations caused by loss or gain of moisture during the course of good distribution practice or by unavoidable deviations in good manufacturing practice will be recognized.* Variations from stated quantity of contents shall not be unreasonably large. (Emphasis added)

In the face of this comprehensive federal labeling program, it would seem that any state or local attempt to impose a further labeling requirement would violate the interstate commerce clause. A manufacturer confronted with the federal requirements on the one hand

and a no-variation state or local law on the other is presented with a Hobson's choice. Either he continues to label, pack and distribute food in compliance with federal law and consider termination of state or local sales operations or he reorganizes his nationwide packing, labeling and distributing procedures in a vain effort to comply with the state or local law. In the latter case, the effort would probably be in vain because of the scientific characteristics of the food and illegal because it would of necessity violate federal law.

The problem is that a state or local governmental unit should not and does not have the power to discriminate against food packaged and shipped in full compliance with federal regulations, nor does it have the power to impose its law or ordinance on interstate commerce. This would be an obvious burden on interstate commerce in violation of article 1, section 8, clause 3 of the federal Constitution. *Southern Pacific Co. v. Arizona*, 325 U.S. 761, 65 S. Ct. 1515, 89 L. Ed. 1915 (1945). Any other conclusion would permit the anomaly inherent in a situation where two identical food packages are packed and shipped, one to a reasonable variation state and the other to a no-variation state. If we assume each is subjected to identical atmospheric conditions and as a result contains slightly less than the stated net weight by reason of moisture loss, the food offered for sale in the reasonable variation state may be legally sold, but the food offered for retail sale in the no-variation state would be considered to be illegal. No reason exists which would justify such disparate treatment of identical articles of commerce. The flow of interstate commerce must be free from such illogical impediments. *Quaker Oats Co. v. City of New York*, 295 N.Y. 527, 68 N.E. 2d 593 (1946); *State v. Hotel Bar Foods, Inc.*, 18 N.J. 115, 112 A. 2d 726 (1955); and *State v. Waldman*, 61 N.H. Super 403, 160 A. 2d 677 (Cty. Ct. Law Div. 1960).

Another interesting interstate commerce question arises because of the wording of Section 5.15. of the Model Law which limits the allowable variations to those caused by evaporation *only* "after the commodity has entered intrastate commerce." Section 12.1.2. of the current version of the Model Regulation defines "introduced into intrastate commerce" to mean the time and place at which the sale and delivery of a package is made "within the state."

Under a literal construction of this language, the first sale and delivery of a packaged commodity shipped into the state from another state would usually be the retail sale to the ultimate consumer, with the result that no variation would be allowed. By contrast, if the packaged commodity were manufactured within the state it would be allowed all evaporation from the time of shipment by the manufacturer to time of retail sale. The competitive disadvantage thus imposed on interstate commerce in the commodity may also violate the interstate commerce clause of the Constitution of the United States.

Federal Preemption

Let me turn now to a brief discussion of the issue of federal preemption. The proper labeling of food packages is a matter of vital interest to consumers, industry and enforcement officials in the entire nation, not just in one state. Nationwide uniformity is a cause which has been espoused by the National Conference for many years, and in my opinion it has never been more important to reemphasize the necessity of uniformity than it is in 1973.

The federal government has recognized both the importance of consumer protection and the need for national uniformity of labeling requirements, and has successfully achieved these two goals by the creation of a detailed and well-conceived packaging and labeling program in which the National Bureau of Standards has been a very active participant for many years, going back to both Bill Bussey and Mac Jensen. To achieve this uniformity Congress has passed both the Food and Drug Act and the Fair Packaging and Labeling Act. Because of the disastrous consequences of nonuniformity, Congress wrote Section 12 into the Fair Packaging and Labeling Act which provides:

It is hereby declared that it is the express intent of Congress to supersede any and all laws of the States or political subdivisions thereof insofar as they may now or hereafter provide for the labeling of the net quantity of contents of the package of any consumer commodity covered by this chapter which are less stringent than or *require information different from* the requirements of section 1453 of this title or regulations promulgated pursuant thereto. 15 U.S.C. 1461. (Emphasis added)

The Food and Drug Act requires regulations authorizing reasonable variations, and FDA has effectuated the statutory mandate by making a specific allowance for moisture gain or loss in Section 1.8b (q) of the regulation, which is quoted above, promulgated under both the Food and Drug Act and FPLA. It would, therefore, appear that a state law or local ordinance which does not allow for reasonable variations would run afoul of the preemption section of the FPLA.

Conclusion

In conclusion, may I say that in our system of American jurisprudence, and particularly in this area of the law which deals with consumer protection, it is important to continually reexamine positions previously taken. It is, therefore, important for you as enforcement officials and for those of us in industry to regularly revisit the question of moisture loss. If the historical position which has been taken by the National Conference, by state legislatures following your lead, by the Food and Drug Administration, and by the courts is sound, it should remain as our present position. I submit to you that it is sound, and that any change in that historical position would in fact be detrimental to consumers and in law would be unconstitutional.

NET QUANTITY—DIRECTIONS AND DETERMINATIONS

Status of Handbook 67 Revision

by ERIC A. VADELUND, Office of Weights and Measures,
National Bureau of Standards



My purpose here this morning is to review for you all known developments concerning Handbook 67. In short, I will attempt to tell you what we are doing and why we are doing it. But, first, the why.

As you know, Handbook 67 is a checkweighing procedure manual published by the National Bureau of Standards in 1959. Since that time it has been used officially and unofficially as a method for the inspection, test, and control of packaged commodities by both industry and enforcement agencies. The document has not been significantly amended or changed since its publication. Some few additions to it have been made, but these have been limited to a discussion of how to use the checkweighing procedure when testing aerosol products.

Over the years certain deficiencies and limitations have become apparent. The Handbook, for example, offers guidelines only for packages sold by weight; little or no mention is made of packages sold by count, fluid measure, linear measure, or the like. Generally, questions concerning the proper procedure to be employed in checking packaged goods labeled in other than weight units have been worked out on an *ad hoc* basis and presented to weights and measures officials during regularly scheduled training schools. Another limitation is the lack of any discussion concerning what to do with packaged commodities bearing two or more statements of quantity, such as count and size, weight and size, or area, count, and unit dimensions. Numerous packages are so labeled and do present problems.

Another basic problem we have encountered is that while Handbook 67 has been widely accepted and employed, this has by no means been universal. There are enforcement agencies at the federal and state levels which employ other procedures. This necessarily presents a problem when the same shipment of goods, or part of the same shipment, is being checked by two different agencies employing two different methods with the distinct possibility of two different results.

Elaborate detailed criticisms could be made about any of the deficiencies or limitations of the Handbook including the lack of a definition of a good lot, shipment or delivery. These terms are used without exact definition and without recognition of the fact that they

change or should change depending upon whether one is applying the procedure in a retail, wholesale, or manufacturing outlet.

Perhaps one should not be too discouraged since the Handbook represented a pioneering effort and criticism usually has the benefit of hindsight. We have all been hearing a great deal about the benefits of hindsight lately. One might conclude that after 15 years or so, it is time to take a closer look at the problem and apply the wisdom of 15 years experience. We have so concluded, helped not a little by several recent court decisions.

The fundamental concept upon which all checkweighing systems are based is the "average concept" as expressed in the Model State Packaging and Labeling Regulation. Section 12 of the Regulation states in part:

Variations from the declared net weight, measure, or count shall be permitted when caused by unavoidable deviations in weighing, measuring, or counting the contents of individual packages that occur in good packaging practice, but such variations shall not be permitted to such extent that the average of the quantities in the packages of a particular commodity, or a lot of the commodity that is kept, offered, or exposed for sale, or sold, is below the quantity stated, and no unreasonable shortage in any package shall be permitted, even though overages in other packages in the same shipment, delivery, or lot compensate for such shortage. Variations above the declared quantity shall not be unreasonably large.

The Model Regulation also makes mention of variations in packages caused by exposure and specifies when this is to be permitted. A comparison of the Model Regulation's requirements with those adopted by federal regulatory agencies shows a great degree of similarity. The language in the regulations issued by the Federal Trade Commission, Food and Drug Administration, and the United States Department of Agriculture is very similar and in some cases identical to that in the Model. If nothing else, at least we have that much uniformity. Further, the Model goes on to state that:

The magnitude of variations permitted under Sections 12, 12.1., 12.1.1., and 12.1.2. of this regulation shall, in the case of any shipment, delivery, or lot, be determined by the facts in the individual case.

This particular section of the Model is a key element in recent court decisions concerning state weights and measures package control programs. The first case to deal with this issue occurred not too long ago in North Carolina. Specifically, the case concerned a charge that a store operator offered short weight meat for sale. The case was argued before the Honorable Sam J. Ervin III of New Hanover County Superior Court, North Carolina. The defendant's attorney argued for a motion to quash the warrant on the grounds that the regulations on which it was based were totally unenforceable and meaningless. The defense pointed out that the State law (Model Law) provided for reasonable variations; it further provided for the adoption by appro-

appropriate authorities of reasonable variations through the promulgation of rules and regulations. The defense then took a look at the rules and regulations adopted under that provision of the law. It found, of course, the same reasonable provision that reasonable variations were permitted as the law prescribed. Going further in the rules and regulations he came across a section identical to Section 12.2. of the Model. It provided that the reasonableness of the variations is to be determined on the facts in each individual case. As the defense attorney noted, he was trying to find out what it was his client was prohibited from doing. He was looking for some criteria that had legally been laid down, against which his client could measure his conduct. In his search he came around in a circle.

In ruling on the motion, the Judge stated :

I think a harsh standard that is clear is a whole lot better than a standard that attempts to be fair but leaves a man in such a position that he just doesn't really know with any degree of accuracy what he can do and what he can't do and avoid being in trouble.

Essentially, the Judge agreed with the defense that he had indeed "come in a circle." It is somewhat akin to chasing one's tail. Needless to say, the motion was granted.

This situation also reminds me of a personal experience I had while traveling across country some time ago. While motoring through Iowa, I was somewhat startled to see the speed limit signs which categorically stated that the nighttime speed limit was 60 miles per hour. By day, however, the speed limit was listed as "reasonable and proper." I often wondered what happened when you got arrested for speeding during the daytime.

A second case dealing with the issue of reasonable variations is the celebrated California case concerning short weight packages of bacon. This case has numerous ramifications including the question of federal preemption of state law. I will attempt to confine my remarks to the question of "reasonable variations." In the bacon case, there seems to be no question that the packages were short weight. Weights and measures officials checked them, found them in violation, and filed charges. After much legal action, a case finally came before the United States District Court for the Central District of California.

In the Memorandum Opinion and Order of the court, it was noted that the United States Secretary of Agriculture had authority to implement a portion of the Wholesome Meat Act by publishing rules and regulations defining the reasonable variations permitted by the Law. In fulfilling this obligation, the Secretary promulgated the following requirement in Section 517.2.(h) (2) :

Reasonable variations caused by loss or gain of moisture during the course of good distribution practices or by unavoidable deviations in good manufacturing practice will be recognized. Variations from stated quantity of contents shall not be unreasonably large.

I am sure you will agree that the language is very similar to that of the Model Regulation. In the order issued by the court, one of the key findings read as follows:

Section 317.2.(h) (2) is void for its inadequacy to set any recognizable standard upon which any individual may measure his conduct or his compliance with the law by which he must order his personal or business life.

The Judge footnoted his finding with this charming statement:

Under the regulation as it is written one meat inspector may conclude that x percent loss of moisture can be expected. Given the same factual context, another meat inspector may come to the conclusion that y percent loss of moisture is reasonable. Delegation of "administrator's function" has never included giving each enforcement officer the "keys to the jailhouse."

From these two cases, there appears to be sufficient similarity of conditions, regulations, and findings at the state and federal levels to indicate a certain commonality of interest. What we have learned is that in addition to a sound statistical checkweighing procedure, we all need to adopt definitive statements regarding reasonable variations for all products. We feel this can be done and we hope to do it in a successor document to Handbook 67.

Already this mutual concern has led to the establishment of an informal working group of officials from NBS, FDA, FTC, and USDA. The basic premise is that since we are all interested in enforcing similar requirements, we need a uniform approach. We propose to develop several documents to do the job.

The basic principles are those of Handbook 67: the average of the quantities in the packages comprising a lot shall not be less than the declared weight, and an unreasonable shortage in any individual package is not acceptable. (This is an abbreviated paraphrase: it will be important to give attention to the precise statement.)

We propose as a long-run goal a system of documents, to be built up in looseleaf format, to provide the following information and services for weights and measures officials and other regulatory officials.

1. Classification of types of packages as to whether they are:
 - a. standard or random pack;
 - b. labeled by weight, liquid measure, count, linear or square measure, or combinations of these;
 - c. the importance or unimportance of tare weight variability;
 - d. special problem packages such as drained weights and aerosols.
2. Procedures for measuring the quantity in each type of package.
3. Classification of market situations in which inspection might be conducted such as:
 - a. retail shelves,
 - b. retail stockroom,
 - c. distribution center,
 - d. packaging plant.

4. Procedures for defining "lots" in each market situation, and for drawing a "random sample" from a lot.

5. Recommended sampling plans, with guidance for selecting a plan appropriate for a particular market situation, lot size, risk level, and packaging variability.

6. Model reporting forms to record the execution of appropriate procedures.

Because the implementation of any package inspection scheme depends on the properties of the production, handling, and storage of the commodity, a data bank will have to be maintained to give a valid basis for quantifying "unreasonable" variation.

One will need a catalog of commodities, giving the types of packages used, a measure of packaging variability, and a definition of "unreasonable shortage" for each; and a system for keeping such a catalog up to date. Procedures for developing data for new commodities or packages will also be required. The catalog will develop slowly, through cooperative effort among all the interested parties, and interim working values will have to be provided. The possibility of interim working values and schemes is very real, since the need for this is urgent. It would be fortunate indeed if we could all proceed in lockstep, but the probability of that is not very high.

Once the basic work is completed, with all of the uncertainties resolved by the engineers and statisticians, it will give fixed and unambiguous rules leading to the acceptance or rejection of a lot of packaged goods. These rules, when adopted by the various jurisdictions, will provide the legal basis for a package control program. The inspector's role will be to simply apply the rules; he will no longer be burdened with the keys to the jailhouse.

DISCUSSION

MR. K. ALLEN (Hobart Manufacturing Company): Ever since Handbook 67 came out I have had questions from my customers, the people who buy our scales, as to how we can meet the requirements of Handbook 67, which are unilateral, when we use scales that have bilateral tolerances. Now by that I mean that Handbook 44, which is a document of this Conference, allows plus or minus errors. How can you take a scale that has a tolerance, plus tolerance or minus tolerance, and on that scale produce packages which will meet this average concept?

There is a double-barreled question I would like to ask. Is H-67 reasonable when it says that you can have variations in packages but the average for any lot shall never be a shortage? What should I say to my customers who ask how they can meet these requirements on our scales and also meet H-44 requirements?

MR. VADELUND: You simply declare your prepack scale a noncom-

mercial device, which is essentially what it is. The package speaks for itself. Does that respond?

MR. ALLEN: I have occasionally recommended to them that they arbitrarily set the scale to under indicate and take the loss to be safe. Again, what happens there is what Mr. Burditt said, "Sure they will take the loss; they will pass it on to the consumer."

At a meeting of the S & T Committee the other day they were talking about tare allowance on direct sales to consumers. The specific thing was that maybe we could have different standard tares. I said that is one thing if you have the new scales; what do you do about the old scales? I suggested setting the scales .01 or .02 short in order to provide for that. I was told, "You cannot do that; the scales must start at zero." So tell me again how I tell my customers to meet H-67 requirements.

MR. VADELUND: You tell them to overpack.

MR. BURDITT: You tell them to be reasonable. I would like to say just a word about these two cases that Eric referred to because they are very interesting cases. They are also quite confusing cases and those of you who have read them would agree with me on that.

The Court in California seems to be disturbed primarily by the footnote that Eric read—that two inspectors have separate jurisdiction or authority so that if one, as the footnote said, has an X percent he can consider it in violation if the other one has Y percent. In other words, different standards for enforcement at the inspection level exist, and I think we probably all share that concern. I think in answering that we have to consider what the alternatives are. Also, as I understand it, that case is on appeal. I might also say, Eric, that industry won both of those cases that you cited.

The North Carolina case is also a very confusing one. Let me just read you two sentences from it. "I'm inclined Mr. Solicitor to (this is the judge) quash the warrant on the ground that the warrant fails to state a criminal offense." That is one sentence. The next one is this, "And what I think I'm saying is that I believe if the warrant had been as it is here and then had gone further and had negated the existence of these discrepancies, for example, that it said wasn't due to an error in weighing, measuring or counting which occurred in packaging in compliance with good commercial practice and it was not due exclusively to any differences in atmospheric conditions, I'm not sure what this thing under subsection 3 in these rules and regulations means but it says discrepancies under subsections 1 and 2 shall be as often above as below the marked quantity."

Now I am not quite sure what the judge meant by that and that is the reason I read it to you. This is a very complex situation. It is not the kind of thing that a judge can really rule on off the top of his head. The word reasonable has been held constitutional in all kinds

of cases. I have a case on appeal now in which I have challenged the constitutionality of the words, in the Federal Food and Drug Act, "current good manufacturing practices." Now how in the world can you stay current on something? What does that mean? What does good mean? Those are really relative words, you know. They can vary depending on the circumstances.

Reasonable, however, is a standard which in many ways does have some basis. I do not know what is going to happen to those cases. I guess the California one will be appealed. I do not know what is happening with the North Carolina one, maybe some of you fellows know. But I would rather expect that appellate courts are going to give a very careful look at any lower court holding which says that the word reasonable is not constitutional. I think maybe that applies a little bit to this gentleman's questions about the scale. Most companies that I know about do have a tolerance on the top side. They do not set it at zero. They do set it a little bit over, as little as possible, so that they come out with their average. The companies I have had dealings with do not set the scales right to zero because there is a risk that you are going to come out below zero on the average, even discounting the moisture loss problem.

MR. E. PRIDEAUX (Colorado) : It seems strange that this one particular company we are talking about that has been in the court cases in California would be the one company that other states (and I have checked with other states) have found consistently in error.

Reasonable does not mean that a tolerance shall be used to the advantage of the packer. We are not talking about a little moisture loss, we are talking about several ounces. Handbook 67 requires packages to average net weight.

We got into the technicality of the law instead of the spirit of the law. Now let us get into other moisture loss items such as Idaho potatoes. Do you know what the percentage of moisture is in Idaho potatoes—and the loss? We are talking 60–65 percent. A shipment could arrive in fifty pound boxes and could be short five or six pounds. Is that reasonable? No, it sure is not reasonable.

I very much hasten to defend the weights and measures jurisdictions that have found these problems and are trying to correct them.

MR. M. KINLAW (North Carolina) : Mr. Chairman, I was in the courtroom the day that Judge Ervin made his ruling and they were having problems with the public address system. I do not think what is recorded are the exact words the judge said.

I was very distressed at apparently being in the position of losing the case, but later I talked to Judge Ervin and the prosecutor. They seemed to indicate to me that any American is entitled to know the limits within which he may operate, without being guilty of a crime, and he is entitled to know it before he commits the act. In these cases he does not know the exact limits within which he may operate before

he can possibly be charged with a criminal offense. It may be different in a civil case, I do not know. They seem to think that in criminal law he is entitled to know in plain English the limits within which he may operate legally.

MR. BURDITT: That is exactly right. That is an excellent statement of the law, particularly the criminal law and the question really is whether the word reasonable does give him that kind of notice. Here are two judges who have talked about this and they wrestled with it. It is a hard problem.

MR. VADELUND: Let me suggest a parallel right within weights and measures. Would you as officials be willing to adopt a Handbook 44 code that said scale errors shall be reasonable, or would you require that scale errors be specified to the nth degree as they now are? I think that is the question.

AFTERNOON SESSION—WEDNESDAY, JULY 25, 1973

No General Session Was Scheduled

MORNING SESSION—THURSDAY, JULY 26, 1973

(H. E. SMITH, *Vice Chairman*, Presiding)

MANAGEMENT ASSISTANCE FOR WEIGHTS AND MEASURES PROGRESS

MIS Analyses and Concept Development

by EDWARD G. NEIGUT, Program Manager, Urban Systems, Technical Analysis Division, National Bureau of Standards



The Technical Analysis Division (TAD) of the National Bureau of Standards (NBS) is a group of approximately 150 people, consisting primarily of professionals who are systems analysts and operations research analysts with various basic disciplines in engineering, mathematics, sociology, the physical sciences and the management sciences. We provide technical and management support services internally to NBS and the Department of Commerce and other federal agencies of the civil sector—as well as

state and municipal governments. We are providing support to the Office of Weights and Measures in analyses and MIS concept development for the states.

Since the topic here is “Management Information System Analyses and Concept Development,” and since your backgrounds may not encompass any familiarity with this subject, I would like to spend a few minutes to describe fundamentals and to establish an overview perspective of our MIS work.

You perform certain day-to-day operations in support of your weights and measures activities. Some of these activities may be rather routine; for example, the calculation of office administrative and operational costs. Inspectors are scheduled to examine the accuracy of various measurement devices and to make inspection reports. On some regular, or perhaps spur-of-the-moment, basis, reports may be required for submission to other state officers, municipal authorities or the federal government. Such reports contain information which may be used for such purposes as establishing the weights and measures budget, substantiating requests for additional funding from the federal government or identifying retailers who deliberately short change the consumer. Therefore, information is required and must be generated within the weights and measures offices to support the internal needs of those offices and for satisfying report requirements and requests from external sources.

Some of the information may be very easily generated. For ex-

ample, if a weights and measures manager wants to know how many gasoline pumps were inspected in the previous year, this is a matter of simple addition—assuming that such records were maintained. On the other hand, a manager may ask for information about how he should allocate a given number of measurement device inspectors in such a manner so as to minimize potential shortages to consumers; or he may ask how many inspectors are required and how he should schedule them so that the potential economic loss to consumers due to device inaccuracies is at a minimum. The generation of the information required to answer such questions is a rather complex process.

As another example of information needs and uses, consider the question of whether the weights or volumes of prepackaged commodities should be checked at the manufacturing and major distribution points or at the retail level. Different costs, times and quantity coverages are associated with such centralized versus decentralized considerations. A thorough cost/benefit analysis is required to properly understand the pros and cons of the different alternatives. The person responsible for making the decision of whether there should be centralized or decentralized inspections needs the best possible information in order to make a proper decision.

In summary, information is required to support the management decision processes which include the budgetary processes and the more routine weights and measures daily operational activities and reporting requirements, as well as to satisfy information requests which originate externally to the weights and measures offices. Now when I speak about the management information system, I am talking about the collection of people and equipment, including computers, which generate information. The concept of an information system includes how the information is used, what information is required, how to acquire the data which is used to generate the information, how the data is processed to form the information, the structure of the reports which contain the information, and, finally, how the report's information is used.

When large quantities of data are used for generating information, or when the information requires long, complex mathematical manipulations, it may be necessary to use a computer. The complexities and details of computer automation are not going to be discussed here. It should be sufficient to say, for purposes of this discussion, that computer system users—not the computer people—basically dictate what the system should do.

The management information system for state weights and measures use is viewed in a broad perspective. It will satisfy the information generation needs of all major management decision processes and those of operational personnel in order to effectively support the weights and measures regulation mission objectives.

Basic major tasks which are to be performed by the Technical Analysis Division and the Institute for Basic Standards in support of OWM's assistance in developing a MIS concept for the states include the development of a methodology for estimating potential economic losses to consumers and sellers due to measurement device inaccuracies, the development of criteria for the selection of a representative sample of states for further analysis, the detailed systems analysis of weights and measures activities in the selected state, analysis of centralized versus decentralized concepts for weights and measures inspections of both prepackaged and nonprepackaged commodities, and the development of preliminary MIS functional designs. These tasks will be discussed in slightly more detail, however, it should be obvious that the degree of success is dependent upon the extent of cooperation and support by the states.

The Technical Analysis Division's approach to the MIS effort provides for substantial analysis, and it also promises significantly enhanced results. Major attributes of the MIS effort are :

- The work provides for the development and implementation of a methodology which will estimate economic losses of sellers and consumers within states which are caused by quantity measurement inaccuracies. Such information is needed because it provides the means for identifying and determining the magnitude of the economic loss problem. It provides an economic basis for federal, state and local officials to recognize that legislative, regulatory and operational changes may be desirable in weights and measures functions, and that changes in their budget may be needed in order to effect those changes. The values of dollar losses to consumers due to device inaccuracies also provide a basis for comparing states and for determining whether changes in operations, etc., cause improvements within a state over a period of time.
- While the estimated economic loss, discussed above, is extremely important, it should not be considered as the only important item to be measured. Inaccurate device measurements impact consumers and sellers in different ways and to different degrees, dependent upon such factors as consumer income levels and the commodity which is being mismeasured. Additionally, the concept of "equity in the marketplace" is somewhat hazy and requires some review. Therefore, the work provides for some additional fundamental research into some existing concepts and potentially important performance/measurement areas which currently lack adequate exploration.
- The approach recognizes that there are various differences among states in weights and measures which include such items as operations, regulations, legislation, geographical considerations, population densities and distribution, equipment used, commodities of

particular interest (grain, cattle, oil), etc. Such differences require detailed identification and analysis in order for the federal OWM to provide the proper guidance which will enable all states to most effectively satisfy their weights and measures mission requirements. Preliminary identification and analysis of such factors must be performed in order to properly select a sample of states. A comprehensive analysis of such factors will then be performed in the selected states and on a comparative basis.

- The comprehensive systems analyses to be performed in the selected states, the detailed comparative analysis among the selected states, and the analysis of centralized and decentralized inspection operations all provide (along with other OWM information) the base for a thorough understanding of weights and measures activities, problems and potential solutions. Based upon those analyses, improved management information systems, operational procedures, and other desirable regulatory and legislative changes would evolve. The final documentation of this expanded effort will include preliminary functional designs of MIS's which could most effectively support the accomplishment of weights and measures mission requirements in the states. Additionally, the data collection, management report formats, and analyses of operational activities will provide an important step towards promoting uniformity (standardization) among weights and measures units on a national basis.

It is important to recognize that OWM is deeply concerned that every state optimally accomplishes its weights and measures mission. However, OWM need not be overly concerned with how each state elects to satisfy it. To this end, this MIS work enables OWM to provide the necessary guidance and information to the states, and the states can select and implement what they believe to be most beneficial—with minimum disruption to their ongoing activities.

The major tasks to be performed in this management information system work by the Technical Analysis Division, and in conjunction with OWM and the states, are briefly summarized as follow :

Task 1—Methodology and Estimate of Economic Losses

Develop a methodology for estimating economic losses due to measurement device inaccuracies for both sellers and consumers, and apply the methodology in a few states in order to test its utility and ease of use. Such economic losses, arising from measurement device errors, will probably be converted to a loss-per-capita (or some other) index for each non-prepackaged commodity. The total estimated economic losses would be valuable at some later date for indicating to the states the desirability of changes for optimally achieving the weights and measures mission. The methodology developed and the information

collected will provide OWM with a base of data which will better enable them to evaluate their ongoing program of assistance to the states.

The methodology includes parameters relevant to measurement device errors. Therefore, a detailed survey and analysis of pertinent device information is required which includes such factors as: types of measurement devices, categories of devices, tolerances, accuracies, numbers of each kind of device, methods and frequencies of calibration, and performance as a function of time and/or usage. Such information is being/will be obtained from manufacturers, inspection information from the states, existing OWM files, a literature search, and, possibly, device testing laboratories. The methodology development will also include an analysis of device performance as it relates to inspection requirements in order to establish the frequency of inspections needed to maintain the devices within acceptable tolerances.

Task 2—Research of Other Measures of Systems Performance

Task 1 provides a major means of measuring potential economic losses to both sellers and consumers. It is desired to promote "equity in the marketplace;" however, it is asserted that while the seller is in a good position to protect his interests (minimize or prevent his economic losses due to device inaccuracies), the consumer is generally incapable of protecting his own interests. The purpose of this task is to provide brief, fundamental research into the concept of "equity in the marketplace" and to identify (and assess—where possible) additional economic and mismeasurement impacts (and seriousness of such impacts) upon the consumer.

Task 3—Criteria for Selection of States for Detailed Analysis

Identify criteria and perform a preliminary analysis based on the criteria for selecting those states which will undergo further, detailed systems analysis. To this end, such factors as weights and measures legislation, regulation, centralized and decentralized inspection procedures, geographical considerations, population density, major types of commodities, need and desire for federal assistance, political consideration, and potential economic losses due to inaccurate quantity statements, as well as inaccurate devices, must be briefly reviewed. Some of this information will be collected through a national survey. Once the representative states have been selected, the pertinent factors of major interest will be analyzed in greater depth as part of the systems analysis effort. It is anticipated that at least six (6) states will be selected for the subsequent, detailed analyses.

Task 4—Perform a Detailed Systems Analysis in Selected States

The objective of this systems analysis task is to develop a comprehensive understanding and to systematically document all major weights and measures activities and problems in the representative states. While alternative solutions to such problems will undoubtedly

germinate and become evident during the conduct of this task, and obvious improvements would be identified for the states at that time, the specification of an improved "typical" MIS cannot be made within the scope of this task. Rather, the development of "typical" MIS concepts and specifications are deferred to a later task, after a comparative analysis has been performed.

Major elements of this system analysis task for each of the selected states follow:

- Review the internal organization of the weights and measures office, its organizational relationships to other parts of the state government, and to local, regional and federal jurisdictions. Identify the weights and measures missions, functions performed in support of missions, and the management levels and responsibilities.
- Identify and analyze constraints on the weights and measures office operations. These include legislative, political, budgetary and other resource constraints.
- Identify and analyze the current operations. This is basically a functional decomposition of the existing weights and measures system, i.e., the operations being performed, their interrelationships, the reports developed along with their data content, the information flows, information usage, information (and data) sources, computer usage costs, etc. Identify and review the management decision processes, the decision hierarchical relationships and the information requirements in support of the decision processes.
- Analyze and identify organizational, operational, legislative, budgetary and information problems. Identify alternative solutions to problems.

Task 5—Comparative Analysis of States

Based upon the results of the detailed systems analyses, review each of the selected states in relation to all information obtained in previous tasks. Perform a detailed comparative analysis of the states in order to identify those existing factors which enable the state offices of weights and measures to more effectively accomplish their mission.

Task 6—Centralized versus Decentralized Inspection Analysis

Analyze centralized versus decentralized concepts for weights and measures inspections of both prepackaged and nonprepackaged commodities. For nonprepackaged items, perform cost/benefit analyses which consider costs of centralized and decentralized (state and local) inspections including facility costs, travel costs, and travel time savings which may be translated into number of inspections, number of inspectors and/or associated costs. For prepackaged commodities, analyze costs and benefits of sampling in stores versus inspections at manufacturing and/or other major distribution points. Also, explore

the potential for increasing inspection efficiency through pooling information for prepackaged goods on an intra- and interstate basis.

Task 7—Develop Functional System Designs and Concepts

Develop a management information system (MIS) concept(s) (i.e., preliminary, functional system design(s)) which could optimally support accomplishment of the states' weights and measures mission. Each preliminary design will include as a minimum data input requirements and formats, output report specifications and formats, computer and manual requirements, and general processing requirements in the areas of inspection reporting, cost accounting, benefit accounting and inspection control. Identify where, why and to what degree legislative, regulatory, distribution and inspection differences impact optimal achievement of the weights and measures mission.

The amount of time required to accomplish the tasks is dependent upon manpower availability, budgetary constraints, and the time required to coordinate, survey, etc. with the states. The present projection for this work reaches into 1975. Your suggestions for clarifying, modifying, eliminating or supplementing the management information system effort would be greatly appreciated.

MANAGEMENT ASSISTANCE FOR WEIGHTS AND MEASURES PROGRESS

Measuring Inaccuracy's Economic Distortion

by S. WAYNE STIEFEL, Operations Research Analyst, Technical Analysis Division, National Bureau of Standards



The public's demand for good management in government has manifested itself in many ways. Legislatures are demanding better rationale and justification for budgets; and, those individuals responsible for generating budget requests are asking their organizational units for quantitative demonstrations of need. In Monday's opening remarks, both Dr. Roberts and Commissioner Carlson stressed the need to demonstrate performance. In weights and measures such demonstrations with respect to device inspection have, for the most part, been limited to compliance. But what is x percent compliance worth compared to y percent? What would be the benefit of additional compliance? Prior to addressing the question of what additional resources are required to improve compliance, the monetary value of distortions caused by device inaccuracies and thus noncompliance must be estimated. The Office of Weights and Measures (OWM), working with the Technical Analysis Division (TAD) of the

National Bureau of Standards, acknowledged this need and requested TAD to attempt to develop a procedure or method for estimating the monetary value associated with commercial measurement device inaccuracies.

The nature of device usage makes direct estimates of economic distortion (the dollars erroneously being exchanged because of shortages or overages) difficult to obtain. A scale, for example, measures commodities of varying densities and unit prices, and the volume of commodities going across each device is not readily available. However, the potential uses for a reasonable estimate make the effort worth the challenge. In addition to budget justification, potential uses of such an estimate include :

1. Allocation of inspection resources to achieve a balance between the various responsibilities of a weights and measures jurisdiction.
2. A base line for measuring changes brought about by new inspection policies or resource shifts.
3. A comparator, perhaps on a per capita basis, between jurisdictions for use to evaluate the affect of various laws, regulations or organizational makeup.

The method does not attempt to consider how an operator uses a device, nor does it place a monetary value on devices which fail to meet specification requirements (such as broken glass on a gas pump). The measure does concern itself with devices' average accuracy, rather than with their precision. Therefore, when our discussion introduces probability distributions and their means, it refers to the distribution of systematic errors in a population of devices, not of random errors in the behavior of a single device. The method I will discuss today estimates the monetary value of goods which incorrectly change hands (or fail to change hands) due to measurement inaccuracies caused by device errors. It attempts to account for both overage errors and shortage errors.

Our procedure is still being evaluated within NBS and, since it is you who will ultimately use what is developed, your opinions and comments are most welcome.

Method for Calculating the Monetary Value of Device Inaccuracies

A logical first approach for the procedure was to account for the magnitude of the various elements which enter into a transaction and obtain estimates for each. Considering a single commodity and addressing overregistration errors, the dollar value due to overregistration for a device category depends upon many factors: the average quantity involved in measurements of the commodity, the average price per unit quantity, the average overregistration error, the incidence of overregistration errors, and the number of measurements of the commodity under this category of devices. For each device category the total dollar value due to overregistration must be summed for

all commodities. A similar approach can be taken to ascertain the dollar value of underregistration errors.

The obvious problem associated with this approach is obtaining estimates of the values associated with the elements of transactions for each commodity by device category. Realizing the additional burden that would be placed upon a jurisdiction to assemble sufficient data to make these estimates, the next step involved finding an approach to utilize the data presently being collected by weights and measures jurisdictions.

File records maintained by weights and measures offices generally contain information concerning device performance, such as whether a device passed inspection, failed by registering an amount in excess of the tolerance value allowed on a known quantity, failed by registering an amount less than the tolerance value allowed on a known quantity or even by violating an established specification requirement. Files also usually contain devices listed by type and location. Using this information as a basis, together with data from other sources, a second formulation to approximate the value of measurement errors was developed.

The procedure has three components which, when taken together, allow estimation of the dollar value attributable to device inaccuracies. The first two components were based on the work of David Edgerly of OWM and Walter Urban of TAD. The first component consists of the Census data—indicating for each state the dollar value of commodities being shipped or offered for sale. The second component is an estimate of the fraction of these commodities being sold by class of device or package. And, the third component involves a measure of the performance of devices taken from weights and measures inspection reports. What I will attempt to show is how these three components can be related to yield our estimates.

From the Bureau of Census the value of commodities shipped or sold at different points in the commerce chain are available. The flow of products in the commerce chain has been divided into Census divisions for each state. The five economic divisions for which weights and measures officials have jurisdiction by virtue of legislation include: Agriculture and Fisheries; Mining; Manufacturing; Wholesale and Retail Trade; and Services. Thus, Census data provides the dollar value of transactions for each commodity classification in a state. Table 1 indicates partial shipments in the Manufacturing Division for a state.

Devices have been grouped basically according to capacity (table 2), and tolerance values have been derived using NBS Handbook 44 as a source. The device classification includes: large capacity scales, small capacity scales, liquid measuring devices—large capacity liquid measuring devices—small capacity, and linear measuring devices.

A second component of our procedure involves relating devices to each commodity classification reported in the Census data. Thus we wish to know what percentage of a commodity is sold by our classification of devices. These percentages (table 3) at the present time are based upon the rational evaluation of Census data and the type of commodities being measured. Contact with the industries involved and appropriate trade associations should lead to refinement of the estimates.

Let me repeat the first two components of our procedure and indicate how they relate. Census data have provided the dollar value of transactions at each stage of the commerce chain. The second component (table 3) indicates the fraction of the dollar transactions for each commodity, divided among the various device categories. Thus, it is possible to calculate for each device class the dollar value of commodities being transacted by taking the product of the appropriate elements of tables 1 and 3. For example, for food and kindred products, table 1 indicates \$1,123.3 million as the State's value of manufacturing shipments; table 3 estimates 5 percent are weighed in bulk over large capacity scales, 5 percent are measured in bulk by large capacity liquid measuring devices, and 90 percent are packaged. Thus it is readily estimated that \$56 million of this type of product are weighed by large capacity scales, \$56 million are measured by large capacity liquid measuring devices, with the remaining \$1010 million as packaged products. Table 4 has been derived from such computations.

TABLE 1
ECONOMIC ACTIVITIES SUBJECT TO WEIGHTS AND MEASURES
REGULATION

Manufacturing Division

SIC code	Activity	Value of shipments in millions
20	Food and kindred products.....	1, 123. 3
201	Meat products.....	395. 2
202	Dairy products.....	159. 6
203	Canned, cured, and frozen foods.....	146. 0
204	Grain mill products.....	70. 5
205	Bakery products.....	107. 3
207	Confectionery and related products.....	102. 2
208	Beverages.....	111. 8
209	Miscellaneous foods and products.....	162. 1
21	Tobacco manufactures.....	1, 030. 5
2141	Tobacco stemming and redrying.....	271. 7
22	Textile mill products.....	146. 5
23	Apparel and other textile products.....	4. 8
239	Fabricated textile products.....	4. 8
24	Lumber and wood products.....	317. 3
26	Paper and allied products.....	298. 7
28	Chemicals and allied products.....	1, 299. 2
281	Industrial chemicals.....	210. 1
282	Plastics, synthetics.....	795. 5

TABLE 2

CLASSIFICATION OF WEIGHING AND MEASURING DEVICES

<i>Large-Capacity Scales</i>	<i>Liquid-Measuring Devices— Large Capacity</i>
1. Crane	1. Compartments or Tanks (Gaged)
2. Dormant	2. Liquefied Gas Meters
3. Hopper and Tank	3. Vapor Meters
4. Livestock and Single Animal	4. Vehicle Meters
5. Meat Beam and Steelyard	5. Wholesale Meters
6. Monorail	6. Farm Milk Tanks (Gaged)
7. Railway Track	
8. Vehicle	<i>Liquid-Measuring Devices— Small Capacity</i>
9. Portable Platform	1. Grease and Lube Oil Meters
10. Belt Conveyor	2. Liquid Measures
	3. Retail Meters
<i>Small-Capacity Scales</i>	<i>Linear-Measuring Devices</i>
1. Computing	1. Linear Metering
2. Counter	a. Fabric
3. Prescription and Jewelers	b. Cordage
4. Spring	2. Linear Permanent
	a. Steel Tape
	b. Other
	3. Odometers
	4. Taximeters

TABLE 3

DEVICE AND PACKAGE USAGE
(Percentage Description of Dollar Values)

Manufacturing Division

Activity	Large capac- ity scales	Small capac- ity scales	Large capac- ity LMD	Small capac- ity LMD	Linear meas- uring devices	Pack- aged prod- ucts
Food and kindred products.....	5	-----	5	-----	-----	90
Tobacco products.....	20	-----	-----	-----	-----	80
Textile mill products and apparel.....	20	-----	-----	-----	20	60
Lumber and wood products.....	-----	-----	-----	-----	80	20
Paper and allied products.....	-----	-----	-----	-----	-----	100
Chemicals and allied products.....	5	-----	5	-----	-----	90
Petroleum and coal products.....	10	-----	90	-----	-----	-----
Stone, clay and glass products.....	10	-----	15	-----	-----	75
Primary metal industries.....	100	-----	-----	-----	-----	-----
Fabricated metal products.....	-----	-----	-----	-----	-----	100
Miscellaneous manufacturing indus- tries.....	-----	-----	-----	-----	-----	100

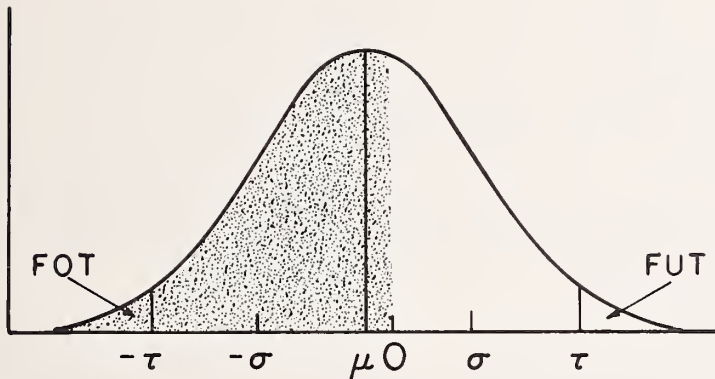
The third component of our procedure has been derived directly from your weights and measures reports. It attempts to develop a profile of errors for each device category. The quantities sought would be applied to the dollar value of transactions estimated for each device class to ascertain the monetary value of overregistration and the monetary value of underregistration. The first approach used the product of the derived tolerance value from Handbook 44 and the fraction of devices found through inspection to be out of tolerance by overregistration. This quantity represented a "minimum relative" value of short-age errors caused by device overregistration. However, this value suffers doubly from underestimation, since the absolute value of errors is not used to compute the dollar value of errors, but the tolerance value, or the lower limit of a rejection, is used. Additionally, errors which are less than the tolerance values (devices which pass inspection) are not included in the estimates, also lowering the dollar value.

To improve upon these estimates the errors for a device class were assumed to follow a normal distribution, and equations were derived to define the distribution using weights and measures inspection information. To illustrate, let me show you what can be done using inspection data which should be readily available to a weights and measures jurisdiction.

TABLE 4
VALUE OF MANUFACTURING GOODS SUBJECT TO WEIGHTS AND MEASURES
BY DEVICE AND PACKAGE USAGE
(\$ Millions)

Activity	Large capacity scales	Small capacity scales	Large capacity LMD	Small capacity LMD	Linear measuring devices	Packaged products
Food and kindred products.....	56. 2	-----	56. 2	-----	-----	1, 010. 0
Tobacco products.....	206. 1	-----	-----	-----	-----	824. 4
Textile mill products and apparel.....	30. 3	-----	-----	-----	30. 3	90. 8
Lumber and wood products.....	-----	-----	-----	-----	253. 8	63. 5
Paper and allied products.....	-----	-----	-----	-----	-----	298. 7
Chemicals and allied products.....	65. 0	-----	65. 0	-----	-----	1, 169. 3
Petroleum and coal products.....	D	-----	D + 8. 6	-----	-----	-----
Stone, clay and glass products.....	23. 3	-----	34. 9	-----	-----	174. 5
Primary metal industries.....	216. 2	-----	-----	-----	-----	-----
Fabricated metal products.....	-----	-----	-----	-----	-----	D
Miscellaneous manufacturing industries.....	-----	-----	-----	-----	-----	40. 9

NORMAL ERROR DISTRIBUTION



Two areas under the normal error curve are known from inspection reports for a device category.

FOT—the fraction of devices which overregister by an amount greater than or equal to the tolerance value (τ), and

FUT—the fraction of devices which underregister by an amount greater than or equal to the tolerance value.

FOT and FUT represent noncompliance because if we summed FOT and FUT, we would have the fraction of devices out of compliance. These two known quantities allow for determination of the mean (μ) and standard deviation (σ) values, which then define the distribution. I will not give the derivations nor the equations, but they will be made available when the final results of our work are published.

The relative error of overregistration then may be obtained by taking the product of the frequency of device error and the magnitude of the error for all points on the left side of the distribution starting from zero error (the shaded area of the curve). If you wish to consider the contribution from devices out of tolerance by overregistration, then this is associated with the area under the left tail of the curve starting from $-\tau$. It represents the component which can be reduced by securing better compliance without tightening the tolerance.

Now, using this information derived from weights and measures inspection data together with the two other components of our procedure allows for computation of an estimate of the dollar value of transactions for each device class. The product of this quantity and the relative error of overregistration, derived from the error distribution, provides an estimate of the dollar value of shortages occurring via this device

classification. Subsequent calculations for each device class would result in determination of the monetary value of shortages attributable to device errors.

Assumptions of the Method

The method just related has implicit assumptions which I will explicitly state:

1. First, linearity of error is assumed to exist within the measurement range in which the device is tested and used.
2. Second, error behavior in devices in any category is assumed independent from the nature of the commodity being measured, its unit price, the device's level of activity, or other attributes of the commodity being measured or the circumstances occurring during measurement.

Conclusion

We would like to be able to relate device performance, as reflected in our computations using the weights and measures inspection findings, to parameters whose changes would be the subject of policy decisions. Such policy decisions include tolerance levels, inspection resources, and the allocation of such resources. The method as presently formulated allows for the evaluation of the present situation, but does not predict the consequences of policy changes. Such prediction demands models which relate policy changes to the accuracy-quality of the relevant populations of measurement devices. One specific goal of our current work is to develop models that can be used to predict how different types of scales will perform under various conditions and at various times. Our models require data which you, the members of this Conference, work with every day. It is my hope that, through continued cooperation with both the industry and government representatives here today, the necessary data can be collected and analyses completed to offer a basis for more effective and efficient weights and measures enforcement.

DISCUSSION

MR. D. E. EDGERLY: The two steps Wayne outlined, essentially the first two analysis steps which involve both the gathering of data from census and also the projecting of the percentage of dollar values in each individual jurisdiction, are something that we recognize and view as, on a short-term basis at least, our responsibility to do for a jurisdiction. In other words, if a jurisdiction was interested in using these models, although they may sound very complicated right now, basically the first two steps that were outlined are steps that we would perform for you in terms of the basic analyses on what is moved in your state in terms of commodities and their relative values broken down by classes of devices and also by prepackaged goods. This would

provide the basic data that is needed then for the third part which is the actual mathematical calculations.

MR. M. GREENSPAN (New York City, New York): Mr. Stiefel, in your last slide on the chart the area minus tau and the area plus tau can be derived from statistical data but the large area, and where some of the greatest monetary losses occur, is in the estimated value. As you indicated, there is no positive data available to make an absolute determination. Is there any way perhaps of developing some type of form and getting a number of jurisdictions to cooperate to supply that basic information which could give you at least a more valid concept of the true losses?

My reason for saying that is a typical experience I had. About fifteen or eighteen years ago I was in the field testing gasoline pumps. In one station I found out after some discussion that each pump was deliberately set to give between five to seven cubic inches in excess on every delivery of five gallons. When I questioned the man, he said he would rather have it that way than be caught with a pump that was short and pay a penalty. I said, "I do not want to impose on you and try to pry into your business, but if you will tell me your total monthly gallonage I will quickly show you what you are losing." After a little hesitation he did it and I sat down with pencil and paper and computed it. I showed that he was losing \$120 a month by deliberately setting each pump only six cubic inches in excess on every five. Now that is a big quantity. That is a lot of money, and this is the area that is totally unknown.

I feel that perhaps if a form can be developed and some jurisdictions cooperate in giving you more precise data in this total area, your final accomplishment of the losses would be that much more accurate.

MR. S. W. STIEFEL: What you are saying essentially is that it is not sufficient just to gather data, at least to develop a model on the ends of our out-of-tolerance range; that what we have tried to do is derive as much information from the present data as we can. To validate what we have come up with, it is necessary perhaps to go out and get detailed information at all points of error. To do this, as you suggest, it may be necessary to go to jurisdictions and to ask them not only to record the values where they exceed tolerance values but also to record all deviations from zero. I happened to see some of the data that has been collected, and I guess gas pumps is the area where most of this is done, but I would rather not limit ourselves to gas pumps. If we think about scales, the same thing applies.

I think it is going to be necessary for us to call upon the states to help us because we do not have inspection forces to go out and gather the data. We have to rely on you to get it for us. We have asked some of the scale companies to provide us with information concerning what happens over time when a scale is used, with usage and some of the other factors that enter into this thing. We recognize that en-

vironment is important and that many other factors enter into it. Especially when we get to the area where we are trying to make a predictive model, we have to become much more sophisticated than we are at the present time. But this is just a gross estimate we have come up with so far. I think that for those states that are interested in participating in the future, perhaps on a detailed survey for one specific device, it might not be a bad idea for you to leave your state's name with the desk. Perhaps we can contact you when we are prepared to do this kind of work. In that way we will have a list of those who are willing and able to help us. We have a mutuality of interest here, and I think it is great that you would be willing to help.

MR. GREENSPAN: What I am pointing out more specifically is that if you were to develop precise reporting forms you would then get back the specific details you require.

MR. STIEFEL: If we were to do a survey, certainly we would be indicating exactly what information we would want on every device that was tested.

MR. EDGERLY: I would just like to make one other comment. I think the matter that Moe has brought up is a crucial one. Otto and I fight about this all the time. That is, do you determine the economic loss of the device from zero or from tolerance? The way that you make that decision has a lot to do with the dollar value that you come up with. For instance, if you say that anything from zero is in error whether it be plus on the consumer's side or minus on the retailer's side and you cross out that error on the gas pump, the amount of error is going to be greater certainly than if you simply consider errors outside of tolerance. This is a question that I think industry would also have some good input to. When we consider economic errors do we consider them within the legal concept of a correct device; that is, within tolerance, or do we consider them in terms of the actual economic loss being anything plus or minus zero. I just throw that out for your consideration.

MR. D. OFFNER (St. Louis, Missouri): Along with what Moe just said, I think that we all have experience, for instance, in the checking of packages in meat counters. I think universally the experience is that the packages average out plus; they almost have to. I mean, they are not going to average out minus I should hope.

I think this discussion points out one other thing and that is that we have got to approach a better degree of uniformity of record keeping among jurisdictions than I suspect we now have. I really think this is a key and yet I hear very little at the Conferences in regard to suggestions for a uniform record and statistic keeping procedure on the part of the various jurisdictions. I think maybe the Conference should devote some of its attention to that point.

MR. C. VINCENT (Dallas, Texas): Are there any provisions for including any of the city jurisdictions in any of your upcoming surveys, or has this progressed that far yet?

MR. STIEFEL: Cities would be involved in our total systems analysis and as far as the surveys go with respect to looking at devices, I do not see any reason why the information coming from a city would not be just as valuable as from a state when you are just talking about usage of devices. We are not going to forget about the cities and counties which go to make up a state. In fact, when we consider a state we hope to consider it as a total entity and we are not going to be concerned with just the state inspections. We are going to be concerned with all inspections going on within a state.

MR. VINCENT: So you would, in fact, be applying the same concept then in each case, right?

MR. STIEFEL: The difficulty that I envision here with respect to a city is that census data, at least, is not collected on a city level. It is collected on what is considered SMA or Statistical Metropolitan Areas. That is the only problem with utilizing some of the procedures we have come up with so far but there could be other sources of information. Certainly the procedure is not thrown out if we can get data for it.

MR. VINCENT: Right, I understand the limitations, thank you.

MR. E. G. NEIGUT: In answer to this other gentleman's statement, this long range effort we are talking about which could lead to what we called the preliminary management information system design would, in fact, be a step toward voluntary standardization. Once you develop these you have to define the data to be collected, the structure of the reports, the reports that come out; that is all part of it. That could be a very nice point at that time after that has been documented to use as a vehicle for getting the Conference to look it over and decide where they are in agreement, where they are not, and ironing out some suitable, more or less standardized formats that could be used by everybody.

MR. J. R. BIRD (New Jersey): Regarding what Mr. Edgerly said, the differences between the loss values of the out-of-tolerance devices and the in-tolerance, in the front of Handbook 44 there is a theory of tolerances that describes why we set tolerances within certain limits. I can see with the information that is going to be developed that it might have an impact on how we set tolerances in the future for the various devices.

NEW APPROACH IN WEIGHTS AND MEASURES OPERATIONS

Pilot Program

by WILLIAM H. KORTH, Director of Weights and Measures,
Ventura County, California

Introduction



I appreciate the opportunity to be with you to discuss our program of Weights and Measures enforcement. What we are doing and the way we are doing it is not to say it is a better way; but this is what we are trying to find out. I hope what we are doing will stimulate thinking and review of the past, present and future of weights and measures. I do not intend to be critical of any individual's policies or how his jurisdiction operates. The program I will discuss is how we

see it in our county and what we feel should be done.

I know you have all seen the add "You've come a long way baby." We certainly have since the first weights and measures laws were signed one hundred seventy-four years ago. We are going to go a long way in the years to come and we have to keep pace with the technology of today.

The program states "New Approach in Weights and Measures Operations—Pilot Program." Now those words "Pilot Program" sound like an interesting topic don't they? No, they do not have anything to do with flying. We have called it the Pilot Program since its inception but a better title would probably be "A Variable Frequency of Inspection Program."

This program really is not a new approach in weights and measures operations but, in reality, is a program of actually doing what we are charged with doing; enforcing the laws and regulations regarding weights and measures. California law states, "Any Sealer having knowledge of a violation of any of the provisions of any law relating to weights and measures shall cause the violator to be prosecuted." Nowhere does it say we are a repair agency; nor does it say we are to adjust devices; nor that it is our responsibility to inform the owner the device needs repair.

Most weights and measures programs, including ours, were started when the population was much smaller; when we knew every merchant in our area; when we had very few repair people in the area; when the marketplace was not as complex as it is today and we did not have the transportation we have today. We grew, expanded and evolved into a service agency. Everyone depended on us to inform him when

something was wrong with his device and usually we adjusted it on the spot so we could seal it and not have to make another trip.

I am sure your area is growing in population. With population come business establishments; with these establishments comes a bigger demand for weights and measures enforcement. Population brings more demand on government for services; more service means a larger budget. But, I am sure your area is the same as ours. The revenue is not there to give us the budget we want or need. After sitting through budget hearings prior to coming to Minneapolis, I know we do not have the budget we wanted or need. This forces us to look at our programs, to determine how we spend our time and our revenue, and how to make the most of it.

Philosophy

There is a poster hanging in my office that says, "But we've always done it this way." How many times have we heard that said or have we said it ourselves? Many weights and measures programs are going along because "we have always done it this way." Most jurisdictions operate under the premise, with some exceptions, that all commercial devices should be inspected yearly. Why? Because we have always done it this way. The frequency of inspection should be based on local experience. What has been the past performance record of the device or the establishment? Is there new management? How are the devices maintained? Are they kept in good repair? When you make your inspection how are they found? When you get the answers to these questions, you will know how often to inspect that device and you will actually be giving more protection to the buyer and seller than with a routine once-a-year inspection.

When we looked at our program we wondered if it was the best way or were we just perpetuating what had gone on before. We have always been more concerned with the accuracy of the device than whether there was an accurate quantity at the time of sale. When you really examine this matter, how the merchant obtains a given weight or measure is immaterial. The real question is, "Did the purchaser receive the correct amount?"

Program Evaluation

In March of 1972, Dave Edgerly, Office of Weights and Measures, National Bureau of Standards, examined California Weights and Measures concentrating on the economic impact of weights and measures controls. He found that there was not much correlation between the percentage of man hours spent on an enforcement program and the dollar value of commerce involved in the activity being regulated.

Function	Percent	
	Man-hours	Commerce dollar value
Large capacity scales.....	7. 6	10. 1
Small capacity scales.....	6. 1	4. 6
Large liquid measuring devices.....	3. 4	6. 5
Small liquid measuring devices (retail meters).....	58. 6	4. 1
Linear measures.....	1. 1	6. 3
Electric meters.....	2. 1	3. 1
Packaged products.....	20. 9	65. 3

Are we utilizing our funds to do the most good? Looking at the percentages, I do not think so.

Program Elements

For a long time some have wondered if the program of annual inspection and testing was doing the job. What would happen if the frequency were changed; what problems might be encountered. If budgets required it, where would changes be made. Answers were needed so a new program was developed with the cooperation of the National Bureau of Standards, Office of Weights and Measures; California Department of Food and Agriculture; California Bureau of Weights, and Measures; California Association of Weights and Measures Officials; State Industry Representatives; County Legal Advisors in Ventura and Santa Barbara Counties; and Field and Office Staff of Ventura and Santa Barbara Counties.

Ventura and Santa Barbara Counties agreed to undertake the project to develop an orderly program and find the answers. The idea was that a program would be developed that would be usable and workable for any city, county or state that might be interested. Many objectives and ideas were discussed. It was decided it would not be a sampling plan; nor was it intended to be a method to decrease the overall workload, although ultimately it may. It was decided a variable frequency of inspection plan would be best. That is, each device and establishment would stand on its own merits. This would be in accord with the legal requirements that place the burden for the accuracy and condition of the device on the owner/user and not on the weights and measures official.

To enable us to enter the program, the California Administrative Code needed to be changed to exempt us from the requirement for checking devices yearly. The exemption stated that all devices had to be inspected at least once in five years. However, at this stage with so many unknowns present, we felt we should not extend the frequency over two years.

What is this program?

A. It is a program designed to:

1. Put the responsibility back on the owner/user to maintain a correct device.
2. Enable us to expand our inspection of consumer commodities.
3. Enable us to concentrate on problem devices or areas.
4. Expand our educational activities.
5. Absorb new areas of responsibility without having to expand staff.
6. Reallocate funds by making more effective use of manpower and equipment.
7. Place more emphasis on the end product.

What was needed to start the program?

- A. We needed accurate devices and establishment records going back at least two years as a basis to start.
- B. We had to train our inspectors in all aspects of the program to make sure they fully understood it.
- C. We had to inform and train the public, business, industry, and repair personnel. This was very important. When you have gone for years being a service type agency, you cannot convert to a straight enforcement agency overnight.
- D. If we were not going to adjust devices, business needed to know that service personnel were competent. We had to eliminate the hammer and screwdriver mechanic who could not really do the job. Therefore, a county ordinance was enacted requiring mandatory registration of all device repairmen and installers. This was needed for control to know who was working in our area and that they were competent.
- E. To make it meaningful that the owner/user was responsible we needed a citation system whereby violations could be cited directly to court without taking out a formal complaint. Los Angeles County had found that, on an average, a formal complaint required sixteen hours of an inspector's time, where a citation took only one hour. We figure our cost would be similar and these would be dollars out of our budget.
- F. The program needed to be evaluated constantly and we had to be ready to make changes when and where needed.

Program Operation

How is the frequency of inspection set? The inspector makes his regular inspection and test, recording all data. Through the use of a hand-out sheet, he explains the program to the owner telling him we will no longer make routine inspections. The inspection will be based on the performance of that establishment and the owner/user is responsible for the device. Any violations found may subject him

to a court citation. At this time a notice of violation is issued for any violations. After leaving the establishment, the inspector evaluates the record of the past two years, the present inspection, the maintenance program of the establishment, and the attitude of management regarding maintenance. He will then assign the establishment to one of three frequency categories :

- a frequency of two, three, or six months (increased),
- a frequency of one year (normal),
- or a frequency of two years (decreased).

What have we found? Generally there has been very good acceptance by industry and business. They are in support of the program. Many wondered why it took us so long to get started. The Board of Supervisors, Grand Jury and County Executive are enthused. They would like to apply this same basic principle to other departments.

We also have those in business that are not taking it seriously and you cannot blame them after all the years of doing it the other way. I am sure that once the citation program is instituted they will get the idea we are serious.

One of our biggest problems, and one we did not fully anticipate, was the resistance to change we found with our own inspectors. "But we have always done it this way" was certainly prevalent. It was hard to change their thinking, after all those years, to not make adjustments, and they probably had a fear of working themselves out of a job. I am happy to say they have come around, can see the value of the program, know they are not going to lose their jobs, and are making valuable contributions to the program.

Initially we found a fear among repairmen that they would lose their registration and we would be hard nosed. Their fears have been alleviated, as we cannot lift their registration without having a hearing before an independent hearing officer. They can see how this is going to upgrade their status. To help the merchant avoid a citation for defective equipment, they are requesting and being allowed to do a more complete job. We have also found the work being done by the repairmen is vastly improved; it is more thorough and complete and we are getting better and quicker reports of repairs and installations. They are happy at being recognized as skilled individuals and not merely employees of a service company.

Program Results

We have experienced a fifty-five percent increase over a comparable period in notices of violations issued. Part of this can be attributed to notices being issued for all violations in place of verbal warnings previously given for some minor violations.

It will be another year before we start seeing major results and changes. Some of the preliminary results are :

Present inspection frequency	Percent			
	Vehicle meters	Vehicle scales	Computing scales	Retail meters
2 to 6 months-----	11	82	7	9
1 year-----	27	18	66	21
2 years-----	62	0	27	70

Spot checks are, and will continue to be, made to confirm our data and decision. Many of the frequencies will change as follow-up inspections are made.

The program is about fully operational. We implemented the citation system July 1st. The period of adjustment and education is about over. Many of those that have received violation notices could very easily get a citation this time around.

The judges in our county are unanimous in their support of the program. They feel this type of white collar crime is more costly to everyone than the ordinary publicized crime, and it was time weights and measures started enforcing the laws entrusted to them.

Many said this program would not work. It would be open invitation for fraud. We have not found this to be the case. The program is working and will continue to work. Changes will be made, I am sure, as we gather more information and continue our evaluations. The crux of the whole program is that "formerly we checked devices, now we are checking people for the end result."

So far this program has enabled us to staff a Consumer Affairs Division, independent of the weights and measures staff, with no overall increase in staff. This division has processed over twenty-three hundred complaints from county residents, closing eighty-five percent successfully with over \$32,000 returned to local residents in adjustments, refunds and delivered merchandise. It has also enabled us to expand our undercover purchase program to include new areas we did not have time for before.

It will enable use to continue our educational programs that may otherwise have been curtailed due to the demand. In 1968 when we started giving educational programs on the function of weights and measures, we spoke to 8 groups, in 1970-71 we spoke to 116 groups, and in 1972 we spoke to 170 groups. This year we will have presented talks to over 150 groups. As a result, residents in Ventura County are very aware of the Weights and Measures Department and what we do.

New Areas

This pilot program will enable us to take on new responsibilities; timing devices, moisture meters, cryogenics, and the increase in packaged commodities. It will enable us to have time to take our proper place when the conversion to metric comes and our help is needed. The California Board of Education is pushing metric in California schools. Math and science books will be switched to the metric system exclusively in 1976. Bills have been introduced to have dual highway signs.

We will have to be ready for these changes ourselves. Hopefully, we will be able to do this with no more increase in staff except what is needed due to county growth and the increase in the number of business establishments to check.

Mr. Walter S. Watson, Chief of the State Bureau of Weights and Measures, stated that there were many counties in California that are very interested in the program and several were preparing to enter the program as soon as sufficient results were available.

I have one other poster hanging in my office. It states, "Not everything that is faced can be changed, but nothing can be changed until it is faced." That is true of many things as well as weights and measures. Maybe it does not need to be or cannot be changed, but you do not know until you face it.

Our new Assistant County Executive recently stated, "If I had to use one word to describe what will be happening in the county in the years to come it would be 'change'. It is only through change in local government that we will be able to meet the many challenges that are facing us; such as increasing growth with resulting demands for service and the limitation of resources. We are living in an age of change and the county must maintain flexibility and foresight to meet these changes and deal with them effectively." We feel the pilot program is doing just that and as a result we will be a little better prepared for the future.

You may have heard the story of the chicken and the hog that were walking down the road together. They went by a restaurant which had a sign in the window that said "Ham & Eggs." The chicken said, "Isn't it wonderful what a great contribution we are making to mankind." The hog replied, "For you it may be a contribution, but for me it is total commitment."

We are totally committed to this pilot program and will see it through until it is a total workable program with the problems ironed out so others can make use of this new approach to weights and measures enforcement.

NEW APPROACH IN WEIGHTS AND MEASURES OPERATIONS

Development of Dallas Department of Consumer Affairs

by CHARLES H. VINCENT, Assistant Director,
Department of Consumer Affairs, City of Dallas, Texas



About a year and a half ago, the administrative staff of the Dallas Weights and Measures Department received a directive from the City Manager instructing that a study be made of the feasibility of creating a Consumer Affairs Department within Dallas City Government. To say that this was a challenging assignment would be somewhat of an understatement. Since the staff's background and experience had been exclusively in weights and measures, there was some consternation as to which way to turn and

what factors to consider.

But the study was undertaken, and after several months of research a number of things became at least partially clear. Based on all available indices, it appeared that Dallas had far fewer abuses of consumer rights than other metropolitan areas of comparable size. But on the other hand, it was determined that consumer abuses for which there were no adequate remedies did exist on a scale that was not acceptable to city government. It was, in summary, concluded that Dallas could and should afford more extensive protection to its citizens in the marketplace.

As an end product of its feasibility study, the Dallas Weights and Measures Department made the following recommendations to the City Manager:

1. That a Department of Consumer Affairs be established for the city, and
2. That all duties, functions, and personnel of the existing Department of Weights, Measures and Markets be transferred to the new department.

Initially, it was not fully expected that a merger of weights and measures with the new consumer protection function would be recommended. The staff went into the study with at least moderate bias against the idea of such a combination. But as the analysis of the role of weights and measures relative to the city's broader consumer protection needs progressed, the following facts had to be reckoned with:

1. Weights and measures has historically been closer to the consumer and more totally committed to the basic concept of consumer protection than any other function of government.

2. By the same token, it has had closer contact with the business community than many functions of government and should, therefore, be in a favorable position to launch a new regulatory service that will require at least some measure of business support.

3. The mechanics of weights and measures and consumer protection enforcement are so closely related that separation of these functions within an individual city government would seem illogical.

Considering these facts, we finally came to look upon weights and measures and consumer protection as two fully compatible functions. And in the process of examining alternatives, we became firmly convinced that a merger of these two functions would open the door for a significant upgrading of the existing weights and measures operation. The reasoning here was that the simple mechanics of departmental expansion would provide a golden opportunity to emphasize to management and council that weights and measures enforcement was of tremendous value to the citizens of Dallas.

After necessary deliberation, management and council agreed to combine the two functions, and the Dallas Department of Consumer Affairs began full operation on October 1, 1972. Based on the first nine months of activity, we continue to feel that weights and measures and consumer protection are indeed compatible functions. To develop further insight into why such a combination still appears sound, let me give a brief overview of what has taken place during the past year.

Since it was initially resolved that weights and measures should serve as the cornerstone of the new department, the first step in reorganization was to decide exactly how it should be structured relative to other functions. It was determined that weights and measures should be set up as one of three major operating divisions headed by an administrative level supervisor. And it was felt that, toward the end of broader consumer protection, the weights and measures function should be expanded in certain areas and that several new programs should be added. Three new employees were added to the weights and measures staff, increasing the size of that division to nine men. Let me stress that this 50 percent expansion of the work force was the first major increase that had occurred in more than a decade.

With the increased staff, added emphasis was placed on several programs, including package weight control, and purchase investigations designed to better control over-the-counter meat sales in low-income neighborhoods. The increase in the weights and measures staff also afforded an opportunity for specialization of job duties. Prior to reorganization, each inspector did both package control and device inspection work. Under the new organization, each man specializes in one area. This leads to one of the most significant aspects of the merger of weights and measures and consumer protection into a single agency. That is the development of a professional career series of job classifications for weights and measures employees.

A promotional career series for city weights and measures positions had long been considered desirable. But prior to establishment of the expanded department, the opportunity for setting up such a series had never arisen. Under the old organization, weights and measures inspector positions had all been set at one level. This resulted in an obvious lack of promotional opportunity. Before reorganization all inspector positions were set at Grade 9. They have now been upgraded to Grades 10 and 12. The weights and measures supervisor slot which was formerly a Grade 10 position was given expanded duties and responsibilities and set at Grade 14. All weights and measures positions are now in a professional class and compare favorably with other municipal jobs of equal responsibility. In changing over to the new classification series, it was possible to "grandfather" existing employees into upgraded positions on the basis of their experience. But the job requirements are now such that new applicants for beginning level positions are required to hold bachelor level university degrees. Present inspector salary levels are sufficient to attract degree holders. Annual salary levels of positions in the weights and measures division range from \$8,352 to \$15,984. Above the division level there is opportunity for promotion into two assistant department director positions and the director slot.

To further analyze the significance of the new job classification series, let us look at it the way a new beginning level employee would. He can start work at \$8,352 per year and will get an automatic increase to \$8,760 at the end of six months if he completes his probationary period successfully. He will then get two additional automatic increases at six-month intervals, and will be earning \$9,660 by the end of 18 months from his original employment date. After two years of experience in the beginning level inspector position, an employee is eligible for promotion to the next higher position. From there he is eligible for promotion to weights and measures supervisor at a salary of up to \$15,984. As I mentioned earlier, weights and measures supervisor is not the top slot in the department. An employee in that position is eligible for promotion to assistant department director, or to director. Promotion to either of these positions would involve a considerable salary increase.

It should be pointed out that, because of the new job classification series, we were in a position to begin a selective staffing program early last fall. The goal was to obtain the best qualified, most highly experienced individual available for each added position. In this light, two of our new weights and measures staff members should be mentioned by name. Mr. James C. Blackwood joined the department last October as supervisor of the weights and measures division. Before coming to Dallas, he served as director of the State of Arkansas Weights and Measures Division. Also joining us in October was Reuben L. Sharp, veteran supervisor of the city weights and measures

division of neighboring Fort Worth, Texas. Reuben now fills one of our senior inspector positions.

With regard to consumer protection, establishment of the departmental job classification series has produced the same positive results here that it did in weights and measures. Consumer protection was set up as a major operating division on the same level as weights and measures. The investigative positions and the division supervisor slot are set at the same pay grades as comparable positions in the weights and measures division. Here again, a selective staffing program was undertaken. The consumer protection division is headed by a former FBI agent with a number of years of investigative experience. Every other member of the investigative staff was highly trained and well experienced in his field before joining us.

To further clarify the role of the consumer protection division, let me add that the consumer protection portion of the new departmental ordinance is patterned closely along the lines of the basic Federal Trade Commission regulation which makes it unlawful to engage in unfair or deceptive acts or practices in trade or commerce. Activity in consumer protection started at a high level the day the new department began operation, and it has increased steadily ever since. We originally estimated that the new department would handle 10,000 consumer complaints during its first year. It now appears that this estimate was somewhat on the short side, since the average daily complaint load has increased steadily to the point that the average for June was about three times the figure for October.

Although time will prohibit going into detail, let me briefly summarize what has happened in consumer protection up to this point:

1. Twenty-one cases have been filed in Municipal Court. Only one of these resulted in a "not guilty" verdict.

2. Along with this, \$100,970.75 in documented refunds and adjustments have been obtained for individual Dallas consumers in cases that were mediated in lieu of prosecution. These ranged from 7 cents for a can of biscuits that went flat to almost \$20,000 for a defective mobile home.

3. To strengthen the department's influence in one particular high abuse area, an electronic repairs ordinance was passed in February. This ordinance authorizes and requires us to license and regulate radio and television repair firms doing business in the city.

4. Additional specialized ordinances are proposed to strengthen authority in certain other high abuse areas. Currently being developed is an automotive repairs ordinance, which is expected to be presented to the City Council before the end of the fiscal year.

5. The reaction of the business community to departmental consumer protection activity has been both positive and supportive. We speculate that development of the new department as an expansion of the existing weights and measures department had some influence here since

consumer-oriented efforts of government have not been well received by the business community in all cases.

So in pausing and looking back both at weights and measures and consumer protection, the past nine months have been generally good ones for the new Dallas Department of Consumer Affairs in terms of overall effectiveness. None of our basic impressions as to how such a department should be organized have changed, although one significant planning error was made.

Our original estimate of the total man hours that added consumer protection responsibilities would require fell considerably short of the mark. As a result, it has been necessary to add seven new employees in consumer protection over and above the number first authorized in the current budget. We are particularly fortunate that management and council have supported us wholeheartedly, both in this area and with respect to other unanticipated needs.

As a final overview of the last nine months, let me stress that our original conviction that weights and measures and consumer protection are compatible functions is stronger than ever. Measured by any standard, the Dallas weights and measures program is better off now than it ever was on its own. We are better equipped, better staffed, and our people are much better paid. With regard to total activity, significantly more weights and measures cases were prosecuted during the first nine months of this fiscal year than were prosecuted during the same period last year under the old organization. Along with this, a number of needed changes and additions have been made to the weights and measures ordinance in conjunction with the development of new consumer protection ordinances.

On an everyday basis, we find that the two enforcement areas are similar in so many respects that it is often difficult to decide whether an individual complaint should be assigned for weights and measures or consumer protection investigation. The job duties are sufficiently related that employees in either division can be temporarily assigned to the other to cope with an emergency.

In conclusion, we feel that based on our experience in the City of Dallas, the combination of weights and measures and consumer protection into a single administrative agency has significantly increased the city's effectiveness in both areas. Weights and measures has provided a stable base for expansion, both in terms of long enforcement experience and established lines of contact with the business community. On the other hand, the public interest generated by consumer protection has focused on weights and measures the degree of attention it has deserved in the marketplace all along. As a result, the citizens of Dallas are now aware that weights and measures enforcement exists. For example, a short weight meat prosecution initiated by the Department of Consumer Affairs makes the front pages and

attracts every television camera in town. The same type prosecution initiated last year by the Weights and Measures Department did not seem to interest anyone at all.

Before this same Conference last year, Conference Executive Secretary Harold F. Wollin delivered an address entitled "The Future is Now." One of the views that he expressed was as follows: "It is time for a reevaluation of priorities in consumer affairs and for weights and measures programs to be placed near the top—not the bottom—of the consumer movement spectrum." This expresses quite well what we have tried to accomplish in the City of Dallas, Texas. At this point we feel that we are definitely moving in the right direction.

DISCUSSION

MR. S. ANDREWS: (Florida): I would like to ask Bill a question regarding his program in which I am very interested. What is the nature of your citations, and in what court?

MR. KORTH: The citations we will be using will be approved by the State Judicial Council. We will use these mainly in minus errors which are very definitely against the consumer, where we are very aware that they are not maintaining their equipment. We will be using them also in the retail markets when we find scales above zero, and we will be using them on meat cases, undercover buys—this type of thing.

We do not yet know the percentages. We are trying to guess for the use of the court and ourselves but we do not know how many we will issue. I am sure we will issue quite a few right off the bat, and I am sure as soon as the word gets around, it will drop very fast. In our county we have about 400,000 people, but we are basically a small county where word travels very fast. I am sure with a few citations issued it is going to clear up a lot of our problems.

MR. ANDREWS: In what court will these be adjudicated?

MR. KORTH: These will go to the Ventura County Municipal Court. They have jurisdiction in our county. They have nine courts but we have an advantage in that all of our citations will go to the central court. Then we can cite to any one of the courts within the county. We send them in to the central agency and they go out from there, but it is the local municipal court.

MR. ANDREWS: Will this be classified as a misdemeanor?

MR. KORTH: It is a misdemeanor right now, yes. We did submit a bail forfeiture schedule which was developed with the State Association and which we felt was very fair. The judges took one look at it and threw it out. They said in California any violation of the Business Professions Code that does not have a bail schedule is a \$500 fine and they feel this is where they should start. They felt it was about time this was stopped. Too many have had a free ride and they would

rather have jurisdiction themselves rather than being stuck to a bail schedule. We will file a report with it so the judge does have complete knowledge of the background. Every violator will have had a notice of violation prior to receiving a citation. This would not be on his first offense.

MR. ANDREWS: Will this require your inspectors to appear in court or will the information filed with the court suffice?

MR. KORTH: We have been advised that the District Attorney will handle that. We have worked very closely with the District Attorney. He is very aware of our operation and laws and with the report at this time they feel it will suffice.

MR. E. GRABOWSKI (Minneapolis, Minnesota): I would like to direct this question to the gentleman from Dallas. I thought I understood him to say that before they went into consumer affairs protection and the like they conducted a survey and the survey indicated that there was little fraud, misrepresentation and deceit. Then I thought he was going to say that there would be no need for the division. Then some of the statistics that came forth indicated that there was a tremendous amount of complaints, like 10,000. Would you please qualify the so called contradiction?

MR. VINCENT: Yes. What I said, I believe, was that we determined at that time that it appeared that the City of Dallas had a significantly lower level of consumer abuse in the marketplace than some other metropolitan areas of comparable size. We made a wee bit of a planning error there. There was a lot more out there than we thought. Does that answer your question? We based the original projection on all available indices as we knew them at that time.

MR. GRABOWSKI: Our division went into operation the first of March, and I am surprised with the exposure that we have had and the publicity that we have had from the news media, be it radio, television or the press. This is strictly my own opinion, but we are not getting the number of complaints that I had anticipated. I will say this though, from the complaints that we are getting we are resolving roughly 90 percent. We have not found it necessary as yet to go to court. We have resolved all of our complaints by mediation and conciliation. I would like to meet with you after the program and discuss your program in comparison to ours.

MR. VINCENT: I would enjoy it. Ours was a bit more like being in the Alamo for the first three to six months, but I would welcome the opportunity to discuss it with you.

CONSUMER PROTECTION IN MINNESOTA

by the Honorable STEPHEN KEEFE, Minnesota Senate, St. Paul,
Minnesota

I am not an administrator of the consumer protection department ; I am a politician and I sit in the State Senate. We have had a very interesting session for consumer protection this year and it has pointed out some difficulties that we have in our program in Minnesota. It has also pointed out some strengths and I think I would like to share them with you this morning.

The consumer protection situation in Minnesota is extremely fragmented. We have consumer protection functions in at least six completely separate departments of government plus a large number of completely autonomous boards, licensing boards and similar boards, that all have consumer protection functions of one sort or another.

The departments that have crime responsibility are the Department of Commerce which deals with securities, insurance, banking and that sort of thing; the Office of Consumer Services which is a fairly new department and which is growing with each session of the legislature by leaps and bounds; and the Attorney General, of course, who not only has some specific responsibilities of his own but serves as legal assistance to all the other departments. The Department of Agriculture deals with food related consumer protection for the most part. Weights and Measures is stuck off in the Department of Public Service, which is the old Railroad Warehouse Commission in Minnesota. It is responsible for regulating the phone companies, the railroads and warehouses, as well as having the Department of Weights and Measures stuck in there.

In addition there are well in excess of 20 autonomous boards. In fact, several members of the Senate Research Staff this year tried to find all the autonomous boards in Minnesota and were unable to do so in only one session of the legislature. So, we have a very fragmented situation.

In addition, we have had an unusual political situation in Minnesota. The Democratic Farmer Labor Party, which is our state version of the Democratic Party, has not controlled both houses of the legislature in 114 years since statehood. This year they control both houses of legislature. I am a member of that party. There is a lot of anxiety in our party to make a good record in our first shot at control and so there were a very large number of consumer protection bills passed. In each one of these bills the problems with fragmentation of consumer protection in Minnesota became more apparent.

Various legislators had their own ideas of which departments were more sympathetic to the consumer, which were more sympathetic to industry, and there was a great deal of yakking about where such and

such a new power should go. Let me give you an example by running quickly through some of the new legislation that we had and the departments it went into. The Department of Commerce has a normal sort of a state version of SEC responsibilities. They regulate banks and securities that are issued in Minnesota. The Insurance Department has a good deal of consumer protection responsibilities. In fact, we found that a very large number of complaints that consumers have are about insurance.

It seems consumers know two things about insurance. They know it costs a lot of money, and whatever happens you are not covered. So this is a great difficulty. In Minnesota we have what is called a File and Use Law, which means if an insurance company wants to increase its rates all it has to do is send a copy of those new rates to the Insurance Commissioners and he has no regulatory power over those rates.

A member of the Governor's Advisory Council for Consumer Affairs had to buy new automobile insurance and he went to 28 agents of the same insurance company. He gave them all the same statistics—same car, same driver, everything like that—and he got 23 different rate quotes. This is a serious consumer protection problem.

The Insurance Department has been given some expanded powers this time. We have made it illegal for insurance companies to fail to respond to complaints from policyholders in a timely manner and they are required to enforce that law. In addition, we have cancelled the \$5 fee the Insurance Department used to charge for investigating a complaint of an insurance cancellation. The Insurance Department felt that its job was consumer protection so they should not be charging consumers to protect them.

In addition, the Commerce Department has been given two fairly important new consumer protection responsibilities. One is in the area of franchise regulation. We find a lot of fairly major examples of consumer fraud in cases where businesses come in and sell franchises to people with promises of another MacDonald's, and the promises do not pan out. New franchise regulations require registration with the Commissioner of Securities of information dealing with financing, advertising, contracts, and policies. Disclosure of all this kind of information to the prospective franchisee is required. Also provided is a Bill of Rights, in effect, for franchisees including protection against unreasonable terminations, fees, and policies.

In addition, we have taken some interest in the problem of subdivided land sales. I am sure you have heard about some of these schemes. Some of them are very legitimate, of course, but there are some fly-by-night operators who sell people extremely small lots with no access and no sewage and mislead the consumers drastically. The Department of Commerce has been given considerable power to regulate this kind of sale as well.

The newest department that is working on consumer protection right now is the Office of Consumer Services which is, in fact, a department of the Commerce Commission. They started out with a little Federal Trade Commission (FTC) Act to regulate which is really a pretty good Act. It makes anything that is fraudulent or misleading or intended to deceive illegal because it provided no penalties. It was a strong inducement to people to think of the wildest schemes they could and use them until they got an injunction to stop them. Then they would go out and try to think of something else. The Consumer Services Office was created. That was the first responsibility they were given in the 1969 session of the legislature. They dealt very well on sort of a job owning basis with consumer complaints. People would call and about all the Office of Consumer Services had was the threat of an injunction from the Attorney General and the threat of adverse publicity from the complaint.

In this session we increased their powers drastically in a number of ways. I think this is an excellent example of what went on in this session of the legislature in Minnesota and what is going on, I am sure, all over the country as people are taking a great deal more interest in consumer protection. We did several things. We defined deceptive trade practices much more specifically including passing of goods and services as those of another, misunderstanding as to certification of goods, falsely representing goods as new or of a particular grade, and a whole list of specific definitions of uniform trade practices.

In addition, we passed another law that is really probably more important and that is a law that provides for civil penalties and damages for consumer fraud. It authorizes the maximum of a \$25,000 civil fine for violators of consumer laws and permits consumers in individual or particularly in class action, which is a very important part of the law, to sue for actual damages plus costs and reasonable attorney's fees. It also provides that a court order won by the Attorney General shall serve as *prima facie* evidence of violation of consumer law in a private lawsuit.

We have a number of very active volunteer citizens consumer groups in Minnesota. We have an active Minnesota Consumers League and we have the Minnesota Public Interest Research Group which, of course, is the local spin-off of the national Nader group. There are a number of other smaller groups in various towns. The labor unions have taken a strong interest. Chambers of Commerce have taken a strong interest. So there is quite a bit of public interest in consumer protection and, there is quite a bit of potential for this sort of a civil class action suit to recover damages from people who have committed any sorts of serious consumer fraud.

In addition, we passed at the local level a new Toy Safety Act which is very similar to the Federal law and which was passed in Minnesota because of complaints from various consumer groups that the Food

and Drug Administration (FDA) was not effectively enforcing the Toy Safety Act. The Minnesota Public Interest Research Group did a survey of stores and they found a large number of toys that had been banned by the FDA for several months but were still on the shelves. They found, in addition, a large number of toys which had not been banned but that were extremely dangerous and fully met the qualifications for being banned. They had not been banned due to inaction by the FDA. We took the Federal law and drafted it as a state law and gave the enforcement powers to the Office of Consumer Services.

That is sort of a new innovation but it is a logical thing. The Office of Consumer Services seemed to us to be the department that was best qualified to do this kind of thing because of its dealings with business, its high visibility to the public, and its militancy as a consumer protector.

In addition, we passed what a lot of other states have and which we have not had in Minnesota for some time. It has been a particular problem because people have thought we had it and that is a three-day cooling-off period for door-to-door sales. We put a \$25 limit on it so it would not pertain to milk truck deliveries or newspaper deliveries but for the encyclopedias or aluminum siding or whatever is being sold door to door by high pressure tactics. This cooling-off period provides an out for the consumer who changes his mind and decides after the salesman is gone and is not putting the pressure on that he does not want that sort of thing. The Office of Consumer Services is going to be enforcing that law as well.

In addition we have another law that is similar to a Federal law and for which we are permitting local enforcement. This is a law prohibiting the tampering of odometers. It prohibits all disconnecting of mileage indicators and it bans the sale of tampering devices. Furthermore, it requires an indication of the mileage when odometers are replaced.

The Office of the Attorney General has had the longest, most visible record in consumer protection. It is the one that brings the suits and gets the court orders when some sort of serious consumer fraud is going on and it gets the most publicity. Its duties have been expanded a great deal in the past session of the legislature as well. Its primary responsibility is to deal with false advertising, although the Office of Consumer Services also deals with that under the Deceptive Practices Act. This year we passed a number of new laws which the Attorney General is going to be required to enforce, and he is going to find it is going to take a great deal more time and attention from his staff and a great deal more staff.

We prohibit false advertising by employment agencies which, for instance, requires that when you are an employment agency and you advertise a job vacancy there has to actually be such a vacancy and, if not, the applicant can be granted financial relief for going out to

look for a job that is not there. It stiffens the requirements relating to licensing of the employment agencies.

We have a law that prohibits disclaimers of implied warranties. I am sure you are familiar with the warranties that amount to nothing except a disclaimer of warranty that this is in lieu of all other warranties expressed or implied, because on all new goods there is an implied warranty whether they say there is or not. A new item has to do what it looks like it should do; a car has to carry you from place to place, a washing machine has to clean clothes, and that sort of thing.

We have passed a number of what we call consumer protection laws in this state which are really laws to clarify the landlord-tenant relationship and protect tenants from unfair landlords. It requires interest payment on damage deposits and the return of damage deposits within a month unless written notice is given of some particular reason why the damage deposit is not returned or some damage that has to be repaired. It provides techniques by court order for tenants to withhold rents in order to make needed repairs on buildings. It also permits tenants to turn to municipal code enforcement agencies to have deficiencies in code enforced on a landlord.

We also abolished in this state the Mechanic's Lien Law this last session. That is a law that has really caused a sort of catastrophic problem to consumers and in a very unexpected way. If you hire a contractor to perform an improvement on your house, he may go out and hire subcontractors and not tell you. You may pay him, but he may not pay the subcontractors. If he does not pay them, they can put a lien on your house for the amount that they are owed. A lot of people have found that they spend many thousands of dollars on improvements to their house; they pay all the money, the improvements are not made, and a lien is placed on their house. They lose the money, they do not get the improvements, and they need more money in addition.

We have abolished that law and now the subcontractors can only place a lien on the house for the amount that is unpaid. There are all sorts of disclosure provisions and notification provisions so that the homeowner knows exactly what is going on and realizes that there are subcontractors out there and that they do have a claim. Even so, if he pays the whole amount to the contractor, the contractor is liable and the subcontractors are going to have to turn to him.

The Department of Agriculture now governs and enforces consumer protection so far as it relates to food. This has been criticized a great deal by activists in consumer protection because they point out that in Minnesota the Department of Agriculture is a large department and it is very active in promoting Minnesota agricultural products. Agriculture is a big industry in Minnesota and it is very important to our economy. Consumer protection advocates point out that a department

of government that has these two responsibilities, one to promote the sale of food products, and the other to protect the consumer from being taken advantage of in the sale of food products, may find itself in a conflict of interest.

We have been particularly fortunate with the current Commissioner of Agriculture who has taken a very strong and militant position in consumer protection and that position is probably most clear in the enforcement of the open dating provision that we passed in the last session. We passed a law that was subject to great debate. It was killed several times in committee and revived. It was defeated once on the floor and then revived and passed again. It is subject to a great deal of fight. The conference committee hearings went on for days, and there were two basic conflicts. The strongest consumer advocates wanted to put the enforcement of open dating in the Office of Consumer Services rather than in the Department of Agriculture where they felt there would be a conflict of interest. The Department of Agriculture prevailed on that particular item.

There was a great deal of argument over what kinds of products should be included. The consumer advocates wanted products with shelf life of up to two years to be included in this law, whereas representatives of various companies in the food industry wanted it to be very short. Consumer advocates offered a compromise that the Department of Agriculture could, after public hearings, exempt various food-stuffs from the open dating requirements if it was found that open dating requirements were not appropriate. That compromise was not accepted and the final compromise that was arrived at was that foods with a shelf life of up to 90 days would be open dated and foods with a longer shelf life than 90 days could be required to be open dated by the Commissioner of Agriculture after public hearings.

Those of us who worked on this bill felt that we got half a loaf. We thought that while we got up to 90 days, there are a great deal of food products—breakfast cereals, cake mixes, things like that—that are around for nine months to a year that are particularly subject to complaints and consumer difficulty. So we thought we had lost that sort of thing. Well, the Commissioner of Agriculture had a hearing and announced his proposed regulations the other day. His proposed regulations were that everything be open dated and he will have public hearings to make exceptions after that. He has been a very militant defendant of consumer rights and we will see what happens in the near future when the various sections of the food industry come in for their public hearings to try to obtain exceptions to this ruling.

The Public Service Commission was formed years ago to regulate railroads and warehouses. Lately, they have had added to their responsibilities the regulation of telephone companies. Other utilities in the State of Minnesota are not regulated on a statewide basis except by little scatterings of laws. We do not have any comprehensive statewide

regulations. There is considerable talk about that. There were three bills introduced in the last session which were given extensive hearings, and I have no doubt that some form of utilities regulations will come out of the legislature in the near future. That will probably go to the Public Service Commission.

In the Public Service Commission, of course, is the Weights and Measures Department which was put in there by some legislature in the distant past for I do not know what reason. Their responsibilities have been expanded in an interesting way this session. We have passed a law that requires posting on gasoline pumps of octane ratings, and I expect the Department of Weights and Measures is going to have the responsibility for making sure that these octane ratings are, in fact, accurate.

Probably the toughest part of consumer protection in Minnesota is the autonomous boards. There are a whole bunch of them. The best known, of course, are the Board of Education, which is a great huge department of the state government, gets more of our tax money than all the rest of state government put together, and the Board of Health. There are a large number of other licensing boards that are not very visible and that have been used in other states as consumer protection divisions. There are some people in the legislature, and I am one of them, who think that most of these licensing boards serve as protection to the industry rather than as protection to the consumer.

I had a bill in this session to permit the advertising of drug prices. We found vast differences in drug prices from drug store to drug store. It was our feeling that people could shop competitively if they knew what prices people were offering and that would bring prices down. The Pharmacy Board actively opposed that bill. They may have been right or they may have been wrong, but the point is that the various boards and agencies stand to defend their industry rather than to defend the consumer in the general case.

As an attempted remedy to that, this session of the legislature did something with all the licensing boards it could find, and let me tell you, I am not sure we found them all. We increased the size of the various state licensing boards from 25 to 40 percent larger with the provision that all the new members be lay members, not members of the profession being regulated. Now, it was our hope, of course, to get a majority of consumers on these kinds of various licensing boards. It was the hope of licensing boards not to get any consumers at all and the compromise was reached where a large minority, typically two on a five-man board, or three on a seven-man board, are consumers and people who do not have an immediate financial interest in the industry.

As an example of the kind of things they do, the Board of Education regulates private trade and correspondence schools that advertise on television. You see them all the time. The Board of Health regulates the new hearing aid control laws. The Pharmacy Board enforces the

Drug Price Posting Act. It requires the posting of sixty of the most used prescription prices in the drug store and also requires pharmacists to answer telephone inquiries. The Board of Health regulates funeral cost itemization—a bill that was passed this session. A new commission has been established to enforce cable television regulation. We are going to franchise cable television at a municipal level but we are going to have some statewide regulation of the franchise.

These bills have passed this session. I think that they have drastically expanded the consumer protection role in the State of Minnesota but they have also made much more apparent the problems that this fragmentation has caused. In addition, we are talking about some fairly major pieces of legislation in the next session.

Unit pricing has passed one house of the legislature and is in a committee in the Senate. We are very interested in the California systems of licensing automobile and electronics repairmen. Drug price advertising is not dead yet. Several things have been proposed. One is the consolidation of consumer protection activities into one large Consumer Protection Department, and that would probably include the entire Commerce Department, the current Office of Consumer Services, the Attorney General's responsibilities for dealing with false advertising, the open dating in the consumer protection field of food, part of the Department of Agriculture, the Weights and Measures Division of the Department of Public Service, and all the non-health licensing boards. These would be consolidated into one large consumer regulation office.

In addition, separate from that, there would be a very small consumer advocacy office which would not have any laws to enforce. Their job would be a gadfly job and this is one of the things that the Office of Consumer Services in Minnesota has been most effective at. They have had very little legal force for their workup until this session of the legislature, but they have been very effective in prodding the legislature, business, and various groups to act in a way that is more helpful to the consumer.

It has been suggested that the various health boards, pharmacy, nursing, medical examiners—there are twelve of them at least—be consolidated under the Board of Health and that their actual regulatory powers be given to the Board of Health which would have a representative from each of these boards. The individual boards, which are dominated by the industry that they are intended to regulate, would act in an advisory capacity to the Board of Health; but the Board of Health, in which that industry would be the minority, and the health professions in general would be the majority, would be the one with the actual power.

This is the kind of thing we are talking about in Minnesota and we are talking about a vast expanding of the consumer protection role in the state. We are running into great difficulty because of the fragmentation. What we are looking for is a consolidation of these activi-

ties so that, as the gentleman from Dallas said, the consumer does not have to guess which department his complaint should go to. He can call up the Department of Consumer Services and they will figure it out. If they cannot figure it out, if it is too ambiguous, they have somebody right there who is prepared to take care of it anyhow.

DISCUSSION

MR. D. OFFNER (St. Louis, Missouri) : There is great concern by a large part of the membership of this Conference about the propensity for state legislatures to move ahead independently in fifty different ways in regard to establishing certain standards. You have mentioned two that come to mind. One is open dating; the other is unit pricing. It is the feeling of a great many of us that activity on the part of legislatures in these fields should be guided by a uniform model because you can see the chaos that we can come into if adjoining states that are supplied from the same source have different standards in regard to things like unit pricing or open dating or many other things. I would like your comment on this.

SENATOR KEEFE : That is a great problem from two points of view. It is a problem as you have expressed it. It is also a political problem in that it is the most commonly used argument. We had lobbyists who went to the City of Minneapolis and said you should not pass a unit pricing ordinance, you should let the state do it. They came to the state and said you should not pass a unit pricing ordinance, you should let the Federal Government do it. I do not know what they tell the Federal Government. If we are not careful and we listen to those arguments, no one will pass such an ordinance.

One of the things we did put in our open dating statute which passed was an automatic repeal of the provision which would allow the Commissioner of Agriculture to accept in lieu of the state unit pricing or open dating requirements any reasonably strong Federal requirements or requirements from another state. I think that is a very good point and it is a difficulty the City of Minneapolis is getting into. They passed both open dating and unit pricing as ordinances and the rest of the state has not followed them as yet on unit pricing. It may put Minneapolis businesses at a disadvantage, although an interesting thing is one major chain of supermarkets in Minneapolis is unit pricing voluntarily and has been for some time.

MR. L. LEENERTS (Purex Corporation) : Does the Minnesota Pollution Control Agency, which has a division of special services which recently passed a law that would prohibit the introduction of a new product in the State of Minnesota made of anything except paper, come under the Office of Consumer Services? Where does that fall?

SENATOR KEEFE : That comes under the Pollution Control Agency and what you have just described is a surface explanation of an ex-

tremely complicated political problem that we had in this last session of the legislature. There is very strong pressure to pass a ban-the-can ordinance to ban nonreturnable beverage containers. There was strong opposition to this from industry and labor. What came out of the session was a very complicated bill which was intended to accomplish some of the goals that ban the can was intended to accomplish without instantly putting people out of work. This was the fear that people had. What we have now is a law that says if you want to introduce a new package, a new nonpaper package, in Minnesota, you take it to the PCA, the Pollution Control Agency. They tell you whether they think it is a good idea or not. If they think it is not a good idea, they can ban it, but only until the next session of the legislature. Then it is up to the legislature itself to decide whether or not these packages are a threat to the environment.

MR. LEENERTS: Do I understand this piece of legislation correctly? If you ask for an exemption on this, does the agency have 150 days to reply?

SENATOR KEEFE: I do not know. I am sure you are right if you read that.

MR. LEENERTS: I have the guidelines here. I agree that fragmentation by states makes interstate commerce rather difficult.

SENATOR KEEFE: I understand that. We are faced with a very interesting difficulty here and it is a political difficulty. Legislatures, as you know, are not so much interested in whether this or that sort of regulation will be easy to administer, or even sometimes be administrable at all. What they are interested in is what their constituents perceive they want. That is even removed a little by the fact that their interests are what they perceive their constituents' interests to be which may not be accurate either.

On the other hand, the criticism that is made of regulatory agencies is that any agency that regulates an industry spends much of its time in contact with the representatives of those industries, so they tend to become more sympathetic to the industry. I think there is bound to be a constant conflict between legislators and the people who have to enforce legislatures' laws.

MR. M. TRUJILLO (Puerto Rico): I would like to make some comments that might be helpful in your endeavor in the next legislative session. We have a consumer affairs department that has very wide authority. One of the problems we faced was the multiplicity of agencies dealing with consumer affairs. You will see that many of the agencies cannot really be consolidated because they have other functions. So the umbrella would be just too big.

In order to cover both the consumer end of the problem and also the need for a separate agency, our law provides that the Secretary of Consumer Affairs can oversee the enforcement of any and all consumer protection laws. What happens is that if the law is under the

jurisdiction of another agency, he refers the notices of violation to that agency for prosecution or adjudication. The complaints are handled in the same fashion. For example, if we receive a telephone complaint we refer it back to the Public Service Commission for adjudication. We also have a strong legal arm within the department. We have a legal bureau that has two divisions, the hearing examiners division and the trial division. They are both kept separate to keep the adjudication function of the department separate from the enforcement function, in order to comply with current constitutional doctrines. We have the authority to represent consumers before any court. For example, the telephone company requested an increase in their rates and our department filed a motion to intervene on behalf of every single consumer of Puerto Rico. So we consolidated certain functions but others had to be left where they were. Our department has the authority to either refer to them complaints and violations or to participate in their procedures on behalf of the consumers.

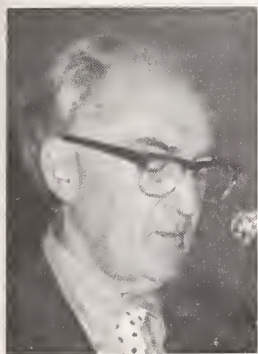
SENATOR KEEFE: Where to assign your priorities in state government is a very difficult problem. I know that one of the people on the Governor's Advisory Council has raised the question of whether environmental protection is really also consumer protection. The trouble is that if you are too broad in your determination of what consumer protection is, then you will have only one department of state government.

REPORTS OF THE CONFERENCE COMMITTEES

REPORT OF THE COMMITTEE ON LIAISON WITH THE FEDERAL GOVERNMENT

Presented by M. GREENSPAN, *Chairman*, Supervising Inspector,
Department of Consumer Affairs,
New York City, New York

(Wednesday, July 25, 1973)



The Committee on Liaison with the Federal Government submits its report to the 58th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by the final report.

The report represents recommendations of the Committee that have been formed on the basis of written comments received during the year and oral representations made during the open meeting of the Committee. The Committee intends to maintain the line of communications already established with Federal agencies and to aggressively pursue all matters involving Federal and State relations in the weights and measures field.

OIML

The United States officially became a member of the International Organization of Legal Metrology (OIML) in August of 1972. The U.S. delegation attended its first plenary session in October of that year. The activities of the OIML interface with NCWM, particularly with regard to commercial weighing and measuring devices.

A United States National Committee is to be formally established to assist the U.S. delegation to OIML. The National Conference has been requested to appoint a representative to sit on the National Committee and the Conference's Executive Committee was requested to name such a representative. The first representative is Mr. James F. Lyles, Supervisor of the Weights and Measures Section, Division of Product and Industry Regulation, Department of Agriculture and Commerce, Virginia, for a period of two years. The official representative will report on activities through this Committee. It is the understanding of the Committee that the United States National Committee for OIML will be made up of both government and private industry representatives in the same fashion as membership in the National Conference on Weights and Measures. The Committee would like to commend NBS on this approach which allows all interested parties a voice in weights and measures matters. The Committee would also like to endorse a pol-

icy of not considering any OIML proposal until the U.S. National Committee has voted affirmatively on the matter which, of course, implies a positive attitude by our representative on behalf of the Conference.

This is the report of the U.S. National Committee representative, James F. Lyles:

I am pleased that the National Conference on Weights and Measures Executive Committee selected me as your representative on the U.S. National Committee of OIML. This Committee is to assist the U.S. delegation to OIML by giving the delegation guidance on matters being discussed or to be discussed at the International Meeting.

As your representative, I will let your wishes be known to this Committee, represent you to the best of my ability and report back to you on matters of interest.

The United States officially became a member of the International Organization of Legal Metrology (OIML) in August of 1972. The U.S. delegation attended the first preliminary session in October of that year. The activities of OIML interface with the National Conference on Weights and Measures particularly with regards to commercial weighing and measuring devices.

The U.S. National Committee (USNC), the advisory body to NBS, has met twice on an *ad hoc* basis to discuss the U.S. role in OIML. It is generally agreed by industry representatives and government officials attending these meetings that the U.S. should assume a leadership role, to provide administrative and technical leadership.

The Committee felt that the U.S. should serve as "pilot secretariat" coordinator for technical working groups, in several areas of interest. For example, studies relating to mass measurements (weighing), weights, liquid hydrocarbons, and gas measurements.

Also, the Committee felt the U.S. industry should participate actively in working groups writing specifications for commercial devices and in other areas where needed.

It seems as if one of the most pressing problems is the language barrier. OIML documents are written in French only; thus, English versions of draft International Recommendations are not available for distribution in sufficient quantities. The U.S. is hoping for English as a working language.

Mr. William Andrus, Acting Deputy Assistant Secretary for Science and Technology, Department of Commerce, and the official U.S. member of the International Committee of OIML, attended a meeting in Paris in May to discuss the U.S. position relative to our participation, and the agenda for the International Committee meeting in October.

Also, Mr. Robert O. Bradley of Toledo Scale Company, and Mr. Thomas M. Stabler, NBS, participated in a working group meeting at PTB, West Germany, writing specifications for Weight-Price (computing) Scales and Large Test Weights.

In summary, I would like to list a few of the benefits to the United States in participating in OIML. They are:

- (a) To improve opportunities for exporting measurement instruments and to help our balance-of-payment position.
- (b) To obtain better information regarding measurement techniques in the field.
- (c) To influence internationally adopted measurement techniques so U.S. procedures will not be put at a disadvantage.
- (d) To insure that the United States can assist lesser developed countries in implementing model laws and uniform procedures compatible with performance requirements commonly used in the United States.
- (e) To facilitate the development of an international standards program for the United States in this area.

This has been a very brief report of my involvement since attending the April 1973 meeting at NBS in Gaithersburg, Maryland. I can assure you that between Conference, NBS, and industry representatives that your interest will be looked after.

Again, I want to thank you for the privilege of representing you on this Committee

The Committee proposed the following resolution for the consideration of the Resolutions Committee of the Conference:

OIML Translations

Whereas, the sole official language of the Organization of International Legal Metrology (OIML) is French, and the legal and predominant language of the United States of America is English:

Be it resolved that the National Conference on Weights and Measures strongly urges the ultimate adoption of English as a second official language of OIML.

Be it further resolved that the Committee on Liaison with the Federal Government is to use all possible means to cause the Government of the United States to provide English translations of all draft regulations, approved international recommendations, policy documents, and official meeting minutes within thirty days following receipt of the French language text continuing until such time as English becomes the second language of OIML.

Be it further resolved that any and all documents received and intended for further domestic distribution to the National Conference or any of its members should, at a minimum, have attached an English language title or table of contents, and an abstract of not more than 100 words summarizing each separate subject within the basic document.

Be it further resolved that the representative of the National Conference to the U.S. National Committee shall not authorize further distribution of OIML material to Conference committees and members until one of the aforementioned conditions has prevailed to his satisfaction.

By endorsement of the National Conference on Weights and Measures, the Office of Weights and Measures is otherwise requested to automatically seek an appropriate extension of deadline so as to allow at least a thirty-day period for comment on any document requiring advice or review by Conference members.

Metrication

A report on the status of metrication was presented to the Committee by NBS representatives. If and when a metric conversion bill is passed by Congress, the Conference should be prepared to present the weights and measures view. Questions concerning equipment and training needs would be particularly important to officials. There will also be a need for establishing target dates for changes to laws and regulations so that all jurisdictions can move uniformly in any conversion. It appears likely that there will be hearings on the matter inasmuch as numerous bills on metric conversion have been introduced in the Congress. The Committee recommends the establishment of a special committee

to consider these matters and to prepare an appropriate presentation when and if hearings on the question are held.

The Committee proposes the following resolution to effect a logical transition to a new measurement system :

Metric Conversion

Whereas, industry, state and local governments of the United States are increasing their voluntary use of the Metric (SI) System of weights and measures at an ever-expanding rate, and whereas, federal legislation under consideration is intended to cause the predominant usage of the Metric (SI) System, and in all cases does create a national planning and coordinating agency for this purpose.

Be it, therefore, resolved that the National Conference on Weights and Measures empowers its Committee on Liaison with the Federal Government to act on its behalf in assessing, evaluating and planning for the impact of conversion.

Be it further resolved that the Liaison Committee shall have authority to draft a special committee to advise it, made up of members of the National Conference, equally drawn from government and industry, who shall :

- (a) Identify specific weights and measures regulations and publications which require modification to accommodate conversion.
- (b) Draft proposed remedial phraseology to authorize the use of metric language.
- (c) Through participation in appropriate forums of all affected interests, propose a timetable for modification of model laws and dependent state regulations.
- (d) Submit all recommendations to the Liaison Committee for coordination with all other committees of the Conference as well as the federally appointed national conversion board.
- (e) Establish a report system to at least annually review the effectiveness of the conversion plan within the weights and measures community.

By endorsement of the National Conference, the Committee on Liaison, with the Federal Government is instructed to commence immediately in preparing advice needed to ensure a rational and orderly National Conversion to the Metric (SI) System of weights and measures.

Handbook 67 Revision

The Committee heard a report by OWM representatives concerning plans for a complete revision of the package checkweighing manual, Handbook 67. The Committee is especially pleased by the fact that the several federal agencies concerned in this area are now jointly

working on the problem. It is anticipated that the states and local jurisdictions will be called upon, through the Conference, to participate in this development and to exercise a review function.

U.S. Postal Service

A report was presented to the Committee by a representative of the U.S. Postal Service. The Postal Service had under development a handbook including operational and maintenance guidelines as well as the appropriate portions of Handbook 44.

In addition, arrangements have been made between the Postal Service and the Western States Weights and Measures Association to conduct a test program on a single state-wide basis. The selected state is Idaho and a sample test program will soon be underway with the cooperation of Idaho officials. A major feature of the program is the installation of a two notice system whereby Post Office operating officials will be notified of incorrect conditions and directed to make necessary corrections.

Device and Package Inspection on Military Installations

The program of weights and measures inspection on military installations became effective on June 8, 1970, with the publication of guidelines by the Assistant Secretary of Defense for Manpower and Reserve Affairs. In accordance with the guidelines, weights and measures officials were requested to forward copies of all inspections to OWM. During calendar year 1972 the following data have been received:

Number of installations inspected	Number of States reporting	Scales	
		Inspected	Percent of rejection
23	*6	135	6.6

Meters		Packages Lots	
Inspected	Percent rejection	Inspected	Percent rejection
24	4.2	478	**23.8

*Includes Seneca County, New York, and San Joaquin County, California.

**Includes label errors in addition to short weight.

The number of installations inspected and states reporting is essentially the same as last year; however, significant reductions in rejection rates are noted indicating improvement in those jurisdictions active in the program. All jurisdictions are urged to participate in the program where appropriate and to report the results of inspections to OWM for processing.

The OWM program of providing instruction on weights and measures enforcement to military students attending commissary schools has been proceeding as outlined in the official guidelines. OWM conducted five two-hour seminars at Fort Lee, Virginia, during the months of January, March, May, October, and December 1972. These seminars are conducted as part of the comprehensive seven-week commissary schools held regularly at Fort Lee for the purpose of training commissary management. Cooperation by DOD in this effort has been outstanding, and it is felt that a better understanding and appreciation for accuracy on the part of the Commissary Officers has resulted.

USDA Labeling Regulations

The Committee has been apprised of communications between the Western States Weights and Measures Association and the USDA on the matter of net weight statements on packaged meat products. The Association has provided the Committee with copies of correspondence wherein the USDA indicates they are considering revisions to their regulations that would strengthen consumer protection at both the producing establishment and at the point of sale. Similar assurances of changes in federal meat and poultry labeling regulations have been received through communications with the Committee on Laws and Regulations. It now appears that the USDA will publish new regulations embodying the concept of requiring net weight on the average at any point in the distribution chain where a product changes hands. These will be subject to comment by both the regional and national associations of weights and measures officials. The Committee is heartened by this development and expresses its appreciation to all of those officials who participated in this effort.

Air Pressure Measurement Devices

The Committee is in receipt of a request from the National Business Council for Consumer Affairs to consider their report, "Tire Inflation and the Consumer." This request has been directed to the Committee through the Chairman of the National Conference, Mr. George Johnson. In considering the matter, the Committee heartily endorses a recommendation made by the NBCCA to the effect that "corporations involved in the sale, servicing, and use of passenger car tires should increase efforts to educate consumers on the importance of tire inflation."

Perhaps the most effective way for consumers to accurately maintain tire inflation pressures is to acquire an accurate tire gage and use it periodically. Since all manufacturers' recommendations regarding tire inflation pressures are based on cold pressure levels, for best accuracy, tire pressures should be measured cold before driving the car. In that fashion inherent errors in a system of using service station air tower gages will be minimized since the air towers will only be used as a source of supply rather than as a measuring device.

The Committee recommends that weights and measures officials participate to the extent possible in any education efforts on the whole subject of tire inflation pressures. In addition, it should be mentioned that since air pressure gages are not commercial devices, but are provided to customers as a convenience by gasoline service stations and other establishments, such devices are not subject to weights and measures regulation or enforcement.

M. GREENSPAN, *Chairman*, New York City, N.Y.

L. D. HOLLOWAY, Idaho

A. SANDERS, Scale Manufacturers Association

W. N. SEWARD, American Petroleum Institute

J. SPEER, Milk Industry Foundation

E. A. VADELUND, *Staff Assistant*, NBS

H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Liaison with the Federal Government

(Mr. Greenspan moved for adoption, and after a second from the floor, the report of the Committee on Liaison with the Federal Government was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON EDUCATION, ADMINISTRATION, AND CONSUMER AFFAIRS

Presented by E. PRIDEAUX, *Acting Chairman*, Chief, Weights and Measures Section, Department of Agriculture, State of Colorado

(Thursday, July 26, 1973)



The Committee on Education, Administration, and Consumer Affairs submits its final report to the 58th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement, and as amended by the final report. The report represents recommendations of the Committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the Committee.

National Weights and Measures Week

Celebration of National Weights and Measures Week is a responsibility of each state and local official. The Committee feels that while certain materials for the Week can be developed at the national level, each jurisdiction is best able to determine the type of media through which it should channel its promotion for the Week. To this end, the Committee feels its major responsibility is to communicate the various individual efforts around the country rather than attempt to develop a national program. Additionally, the Office of Weights and Measures, National Bureau of Standards, developed the art work for a weights and measures place mat. A copy of the original art work can be supplied to interested jurisdictions who wish to have the mats printed.

Subcommittee on Public Affairs

For many years, industry has expressed and demonstrated its support for weights and measures administration and the job done by the National Conference in promoting uniformity and serving as a forum for problem solving. The Committee feels that the problem of bringing national recognition to weights and measures could best be pursued by having the Conference and industry work together on this matter. The Committee is continuing to pursue the idea of having a select group of persons, including representatives of industry, with wide experience in public relations develop a promotional plan for the National Conference that might include films, slide tape presentations, and publications. The Committee will soon recommend persons to

OWM to serve on such a body and will ask that OWM coordinate the study group so that a public relations proposal could be developed for the 1974 Conference.

Weights and Measures Promotional Activities

A number of excellent ideas designed to reflect the importance of weights and measures enforcement have been brought to the attention of the Committee. They are as follows:

1. Weights and Measures Commemorative Stamp

The Committee wishes to recognize the efforts of Mr. Mack Rapp, Detecto Scales, Inc., for his work in organizing support for the issuance of a commemorative stamp in 1974 to celebrate the 175th anniversary of the first Weights and Measures Act passed by Congress and signed by President John Adams on March 2, 1799.

Meetings have been held with officials of the Postal Service and with NBS personnel to discuss this matter. These discussions have centered on the possibility of stamps to commemorate:

- (a) Treaty of the Meter
- (b) Weights and Measures
- (c) National Bureau of Standards
- (d) Metric Conversion Law—if Congress passes such a law this session.

The stamps would be issued in a block of four, designed so as to bring recognition to the entire field of measurement science. The Committee is hopeful that the request will receive favorable attention.

2. Weights and Measures Commemorative Medallion

The Committee is attempting to have the Franklin Mint issue a medallion on weights and measures under its Special Commemorative Issues Program.

For the past several years, the Franklin Mint has annually issued a series of medals commemorating significant persons, places, and events. These medals, termed special commemorative issues, are available only to a closed group of established collectors and to the sponsoring organization associated with the issuance of each medal.

Apart from the prestige of having a medal especially struck to commemorate weights and measures, the National Conference would receive these benefits:

- (a) All design, die, and engraving charges would be absorbed by the Mint.
- (b) The Conference would be given a gratis supply of the medal for special VIP presentations.

- (c) The Conference would be able to offer the medallions for sale to all interested parties.

The Committee will soon forward correspondence to the Franklin Mint outlining the importance of weights and measures, and requesting that the medallion be issued.

3. *Scouts of America Weights and Measures Merit Badge*

The Committee expresses its appreciation to the newly organized Northeastern Weights and Measures Association for proposing that the Scouts of America issue a Weights and Measures Merit Badge.

The objectives and requirements of the merit badge are as follows:

Objectives

- (a) To demonstrate the necessity for a common, worldwide system of measurement.
- (b) To create an awareness of weights and measures as a factor in modern living.
- (c) To create an awareness of vocational opportunities in the weights and measures profession.
- (d) To foster a better understanding of the need for weights and measures standards.

Requirements

- (a) Define the word "weight" in a 100-word essay.
- (b) Define the word "measure" in a 100-word essay.
- (c) Explain the difference between the "English" (conventional) system of measurement and the metric system of measurement.
- (d) Construct a measuring stick of wood or metal, or a combination of both, which are on one side marked graduations in feet and inches and on the other, metric graduations; or Construct out of wood or metal, or a combination of both, an equal arm balance; and
By visiting a weights and measures official or with the help of your counselor, verify its accuracy using the requirements set forth in the National Bureau of Standards Handbook 44.
- (e) Using a readily available map of your own, make an overlay of the map showing the distance from 12 different points using the metric system.
- (f) Using packaged or canned food or hardware items, convert the package labeled quantity to the metric system for a minimum of 15 different commodities.
- (g) Make a scale drawing showing the difference between a quart and a liter, a pound and a kilogram.
- (h) Write a report describing the duties of a weights and measures official following a visit to a local state weights and measures facility; or

Write a brief report concerning the content and scope of your state's weights and measures laws.

- (i) Draw a diagram of a weighing or measuring device describing its components.

It is imperative that the Conference endorse the badge and that state and local officials support the Scouts of America in this effort.

4. *Smithsonian Institution Exhibit of Weighing and Measuring Instruments*

The Committee has learned that the Smithsonian is assembling an exhibit on weights and measures. At present, an opening date has not been set for the exhibit. However, Dr. Jon Eklund of the Smithsonian has asked the Committee to urge that weights and measures officials assist him in two areas:

- (a) By writing to him letting him know of weights, measures, and balances in their possession that may be of historical significance.

Dr. Jon Eklund
Division of Physical Sciences
MHT 5123
Smithsonian Institution
Washington, D.C. 20560
Tel: 202: 381-5330

and

- (b) by giving him interesting anecdotes on weights and measures enforcement.

The Committee is enthusiastic about the possibility of a weights and measures exhibit and urges all officials to provide whatever input they can.

5. *National Geographic Article on Weights and Measures*

Comment was received during the open meeting requesting that the Committee approach the National Geographic Society, Washington, D.C., with a proposal that they do an article in 1976 on weights and measures systems, metrology, equipment, and metrication. The Committee has placed this request on its agenda and will approach the National Geographic Society as requested.

Metric Education

The Committee is aware that many jurisdictions are flooded with requests for educational type materials that explain the metric system of measurement. To this end, the Committee provided a display

at the National Conference of all currently known sources of educational material on the metric system. This included films that were available, books, pamphlets, and other materials that weights and measures officials may wish to acquire for dissemination to the general public.

During the open meeting comment was received from Puerto Rico requesting that in any changeover to the metric system, the United States consider the use of metric subunits that are practical for use by consumers rather than subunits that are normally used in academic or technical circles. An example would be the use of the centimeter rather than the millimeter on consumable goods. The Committee wishes to express its appreciation for these comments and certainly endorses the need for the use of practical metric units when involving the consumer.

National Survey of Weights and Measures Administration

The Committee received correspondence concerning a very serious need for information on the various activities and administrative procedures of state and local weights and measures offices. The purpose of such information is to offer anyone a realistic picture of the resources currently in use in this country to provide for weights and measures enforcement. The uses of the information are, of course, varied according to each individual jurisdiction and may range from a simple comparison of resources to a rather in-depth analysis of resource commitments based upon population density, levels of commerce, etc. The need for these data is obvious. The planning for such a survey and the capturing of resources to do it is a matter for the Conference and the NBS Office of Weights and Measures to coordinate.

Clearinghouse for Exchange of Packaging and Labeling Problems

This topic results from correspondence from the field on a need for some type of package information clearinghouse at the national level that is similar to that currently being operated by the City of Baltimore, Maryland. The Committee is of the opinion that a national clearinghouse of packaging data is cost prohibitive. Additionally, the problem appears not so much to be an exchange of all data on packaging or labeling problems but a meaningful and uniform exchange of information between a jurisdiction which has uncovered a packaging problem and the jurisdiction where the package was manufactured or packed. To this end, the Committee, largely through the efforts of Dan Offner, has developed a uniform reporting form that can be used by all jurisdictions in notifying each other of packaging problems where assistance is required for enforcement purposes. The recommended form is presented below.

Date _____

YOUR OFFICE LETTERHEAD

PACKAGE TEST AND INSPECTION REFERRAL

To: Receiving Jurisdiction
Street
City
State, Zip

This is to report that our office has found a violation of Section _____ of our law dealing with packaged commodities. The violation apparently originated in your jurisdiction.

Descriptive Name
of Commodity: _____
Brand Name of
Commodity: _____

Manufacturer or Distributor
(as shown on package): _____
Address: _____

Type of Container (plastic bottle,
aerosol, paper sack, etc.): _____ Declared
Net Contents: _____

Lot, Code, or Other Identifying Numbers: _____
Name & Address of Establishment
where Violation was found: _____

Date Violation Occurred: _____

Nature of Violation: Labeling ☐ Short Weight ☐ Short Measure ☐
Short-count ☐ Slack fill ☐

Other (Specify): _____
If Labeling Violation, describe: _____

If Shortage Violation, give the
following details: Approximate Number in Lot: _____

Average Error: _____ Range of Error: _____

Remarks:

We would appreciate a report of your investigation of this violation.
Very truly yours,

Open Dating on Packaged Commodities

The Committee is aware of attempts at the state and local levels to provide for mandatory open dating of packaged commodities and the voluntary open dating systems employed by the private sector. These developments could lead to a great degree of nonuniformity. Because of the lack of uniform guidelines, and the possibility that enforcement of open dating requirements will become the responsibility of weights and measures officials, it has been requested that the Committee on Laws and Regulations consider the development of a Model Regulation for open dating.

The Committee wishes to express its appreciation to the Committee on Laws and Regulations for its prompt and thorough response in the development of a model regulation for open dating. The Committee endorses the model regulation in view of its responsibility in

the area of consumer affairs. The National Conference has as one of its objectives the adoption of uniform model regulations. While many officials may question whether or not open dating is a weights and measures responsibility, the Committee feels that the significance of promoting a uniform model open dating regulation should override such consideration.

E. PRIDEAUX, *Acting Chairman*, Colorado
G. E. MATTIMOE, Hawaii
D. I. OFFNER, St. Louis Missouri
S. F. VALTRI, Philadelphia, Pennsylvania
R. T. WILLIAMS, Texas
D. E. EDGERLY, *Staff Assistant*, NBS
H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Education, Administration,
and Consumer Affairs

(Mr. Prideaux moved for adoption and, after a second from the floor, the report of the Committee on Education, Administration, and Consumer Affairs was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON LAWS AND REGULATIONS

Presented by S. D. ANDREWS, *Chairman*, Director Division of
Standards, Department of Agriculture and Consumer
Services, State of Florida

(Thursday, July 26, 1973)



The Committee on Laws and Regulations submits its final report to the 58th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement, and as amended by the final report.

The report represents recommendations of the Committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the Committee.

MODEL STATE METHOD OF SALE OF COMMODITIES REGULATION

1. *Combination Quantity Declarations*

At the 57th National Conference the Committee on Laws and Regulations acknowledged that numerous packaged products bearing combination quantity declarations presented problems in applying the average concept to such quantity declarations. Specifically, the Com-

mittee made recommendations with respect to packaged paper plates and indicated that the total subject of combination quantity declarations would be retained on the Committee's agenda.

It is now our consensus that this problem must be dealt with on a case-by-case basis and solutions should be specified in regulation rather than as Conference recommendations. Accordingly, it recommends consideration and adoption of the following amendment and appropriate renumbering of existing sections:

SECTION 15. COMBINATION QUANTITY DECLARATIONS.—Whenever the method of sale for a bulk or packaged commodity requires the use of a statement including two or more declarations of weight and measure, or count, or size, or other appropriate combinations, the following shall apply to the particular commodity:

15.1 Paper Plates—The allowable difference between actual and declared dimensions shall be minus $\frac{1}{8}$ inch to plus $\frac{1}{4}$ inch.

2. Railroad Car Tare Weights

The problem of inaccurate railroad car tare weights has been thoroughly explored by the Committee and the Committee is in receipt of a study completed by the Association of American Railroads. The study indicates that variations between actual and stenciled tare weights are a serious problem and that a significant portion of the problem is traceable to initial weighings of newly built or reconditioned freight cars. The AAR study disclosed that approximately 74% of newly built and reconditioned cars being supplied by car makers were accurately weighed and stenciled within allowable tolerances. Similarly, initial tare weights established by operating railroads on freight cars indicated that about 53% of such cars were stenciled with accurate tare weights.

In light of this situation, it is the Committee's recommendation that state weights and measures officials begin immediate enforcement activities concentrating on newly built and reconditioned cars. The AAR has provided a listing of car builders and a listing of facilities where freight cars are reconditioned. These listings have been made available to appropriate state weights and measures officials.

To further assist in resolving this problem, the Committee recommends consideration and adoption of the following amendment and appropriate renumbering of existing sections:

SECTION 16. RAILROAD CAR TARE WEIGHTS.—Whenever stenciled tare weights on freight cars are employed in the sale of commodities or the assessment of freight charges, the following conditions and requirements shall apply:

16.1. All newly stenciled or restenciled tare weights shall be accurately represented to the nearest 100 pounds and the representation shall include the date of weighing.

16.2. The allowable difference between actual tare weight and stenciled tare weight on freight cars in use shall be:

(a) Plus or minus 300 pounds for cars 50,000 pounds or less;

(b) Plus or minus 400 pounds for cars over 50,000 pounds to and including 60,000 pounds;

(c) Plus or minus 500 pounds for cars over 60,000 pounds.

16.3. Tare weight determinations for verification or change of stenciled weights shall only be made on properly prepared and adequately cleaned freight cars.

16.4. The provisions in Section 16. shall be effective as of July 1, 1973 for all railroad cars stenciled or restenciled with a tare weight after that date and for all railroad cars as of January 1, 1978.

Model State Packaging and Labeling Regulation

1. The Committee has received a request from the Feather and Down Association seeking an exemption from package labeling requirements on feather and down products in package form. The Feather and Down Association has shown that their products must meet specific labeling requirements under existing state furniture and bedding laws. These laws provide that identity, quantity, and responsibility statements appear on a permanently attached tag for each product.

It is the Committee's view that since these products, and similar items utilizing materials other than feather and down, are subject to specific state laws and regulations which afford adequate consumer protection, it is appropriate that such products, when in package form, be excluded from certain of the specific labeling requirements in the Model State Packaging and Labeling Regulation. The Committee, therefore, recommends consideration and adoption of the following amendment:

11.26. Pillows, Cushions, Comforters, Mattress Pads, Sleeping Bags, and Similar Products.—Those products, including pillows, cushions, comforters, mattress pads, and sleeping bags, that bear a permanent label as designated by the Association of Bedding and Furniture Law Officials or by the California Bureau of Home Furnishings shall be exempt from the requirements for placement (Sections 3.1. and 5.), location (Section 8.1.1.), size of letters or numbers (Sections 8.2.1. and 8.2.2.), and free area (Section 8.1.4.) and the declarations of identity and responsibility; provided that declarations of identity, quantity, and responsibility are presented on a permanently attached label and satisfy the other requirements of this Regulation; and further provided that

the information on such permanently attached label be fully observable to the purchaser.

2. *Random Weight Packages*

The continuing debate over the question of whether random weight products in consumer size units should be labeled by the packer or the retailer has indicated a need to clarify Section 1. (e) of the Model State Packaging and Labeling Regulation. The intent of Section 1. (e) was to permit random weight packages to be labeled with identity and responsibility statements while moving in commerce with the quantity statement to be entered at or just prior to the time of sale. Present wording of the section is open to the interpretation that it permits such packages in commerce without any labeling whatever.

The current federal regulations concerning random weight and some standard weight consumer units, provide for different labeling methods depending upon whether the item is a meat or poultry product governed by the U.S. Department of Agriculture or another type of food product governed by the Food and Drug Administration. The regulations of both agencies permit the movement in commerce of such consumer units without a quantity statement provided that the quantity statement is placed on the package at or just prior to sale to the consumer. However, the USDA provides one method and the FDA provides a differing method for handling this problem. Accordingly, the Committee has addressed a communication to both agencies suggesting that one uniform method of dealing with such packages be utilized by both.

Additionally, to remove any question about the intent of Section 1. (e), the Committee recommends consideration and adoption of the following amendment:

Eliminate Section 1. (e) in its entirety and add a new Section 11.27. as follows:

11.27. Commodities' Variable Weights and Sizes.—Individual packaged commodities put up in variable weights and sizes for sale intact, and intended to be weighed and marked with the correct quantity statement prior to or at the point of retail sale, are exempt from the requirements of Section 6. Declaration of Quantity: Consumer Packages, while moving in commerce and while held for sale prior to weighing and marking; provided that the outside container bears a label declaration of the total net weight.

The Committee feels this amendment will clarify the original intent of Section 1. (e) and that nothing further can be done on this matter until both federal agencies with responsibility in the area provide for a uniform treatment of this problem.

3. Packages Sold by Count

The Committee has been requested to provide an exemption for packaged commodities sold by count containing less than 6 items fully visible to the purchaser. The problem is particularly acute with respect to hardware items, notions, and the like.

The Committee is sympathetic to this request but would like to point out that neither the Food and Drug Administration nor the Federal Trade Commission has provided such an exemption on packages subject to the Fair Packaging and Labeling Act regulations. Nevertheless, the Committee feels that such an amendment is appropriate and that a communication should be delivered to the appropriate federal agencies urging the adoption of an exemption for such packages. It is to be noted that prior to the passage of the Fair Packaging and Labeling Act, an exemption for packaged items sold by count was a feature of federal regulations and should be restored. Accordingly, the Committee proposes to communicate this view to the federal regulatory agencies and also proposes for consideration and adoption the following amendment to be applied to all those packages not currently subject to the Fair Packaging and Labeling Act requirements.

11.28. Packaged Commodities Sold by Count.—When a packaged consumer commodity is properly measured in terms of count only, or in terms of count and some other appropriate unit, and the individual units are fully visible to the purchaser, such packages shall be labeled in full accord with this regulation except that those containing 6 or less items need not include a statement of count.

4. Packaged Fishing Lines and Reels

Quantity statements on packaged fishing lines and capacity statements on reels are uniformly presented in terms of yardage. The use of a dual quantity statement as required by Section 6.6.2. (a) is of no benefit to the consumer. Accordingly, the Committee proposes the following exemption:

11.29. Fishing Lines and Reels.—Packaged fishing lines and reels are exempt from the dual quantity declaration requirements of Section 6.6.2. (a) provided that the quantity or capacity, as appropriate, is presented in terms of yards in full accord with all other requirements of this Regulation.

5. Exposure Variations

The Committee has thoroughly explored the situation with respect to the request received at the last Conference to eliminate Section 12.1.2. from the Model State Packaging and Labeling Regulation. The Committee is aware that there is litigation which, when resolved, will have a decided effect upon the whole question of exposure variations.

The Committee has also been informed by representatives of the U.S. Department of Agriculture that it is their view that package quantities should be accurate at any and all points of sale in the normal distribution chain. In effect, this view means that the so-called "when packed" concept for meat and poultry products will no longer be adhered to. The Committee is heartened by this development; however, it feels that it would be premature to recommend the elimination of Section 12.1.2. until such time as a definitive statement is received from the courts on this whole matter. Accordingly, the Committee recommends retention of this section.

Other Items

1. *Open Dating*

The Committee has received a request from the Committee on Education, Administration, and Consumer Affairs to consider the development of a Model State Open Dating Regulation. In considering the matter, the Committee is aware of numerous open dating experiments being carried on in the private sector and numerous legislative proposals being considered by states, counties, and cities around the country. Many weights and measures officials are being called upon to provide information on the subject and many of the proposals indicate that the responsibility for enforcing open dating requirements will probably be placed upon weights and measures officials. It is the Committee's view that this widespread activity could well lead to a great degree of nonuniformity in open date labeling.

Accordingly, the Committee recommends the following open dating regulation for consideration and adoption.

MODEL STATE OPEN DATING REGULATION

SECTION 1. APPLICATION.—Except for packages and commodities in package form open dated in accord with existing regulations, or specifically exempted therefrom, any open dating information provided or required for any perishable and semi-perishable food commodity shall provide such information in the manner prescribed herein.

SECTION 2. DEFINITIONS.

2.1. Food Commodity in Package Form.—The term "food commodity in package form" shall be construed to mean a food commodity put up or packaged in any manner in advance of sale in units suitable for retail sale. Where the term "food package" is used in this Regulation, it shall be construed to mean "food commodity in package form" as herein defined.

2.2. Consumer Package: Package of Consumer Commodity.—A "consumer package" or "package of consumer commodity" shall

be construed to mean a food commodity in package form that is customarily produced or distributed for sale through retail sales agencies or instrumentalities for consumption by individuals.

2.3. Perishable, Semiperishable Food Commodity.—The term “perishable or semiperishable food commodity” shall mean any food commodity in package form which the manufacturer or packer determines as having a significant risk of spoilage, loss of value, or loss of palatability within 60 days of the date of packaging; provided that the term does not include meats, poultry, seafood, and fresh produce.

2.4. Pull Date.—The term “pull date” means the last date on which a perishable or semiperishable food commodity should be sold without a significant risk of spoilage, loss of value, or loss of palatability, if stored by the purchaser after that date for the period and in the manner which such commodity can reasonably be expected to be stored.

SECTION 3. DATING REQUIREMENTS.—No person who manufactures or packages a perishable or semiperishable food commodity in package form may distribute, or cause to be distributed for purposes of sale, such commodity unless such consumer packages are labeled to show the pull date in accordance with Sections 5, 6, and 7.

SECTION 4. COMMODITIES TO BE DATED.—All perishable and semiperishable food commodities, when put up in consumer packages, are required to be dated with a pull date in accordance with this Regulation.

SECTION 5. DATE REQUIRED.—The date required by this Regulation shall be construed to mean the date by which the commodity should be removed from the channel for regular sale (pull date). The date may be accompanied by a statement appropriately identifying it as a pull date by the use of such terms as “not to be sold after,” “sell by,” or words of similar import.

SECTION 6. MANNER OF EXPRESSING DATE.—Commodities subject to this Regulation must be dated in accordance with this section. The date must show first the month and then the day of the month, followed by the year, if used. The month must be shown by letters that clearly identify the month or by digits “1” through “12,” where “1” signifies January “2” signifies February, and so on through “12” which signifies December. The day of the month must be shown by the digits “1” through “31,” to show the date within the month specified. The digits for the month must be separated from the digit or digits for the date within the month by a space, a dash, an asterisk or other symbol. Bakery products with a shelf life of 7 days or less and subject to this Regulation may be open dated with the day of the week or

abbreviations of same, in lieu of the foregoing requirements, as follows:

Sunday	SU, SUN	Thursday	TH, THU, THUR
Monday	MO, MON	Friday	FR, FRI
Tuesday	TU, TUES	Saturday	SA, SAT
Wednesday	WE, WED		

SECTION 7. PLACEMENT OF DATE.—The date required or permitted by this Regulation must be placed on each package made available to purchasers. The date shall be presented in a size, manner, and style clearly and easily legible to the purchaser at the time of making or accepting a selection for purchase.

SECTION 8. PREEMPTION.—No person subject to this Regulation shall be required to affix any date to any food commodity in package form except as provided for by law or regulation of the United States or by law or regulation of this State.

SECTION 9. EFFECTIVE DATE.—Full compliance with this Regulation by any manufacturer or packer shall be attained within 1 year after this Regulation, by its terms, becomes applicable to such manufacturer or packer.

It has also been noted that the Model Law makes no specific reference to the matter of labeling in general, and that this oversight should be corrected. Accordingly, the Committee recommends consideration and adoption of the following amendment to the Model State Weights and Measures Law:

SECTION 5. POWERS AND DUTIES OF THE DIRECTOR.—The director shall:

5.4. Establish labeling requirements, establish requirements for the presentation of cost-per-unit information, establish standards of weight, measure, or count, and reasonable standards of fill for any packaged commodity; and may establish requirements for open dating information.

The Committee on Laws and Regulations extends its thanks to all those members of the Conference who submitted items for consideration. Only through such continuing communications can the Committee fulfill its function to the Conference.

S. D. ANDREWS, *Chairman*, Florida

R. M. LEACH, Michigan

J. L. O'NEILL, Kansas

R. L. THOMPSON, Maryland

C. H. VINCENT, Dallas, Texas

E. A. VADELUND, *Staff Assistant*, NBS

H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Laws and Regulations

(Mr. Andrews moved for adoption and, after a second from the floor, the report of the Committee on Laws and Regulations was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON SPECIFICATIONS AND TOLERANCES

Presented by JOHN C. MAYS, *Chairman*, Director, Consumer
Protection Division, Dade County, Florida

(Thursday, July 26, 1973)



The Committee on Specifications and Tolerances submits its report to the 58th National Conference on Weights and Measures. The report consists of the tentative report as offered in the Conference Announcement and as amended by its final report.

The report represents recommendations of the Committee that have been formed on the basis of written and oral comments received during the year and oral presentations made during the open meeting of the Committee. All recommended amendments are to appropriate provisions of the codes of the National Bureau of Standards Handbook 44, Fourth Edition, *Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices*.

GENERAL CODE

1. *Digital Indications and Recorded Representations.*—With the continual development of this new technology and its application to weighing and measuring devices, the Committee received many recommendations from representatives of the private sector, other Federal agencies, and the three regional weights and measures associations. Since certain criteria are applicable to the design of all digital weighing and measuring equipment, and other criteria are applicable only to specific devices, the Committee recommends amendments to the General Code as follows and will recommend amendments to the specific codes where deemed appropriate in its report.

Amend G-S.5.2.2. to read:

G-S.5.2.2.—Digital Indication and Representation.—Digital Elements shall be so designed that:

- (a) All digital values of like value in a system agree with one another.
- (b) A digital value coincides with its associated analog value to the nearest minimum graduation.

(c) A digital value "rounds off" to the nearest minimum unit that can be indicated or recorded.

(The foregoing item was adopted by voice vote.)

2. *G-UR.4.1. Maintenance of Equipment*—The Committee received a recommendation from the Western Weights and Measures Association that the word "proper" in this requirement be changed to read "correct." But after serious consideration, the Committee recommends that the word "proper" be retained.

However, to correct the conditions noted in this Report under Item 3 in the Code for Liquid-Measuring Devices, the Committee recommends this requirement be amended by adding the following sentence:

Equipment in service at a single place of business found to be in error predominantly in a direction favorable to the device owner or near the tolerance limits shall not be considered "maintained in a proper operating condition."

This recommendation reflects in a requirement the philosophy expressed in Fundamental Considerations 2.3 Tolerances and Adjustments. The Committee further wishes to call attention to G-UR.4.2. Use of Adjustments, the application of which will further aid the enforcement process.

(The foregoing item was adopted by voice vote.)

CODE FOR SCALES

1. *Digital Indications and Recorded Representations*.—It is the Committee's view that their recommendation in Item 1 of the General Code applies to all scales. It further recommends the following amendments to the Scale Code:

Amend S.1.1. Zero Indication by adding the following sentence:

A digital zero indication shall represent a balance condition that is within plus or minus one-half the value of the minimum increment that can be indicated or recorded.

(The foregoing item was adopted by voice vote.)

Add under S.2.1. Zero-Load Adjustment the following new non-retroactive paragraph:

S.2.1.3. For Scales Over 5000 Pounds Capacity Other Than Livestock and Grain Hopper.—A scale designed with automatic means to maintain a digital zero-balance indication shall be provided with means to meet the requirements of S.1.1. Zero Indication; however, with the automatic balance

ing mechanism in operation a digital zero indication may represent a balance condition that is within plus or minus the value of the minimum increment that can be indicated or recorded. [Added and nonretroactive as of 1973]

Renumber present paragraph S.2.1.3. to S.2.1.4.

(The foregoing item was adopted by standing vote.)

2. *S.2.1.2. Balancing Mechanism on Scales Used in Direct Sales.*—A comment was received from the State of Maryland that some digital indicating scales are equipped with an externally operated mechanism which provides a zero adjustment finer than the digital indication of plus or minus one-half the minimum interval. It was their view that since this was a balancing mechanism, the fact that it has an external adjustment was in violation of this requirement. They further commented that since this adjustment allowed the weigher to weigh more accurately by setting a finer zero-condition and that it could not be used to facilitate fraud, recognition should be given this feature. Therefore, the Committee recommends the following:

Amend S.2.1.2. to read as follows:

S.2.1.2. Balancing Mechanism on Scales Used in Direct Sales.—A balancing mechanism (except for a balance ball or on digital scales with an analog zero adjustment mechanism with a range of not greater than one minimum increment) shall be operable or accessible only by a tool outside of and entirely separate from this mechanism, or enclosed in a cabinet. *A balance ball shall not itself be rotatable unless it is automatic in operation or is enclosed in a cabinet (nonretroactive as of 1956 and to become retroactive on January 1, 1976).*

(The foregoing item was adopted by voice vote.)

3. *UR.1.1.6. Value of Minimum Graduated Intervals on Primary Indicating and Recording Elements—For Axle-Load and Vehicle Scales, and Wheel-Load Weighers Only.*—The Committee received recommendations from the Scale Manufacturers Association, the Southern Weights and Measures Association, Western Weights and Measures Association, and the Northwest Weights and Measures Association on this requirement. It is the Committee's view that a 50-pound minimum interval is appropriate for individual axle-load scales used for highway law enforcement purposes; however, an axle-load scale used commercially and installed in combination with other axle-load or motor vehicle scales so that an entire vehicle can be weighed

simultaneously, the value of the minimum graduated interval on such scales must not exceed 20 pounds and should be the same for all scales in the system. The Committee, therefore, recommends the following amendments:

Amend UR.1.1.6. so as to read:

UR.1.1.6. For Vehicle Scales and Axle-Load Scales Used in Combination.—The value of the minimum graduated interval on a scale or scales used to determine the weight of a vehicle shall be not greater than 20 pounds.

Amend UR.1.1.8. by deleting the terms "Axle-Load" and "Wheel-Load Weighers" in the title so as to read:

UR.1.1.8. For Scales with Nominal Capacities of 500 Pounds or More, Other Than Animal, Livestock, Grain Hopper, Crane, Vehicle, and Railway Track Scales.

These amendments will provide for a minimum graduated interval on noncommercial axle-load scales and wheel-load weighers of 0.1% of the nominal capacity of the scale and, in any case, not greater than 50 pounds.

(The foregoing item was adopted by voice vote.)

4. *UR.2.4. Foundation, Supports, and Clearance.*—The Committee received comment from the Northwest Association that on motor truck and livestock scales foreign material could wedge itself between the platform and the coping or pitwall. To eliminate this problem, they suggested that Handbook 44 be amended to require that the clearance at the bottom edge of the platform be wider than the clearance at the top edge of the platform. This would allow foreign material to drop through rather than lodge between. The Committee agrees with this suggestion and recommends the following:

Amend UR.2.4. by adding this sentence:

On motor truck and livestock scales the clearance between the load receiving element and the coping at the bottom edge of the platform shall be greater than at the top edge of the platform.

The Committee further recommends that this be included in the SMA publication "Recommendation for the Design and Installation of Pit-Type Scales for Weighing Highway Vehicles and Their Axle Loads."

(The foregoing item was adopted by voice vote.)

5. *Motor Vehicle Scales Equipped with Hydraulic Hoists.*—Comment was received from the Northwest Association that those motor vehicle scales equipped with hydraulic hoists which raise the scale platform to facilitate the emptying of loaded trucks did not always return to a proper weighing position when lowered. Based on their suggestion to eliminate this problem, the Committee recommends adding a new user requirement as follows:

UR.2.8. Hoists.—On motor vehicle scales equipped with means for raising the load receiving element from the weighing element for vehicle unloading, suitable means shall be provided so that it is readily apparent to the weigher when the load receiving element is in its designed weighing position.

(The foregoing item was adopted by voice vote.)

6. *Railway Track Scales and Weighing Practices.*—The Committee received several proposals from the states and industry concerning requirements for railway track scales. At its interim meeting the Committee heard presentations by representatives of the railroad industry and scale manufacturers. The Committee gave serious consideration to all these proposals and determined there was a need for additional requirements in Handbook 44 for railway track scales and especially requirements relating to uncoupled- and coupled-in-motion weighing. The Committee, therefore, recommends the following amendments to the Code for Scales:

Change reference to tolerances as follows:

Delete reference to railway track in T.3.5.

Add a new section as follows:

T.3.6. For Railway Track Scales. [Added 1973]

T.3.6.1. Weighing Statically.—The basic maintenance tolerance shall be 2 pounds per 1,000 pounds of test load (0.2 percent). The acceptance tolerance shall be one-half the basic maintenance tolerance.

T.3.6.2. Weighing Uncoupled-In-Motion Cars.—The basic maintenance and acceptance tolerance shall be 2 pounds per 1,000 pounds of test load (0.2 percent).

T.3.6.3. Weighing Coupled-In-Motion Unit Trains.—The basic maintenance and acceptance tolerance shall be 2 pounds per 1,000 pounds of test load (0.2 percent).

T.3.6.4. Weighing Coupled-In-Motion Cars.—The basic maintenance and acceptance tolerance shall be applied to the errors on 100 car weights with:

- (a) no more than 30 car weights exceeding 0.2 percent error,
- (b) no more than 5 car weights exceeding 0.5 percent error, and
- (c) none of the car weights exceeding 1.0 percent error.

[Added 1973]

Renumber present paragraph T.3.6. to T.3.7.

Add the following definition:

Unit train: A unit train when used for testing purposes shall be considered to mean a train yielding 100-car weights, usually a 10-car cut weighed 10 times

With the inclusion of tolerances for railway track scales in Handbook 44, the other requirements of the General Code and Code for scales also apply. However, test equipment, methods, and procedures also become necessary. The Committee recommends that weights and measures officials cooperate with railroad representatives and follow the appropriate test procedures set forth in AREA-AAR (American Railway Engineering Association-Association of American Railroads) Scales Handbook, as revised and issued in 1973.

The Committee also recommends that railway track scales be installed in accordance with the installation requirements in that publication.

These recommendations for railway track scale requirements represent the Committee's attempt to resolve a difficult problem. The application of these requirements will determine their feasibility and practicability and will require the cooperation of all concerned. Industry representatives and weights and measures officials should understand that additional studies and requirements may be necessary to provide adequate control for the use of railway track scales and weighing practices to ensure equity in this important area of commerce.

(The foregoing item was adopted by voice vote.)

7. Automated Checkout Stands.—Since the publication of its tentative report, OWM and members of the Committee have studied these systems and made available at its open session its tentative views. On the basis of the comments received at the open session and lengthy discussions with manufacturers of this equipment and scale manufacturers, the following represents the views of the Committee on Specifications and Tolerances of the 58th National Conference on Weights and Measures with respect to the weights and measures enforcement consid-

erations with the use of Point of Sale Systems and its incumbent technology in supermarkets.

The first consideration to be dealt with is the application of Handbook 44 requirements to the weighing device and the cash register with which it is associated at the checkout stand in a supermarket.

When commodities are weighed at the checkout stand with this type equipment, as is the case with use of existing equipment, it is a direct sale situation. All of the requirements of the Model State Weight and Measures Law and Handbook 44 directed to computing scales use for over-the-counter sales, as in the delicatessen section, for example, are applicable. So that this equipment may be properly designed, the Handbook which follows will set forth specific H-44 requirements, the philosophy expressed in these requirements, and the design and use criteria necessary to meet these requirements. In certain instances the specific requirement referenced is included as it appears in the Handbook, and in others it is paraphrased.

1. G-S.5.1. Indicating and Recording Elements, General.—All weighing and measuring devices shall be provided with indicating and recording elements appropriate in design and adequate in amount. Primary indications and recorded representations shall be clear, definite, accurate, and easily read under any conditions of normal operation of the device.

The philosophy expressed in this requirement is that the indication of weighing and measuring devices are readily and easily understood by all those affected. The key words in this paragraph are "clear," "definite," and "easily read." Consequently, the equipment must be so designed that the indications and printed representations must meet this criteria for the owner or operator of the equipment and the customer.

The decision as to the amount of time that the necessary values are displayed to the customer is based on this requirement. That is, the values displayed must be clear, definite, and easily read. They must be displayed long enough for the information to be meaningful to the customer.

It must also be inherent in the design of the indicating elements that a clear indication is provided when scale capacity has been exceeded. If the scale is of the conventional analog design, the index line will extend beyond the last graduation. If a digital display is provided, this can be accomplished in the following ways:

- a. By inhibiting the entire display when capacity is exceeded.
- b. By flashing the entire display and labeling it "flashing display—indicates out of weighing range" or with a similar and suitable statement.

It also must be inherent in the design that the printer is inhibited from printing weight values which exceed scale capacity. If negative

values are displayed, the printer must be inhibited from printing these values.

2. G-S.5.2.4. Values.—This section further refines the requirements of G-S.5.1. and stipulates that all indicated and printed values must be defined as follows: Quantity, unit price, total price, and further, dollars, pounds, etc.

3. G-UR.3.2. Position of Equipment.—A device equipped with a primary indicating element and used in retail trade, except a pre-packaging, check-weighing, or prescription scale, shall be so positioned that its indications may be accurately read and the weighing and measuring operation may be observed from some reasonable “customer” position. The permissible distance between the equipment and a reasonable customer position shall be determined in each case upon the basis of the individual circumstances, particularly the size and character of the indicating elements.

This section requires that the user locate the equipment in such a manner that all of the “clarity,” etc., of the indications required in the design by the manufacturer are readily observable to the customer and the customer has the opportunity to fully view the weighing operation from that same position. Consequently, the indications of the electronic cash register or scale indications and the load receiving element (platter) of the scale must be in full view of the customer when commodities are weighed.

4. G-S.5.5. Money Values, Mathematical Agreement.—This requirement stipulates that a computing device must take the represented total quantity of the commodity, multiply it by the correct unit price, and present a total price to the nearest cent.

Examples

a. $1.49 \text{ pound} \times \$1.29 = \$1.922$. The total price must be \$1.92.

b. $1.50 \text{ pound} \times \$1.29 = \$1.935$. This total price may be either \$1.93 or \$1.94.

c. $1.54 \text{ pound} \times \$1.29 = \$1.986$. This total price must be \$1.99.

5. G-S.5.6. Recorded Representations.—This requirement stipulates that certain requirements directed to indications are equally applicable to printed representations; i.e., “clear,” “easily read,” “understandable,” “values defined,” etc.

6. S.1.1. Zero Indication.—Provision shall be made on a scale equipped with indicating or recording elements to either indicate or record a zero balance condition, and on an automatic-indicating scale or balance indicator to indicate or record an out-of-balance condition on both sides of zero.

This section requires a scale to be designed so that it is clear when the scale is in a zero-load balance condition, when it is out-of-balance, and which direction it is out-of-balance. Coupled with this design requirement is Paragraph UR.4.1. Balance Condition, which stipulates that

it is the operator's responsibility to maintain the scale in a correct zero-balance condition.

The requirements of S.1.1. can be met in the associated digital display or an analog indication in the following ways:

a. There must be positive zero indication, analog or digital. If digital, there must be a display of digital zeros. It is not necessary that this display or the analog indication be active at all times, but, prior to any weighing operation, it must be clearly evident to the customer that the scale is in a correct zero-balance condition.

b. The indication that a scale is out of balance in a plus direction is the display of any weight value other than zero.

c. The indication that a scale is out of balance in a minus direction can be accomplished in several ways, as follows:

(1) Weight values displayed with a minus sign.

(2) Weight values displayed with a clear indication that these are tare values, such as an activation of the word "tare" or other visual signal labeled "out of weighing range" or with a similar and suitable statement.

(3) No zeros or other values displayed and a display of a minus or other visual signal labeled "out of weighing range" or with a similar and suitable statement.

7. S.2.1.2. Zero Load Adjustment, Balancing Mechanism on Scales Used in Direct Sales.—This section requires that the device be provided with means by which the scale may be adjusted to zero. These means must be operable with a tool or housed in some manner. The philosophy expressed in this requirement is, since the zero load adjustment may be used to facilitate the perpetration of fraud, it must not be convenient for the operator to do so.

8. S.1.5.3. Customer's Indications.—Weight indications shall be shown on the customer's side of computing scales when these are used for direct sales to retail customers. Computing scales equipped on the operator's side with digital indications, such as the net weight, price per pound, or total price, shall be similarly equipped on the customer's side (nonretroactive as of 1971).

The philosophy expressed here is that the customer is provided the information specified (net weight, unit price, and total price) when bulk commodities are weighed in his presence for a sale when the device used is of a computing type. This philosophy is consistent with the intent of Congress when that body passed the Fair Packaging and Labeling Act. Section 2 of that Act stipulated that the intent of Congress is to provide accurate quantity information and to facilitate value comparisons. The question then arises as to the method that can be utilized to provide the customer this information when purchasing commodities from bulk to be weighed at the checkout stand.

The unit price information can be provided either by visual display or recorded on the cash register receipt. However, the unit price must

be clearly identified as the unit price and should be based on a price per pound, not per quarter pound or half pound. The total price will normally be displayed and printed. The quantity should be indicated and printed. However, in a system utilizing a weight display separate from the cash register, it would be acceptable to indicate a gross weight if the net weight were printed and there was inherent in the system adequate safeguards to make certain that the total price is based only on the net weight.

9. S.2.4. Damping Means.—The philosophy expressed here is that whenever such means are necessary the oscillation of any automatic indicating element must be dampened so that the system provides an accurate weight indication and prevents facilitation of fraud. This requirement must be met for the weighing element and the printer.

10. Tare: Based on the requirements of existing Weights and Measures laws and regulations, correct net weight has always been mandatory. To obtain correct net weights, tare must be taken into consideration. Tare may be provided in the systems by any of the following methods or other equally adequate methods:

a. Standardize the container available to one individual tare weight. This material could be rolls of polyethylene bags that are provided the customer in the produce department by simply tearing from the roll. The weight value of this standardized tare can be programmed into the system so that whenever a net weight is to be obtained, the appropriate tare value is automatically deducted prior to the display of the net weight and calculation of the total price.

b. Containers can be limited to two or three weight values. The cashier, by observation, can determine the particular tare and be actuating a key for tares, one, two, or three, the weight value of the appropriate tare can be deduced in a manner similar to 10-a. above.

c. Containers can be provided in a series of weights; the cashier determines the appropriate value, actuates the tare button and selects the particular value; and the system operates in the same manner as 10-a. above. This is the least acceptable of the three because of possible operator error.

Other Enforcement Considerations.

1. Variable Measure Code Symbol.

If an existing prepack scale, which issues a random label, also issues a VMC symbol, the requirements of Handbook 44 apply; and this symbol (label) must accurately reflect the total price indicated on the random label. Inclusion of other information in the VMC symbol is optional.

2. Universal Product Code Symbol.

Section 9 of the Model State Weights and Measures Law stipulates that prices may not be misrepresented. It is not expected that a weights and measures official, in the routine performance of his duties, would

ascertain the accuracy of the UPC symbol on standard weight packages. However, in particular instances he may do so; or if a complaint were to be received, it would be his responsibility, and within the purview of the law, to ascertain whether or not the total price posted on the display of that particular commodity accurately reflected the price that would be charged the customer when the UPC symbol was "scanned" and recorded by the system.

3. Symbol Verification and Scale Test.

Means must be provided so that the enforcement official can conduct the necessary tests on the scale and can determine the accuracy of either the UPC or VMC symbol.

(The foregoing item was adopted by standing vote.)

CODE FOR LIQUID-MEASURING DEVICES

1. *Digital Indications and Recorded Representations.*—As indicated in this Report in Item 1 of the General Code, the Committee received many comments concerning the application of this technology to commercial weighing and measuring devices. It is the Committee's view that the amendments recommended in the General Code are applicable to devices covered by this Code and that no further amendment is necessary.

2. *Application of G-S.5.5. to Remote Indicators.*—In response to several requests from gasoline pump manufacturers, the Committee wishes to express its view with respect to the application of G-S.5.5. to remote digital readouts used in combination with existing analog indicating retail petroleum dispensers. It is the Committee's interpretation that the requirements of G-S.5.5. are applicable to these remote digital readouts. This would require any digital readout which indicates both total price and quantity to indicate the quantity in 0.01-gallon increments. Since the 0.01-gallon indication changes nothing in the completion of the sale and the total price indication is always presented to the closest cent of the analog indication, it is the Committee's view that it is unnecessary to require the 0.01-gallon indication.

The Committee, therefore, recommends amendment to G-S.5.5. by adding at the end of the paragraph the following sentence:

This does not apply to auxiliary digital indications intended for the operator's use only when these indications are obtained from existing analog customer indications which meet this requirement.

(The foregoing item was adopted by voice vote.)

3. *T.2.1. On Retail Devices Except Slow-Flow Meters.*—The Committee received a suggestion from the Northwest Association that a study be conducted to determine the feasibility of reducing the tolerances on retail motor fuel dispensers. It was the view of the Committee

that the problem was not the magnitude of the tolerances, but rather that owners and operators of these devices and servicemen were taking advantage of the tolerances by adjusting and maintaining these devices to the limit of the allowable tolerance. It is the Committee's view that this problem is resolved with the adoption of its recommendations made in Item 2 of the General Code.

(The foregoing item was adopted by voice vote.)

4. *T.2.3. On Wholesale Devices.*—The Committee received several comments that the tolerances applicable when conducting a split compartment test on a vehicle tank meter were impractical. The existing tolerances are based on the capacity of the prover used in the test; however, the error resulting from this test is not a function of prover capacity but rather it is related to the rate of flow and the system itself. The Committee agrees with these comments, however, at this time it has no recommendations for appropriate tolerance values. The Committee suggests that weights and measures officials, the S & T Committee, and the Meter Manufacturers' Technical Committee cooperate during the ensuing year in the development of appropriate tolerance values.

Since the publication of its tentative report, the Committee received a comment that "split compartment tests" would be more appropriately referred to as "supply exhaustion tests". The Committee recommends this change be made when new tolerance values are adopted.

(The foregoing item was adopted by voice vote.)

CODE FOR VEHICLE-TANK METERS

1. *T.2. Tolerance Values.*—The same comments and recommendation stated in the previous item in this report (LMD Code-Item 4) apply.

(The foregoing item was adopted by voice vote.)

CODE FOR LPG LIQUID-MEASURING DEVICES

1. *N.4.2.2. For Other Retail Devices.*—The Committee received comment from the Southern Association that under certain conditions of installation a meter could be tested at a flow rate less than the minimum flow rate marked by the manufacturer on the meter. It was the Committee's view that a device should not be tested at a flow rate less than the minimum marked on the meter and that if the conditions of installations were such that the meter is operated at a slower speed, the meter should be condemned under G-UR.1.1. Suitability of Equipment. To correct this condition, the Committee recommends the following amendment to N.4.2.2.:

N.4.2.2. For Other Retail Devices.—A retail device other than a motor-fuel device shall be tested at a minimum discharge rate of

- (a) the minimum discharge rate that can be developed under the conditions of installation, or
- (b) the minimum discharge rate marked on the device, whichever is greater.

(The foregoing item was adopted by voice vote.)

CODE FOR LPG VAPOR-MEASURING DEVICES

1. *Metric Units*.—The manufacturers of these devices have informed the Committee that when converting these devices to a vapor measurement indication, they wish to convert in metric units. It was the Committee's view that this was an appropriate action. Therefore, the Committee recommends amendment to the Code as follows:

Amend S.1.1.5. by inserting in the third sentence the phrase "or 0.025, 0.05, 0.1, 0.2, or 0.25 cubic metres per revolution," after "10 cubic feet per revolution."

Amend S.4.2. by inserting within the parentheses at the end of the sentence the phrase "or cubic metres" after the word "feet."

Amend N.3. by adding at the end of the first sentence the phrase "or 0.05 cubic metres."

Amend Table 1 to read:

Rated LP gas capacity	Low flow test rate
<i>U.S. Customary Units</i>	
Up to and including 250 ft ³ /h	0.25 ft ³ /h
Over 250 ft ³ /h up to and including 500 ft ³ /h	0.50 ft ³ /h
Over 500 ft ³ /h	0.1 percent of capacity rate
<i>Metric Units</i>	
Up to and including 7 m ³ /h	0.007 m ³ /h
Over 7 m ³ /h up to and including 14 m ³ /h	0.014 m ³ /h
Over 14 m ³ /h	0.1 percent of capacity rate

Amend T.1.1. by deleting the word "foot" in the third, fourth, and fifth lines and inserting the word "unit".

Amend T.1.2. by deleting the word "foot" throughout the paragraph and inserting the word "unit."

Change the spelling in the following sections from "meter" to "metre" or "meters" to "metres":

S.1.1.2., S.1.1.3. and UR.2.2.

Amend Definition of Terms section as follows:

Add to the definition of "meter register" the phrase "or 0.025, 0.05, 0.1, 0.2, or 0.25 cubic metres" after "10 cubic feet."

Add to the definition of "rated capacity" the phrase "or cubic metres" after "cubic feet."

Add new definitions:

"ft³/h.—Cubic feet per hour."

"m³/h.—Cubic metre per hour."

(The foregoing item was adopted by voice vote.)

TENTATIVE CODE FOR CRYOGENIC LIQUID-MEASURING DEVICES

1. The Committee recommends this Code remain on a tentative basis for another year.

(The foregoing item was adopted by voice vote.)

CODE FOR VEHICLE-TANKS USED AS MEASURES

1. *Bottom Loading.*—At the last National Conference, the Committee heard considerable discussion on this subject and recommended the additions of a new specification paragraph that would alleviate problems involved with vehicle tanks equipped for bottom loading. The Conference failed to take action on this recommendation and passed a motion instead calling for further study by all parties concerned with the matter. On the basis of such study, and comments and data received, the Committee recommends the following change to this Code:

Add a new subparagraph S.1.6.1. to paragraph S.1.6. Compartment and Piping Capacities and Emergency Valve, as follows:

S.1.6.1. On Vehicle Tanks Equipped for Bottom Loading.—On equipment designed for bottom loading, the compartment capacity shall include the piping of a compartment to the valve located on the upstream side of the manifold and immediately adjacent thereto or, if not manifolded, to the outlet valve, provided that on or immediately adjacent to the marking as specified in S.4. the following words or a statement of similar meaning shall be affixed: "Warning: Emergency valves must be opened before checking measurement."

The Committee also wishes to call to the attention of enforcement officials that these vehicle tanks must be designed to comply with requirements of S.3. Design of Compartment Discharge Manifold. This paragraph requires the prevention of the reversal of flow from a full compartment to an empty one during the unloading process *by automatic means.*

(The foregoing item was adopted by voice vote.)

CODE FOR FARM MILK TANKS

1. *UR.3. Storage of Gage Rod.*—The Committee was advised that the storage of the gage rod outside the farm milk tank was in violation of certain sanitary requirements in some jurisdictions. **The Committee desires to eliminate this conflict and recommends that paragraph UR.3. be deleted from the Code.** However, the Committee wishes to remind enforcement officials that in order to obtain an accurate measurement of the milk, the rod must be removed from the tank, cleaned in a solution at room temperature and dried before taking any measurement.

(The foregoing item was adopted by voice vote.)

CODE FOR TAXIMETERS

1. *UR.2. Position and Illumination of Taximeters.*—The State of North Carolina has called attention to the fact that new taximeters are made to fit where the glove compartment door is normally mounted. This condition together with the fact that headrests are now mounted at the back of each front seat makes it impossible for a passenger to see the taximeter when seated upon the rear seat as required by this section. In recognition of this problem, the Committee recommends amending the first sentence of UR.2. so that the paragraph reads as follows:

UR. 2. Position and Illumination of Taximeter.—When mounted upon a vehicle, a taximeter shall be so located that its face can be seen by a passenger from the rear compartment of the vehicle. Adequate lighting facilities shall be provided for so illuminating the face of the taximeter that the indications thereof may be conveniently read by the passenger, and the face of the taximeter shall be so illuminated whenever the taximeter is in operation and artificial illumination is necessary, for the convenient reading of its indications.

(The foregoing item was adopted by voice vote.)

CODE FOR ODOMETERS

1. *Application A.2.*—The Committee received comment that there are many rental trucks and recreational vehicles exceeding a gross vehicle weight of 10,000 pounds. This section as presently worded eliminates from the purview of weights and measures enforcement all such vehicles in excess of 10,000 pounds. It is the Committee's view that the existing Code requirements should be applicable to all rental vehicles having a gross weight of 20,000 pounds or less. **Therefore, it recommends this requirement be amended by deleting the term "10,000" and inserting the term "20,000."**

(The foregoing item was adopted by voice vote.)

TENTATIVE CODE FOR TIMING DEVICES

1. The Committee recommends this Code remain on a tentative basis for another year.

(The foregoing item was adopted by voice vote.)

OTHER ITEMS

1. *Metric Temperature Units.*—A request has been made to change Handbook 44 so that temperatures stated in terms of Fahrenheit also give the metric equivalent in parentheses. Since this would require extensive reprinting, the Committee wishes to bring to the attention of enforcement officials that G-A.4. Metric Equipment states when equipment indicates in metric units and the tolerance values are listed in U.S. customary units, that equivalent metric units and values are applicable. Therefore, the same reasoning applies to temperature values. However, as other changes are made to the Codes which require a page to be reprinted, all references to Fahrenheit temperature will be changed to include the metric equivalent in parentheses.

The American Petroleum Institute has provided OWM with a copy of API Draft Standard 2564 which is an extensive, accurate Fahrenheit to Centigrade, and visa versa, table and has given permission to OWM to reprint this publication so as to make it available to Weights and Measures officials. If OWM receives sufficient requests for this publication, reprints will be made available.

(The foregoing item was adopted by voice vote.)

2. *NBS/OWM Studies.*—During its deliberations at the interim meeting, the Committee felt there was a need for new studies to be conducted in several areas before making specific recommendations. Since NBS/OWM resources are limited, it is impossible to conduct all the studies necessary. For this reason, the Committee has prepared the following list of some of the studies that they felt were necessary and recommends that all interested parties contact the National Bureau of Standards, Office of Weights and Measures, listing these items in order of their priority and adding any other they feel necessary:

1. Tolerance Values—Retail Petroleum Dispensers,
2. Specific Requirements for Moisture Meters,
3. Specific Requirements for Liquid Feed Meters,
4. Specific Requirements for Liquid Fertilizer Meters,
5. Tolerance Values and Test Procedures for Odometers on Rental Vehicles and Trucks with a Gross Vehicle Weight in Excess of 20,000 Pounds.

(The foregoing item was adopted by voice vote.)

3. Since the publication of its tentative report, the Committee received a comment from the State of Colorado that many existing computing scales in use today are not capable of computing total prices for commodities having high unit price values. The Committee has given consideration to this problem but has had insufficient time to fully evaluate all facets of the problem or to develop appropriate recommendations at this time. Thus, the Committee will keep this item on its agenda for study and will report its findings to the Conference next year.

(The foregoing item was adopted by voice vote.)

The Committee expresses its appreciation to all who have contributed to and participated in the Committee deliberations. The Committee urges all weights and measures officials and other affected parties to promptly communicate with the Committee on all matters of concern. It is only in this manner that the Committee can consider all problems and fully evaluate all situations prior to issuing its reports.

J. C. MAYS, *Chairman*, Dade County, Florida
T. F. BRINK, Vermont
W. E. CZALA, Minnesota
K. J. SIMILA, Oregon
W. S. WATSON, California
O. K. WARNLOF, *Staff Assistant*, NBS
H. F. WOLLIN, *Exec. Secy.*, NCWM

Committee on Specifications and Tolerances

(Mr. Mays moved for adoption, and after a second from the floor, the report of the Committee on Specifications and Tolerances was adopted in its entirety by the Conference by voice vote.)

(On motion of the committee chairman, seconded from the floor, the Conference by voice vote authorized the Executive Secretary to make any appropriate editorial changes in the language adopted by the Conference, provided that the requirements thus adopted are strictly adhered to.)

REPORT OF THE EXECUTIVE COMMITTEE

Presented by G. L. JOHNSON, *Chairman*, Director, Division of Weights and Measures, Kentucky Department of Agriculture

(Wednesday, July 25, 1973)



The Executive Committee of the National Conference on Weights and Measures met in open session on Monday, July 23, 1973, at 3:00 p.m. The following items were presented for consideration and action by this Conference.

1. *Plans for the 59th National Conference.*—The plan and general arrangements for the 59th National Conference on Weights and Measures were reviewed and include the following principal features:

Site: Washington, D.C.
Hotel: The Shoreham
Dates: July 7–12, 1974
Rates: Single \$20; double \$26; suites \$50-up

The Committee is in agreement with these arrangements and recommends action accordingly by the Incoming Executive Committee.

2. *Future Conference Sites.*—Since it is necessary to make plans for future meetings of the National Conference several years in advance, the Committee recommends that the Executive Secretary proceed with arrangements according to the following schedule and details:

1975: July 13–18—San Diego, California,
Sheraton Harbor Island Hotel
1976: July 10–16—Washington, D.C.,
Shoreham Hotel
1977: State of Texas (dates and hotel not yet determined)

3. *Program Format.*—The Committee is in agreement that the program for the 59th National Conference (1974) should follow the general format that was established for this Conference meeting. However, the Committee would like to encourage members of the Conference to send in their suggestions as to program speakers, topics, schedules, and related matters to the Executive Secretary so that such suggestions may be considered by the Incoming Executive Committee in the development of the program for next year.

4. *Orientation for New Members and Manufacturers' Equipment Display.*—The Committee feels very strongly that both of these items

were well received by Conference members and recommends that they be a continuing feature of the Conference program.

5. *Policy.*—It has been recommended that as circumstances require, the Executive Committee take the initiative in communicating on all matters that are developed and approved by the National Conference on Weights and Measures. From time to time, the need for such communications arise with respect to actions taken by the Conference. The present Committee feels that this is an appropriate responsibility of the Conference Executive Committee and, accordingly, seeks the acceptance of this recommendation by the Conference.

6. *Assistance to Foreign Officials.*—The Committee has received a request from the National Bureau of Standards for the National Conference on Weights and Measures to consider entering into a cooperative program with the Bureau with respect to officials from foreign governments who desire to visit the United States for the purpose of meeting with weights and measures officials and representatives of industry in this country. Such visits by foreign officials are usually of short duration and involve the gathering of information and the observation of operations in which they are interested. In a few instances it may also involve training over an extended period of time. The Committee is sure that the membership of the National Conference on Weights and Measures, including both government officials and industry representatives, would be glad to cooperate with the National Bureau of Standards in this matter. Thus, the Committee recommends that the Incoming Executive Committee work out further details concerning the implementation of this cooperative program with officials of NBS.

7. *Report of the Associate Membership Committee.*—As is a customary procedure, the Executive Committee called on the Associate Membership Committee for its report. The following report was presented by Mr. Lee J. Moremen, Committee Chairman:

The Associate Membership Committee held two official meetings during the past year. The first was held on January 29, 1973, at the Washington Hilton Hotel in Washington, D.C., and the second on July 23, 1973, in the Radisson Hotel in Minneapolis, Minnesota.

On March 5, 1973, Charles W. Campbell and Charles E. Joyce met with Harold F. Wollin and George L. Johnson during the Northwest Regional Conference on Weights and Measures in Minneapolis to discuss the plans and make arrangements for the Associate Membership Reception scheduled for Tuesday evening, July 24.

The meeting in Washington on January 29 was called mainly to discuss the role the Associate Membership Committee should play in assisting the Conference. The members reached a consensus that this Committee should be considered as a backup to the Liaison Committee with the Federal Government on special projects that are appro-

priate in supporting the National Conference on Weights and Measures. The Committee should also act as the "selling" group to industry members to keep them reminded of the important work that is accomplished through the National Conference on Weights and Measures. It should also serve as a link between the Office of Weights and Measures of the National Bureau of Standards and industry.

To add substance to this stated objective, the Committee developed a special letterhead for its stationery and sent two mailings to the more than 200 names on its mailing list. The first was an invitation to attend the 58th National Conference and enclosed a copy of the NBS publication "The National Conference on Weights and Measures, Its Organization and Procedure." The second was an announcement of the Reception by Associate Members on Tuesday evening, July 24, and asked for financial support for this important event.

The Committee feels it can be of special assistance in the near future in two specific fields: One is in metric development and the other is in OIML (International Organization for Legal Metrology) matters. We stand ready to assist in these and other projects that will further the communications and understanding between industry and weights and measures officials.

The Committee wishes to thank those delegates who attended the open meeting session and offered suggestions and comments on the items under consideration.

G. L. JOHNSON, *Chairman*

J. R. BIRD

G. L. DELANO

H. E. SMITH

R. A. THARALSON

C. C. MORGAN

J. I. MOORE

J. C. BOYD

W. T. DELOGE

K. G. HAYDEN

R. W. HORGER

M. L. KINLAW

C. B. NOBLIN

C. H. VINCENT

R. W. WALKER

H. F. WOLLIN, *Exec. Secy.*, NCWM

Executive Committee

(Mr. Johnson moved for adoption and, after a second from the floor, the report of the Executive Committee was adopted in its entirety by the Conference by voice vote.)

REPORT OF THE COMMITTEE ON NOMINATIONS

Presented by E. H. BLACK, *Chairman*, Administrator of Consumer Protection Agency, Ventura County, California

(Thursday, July 26, 1973)



The Committee on Nominations met on Wednesday, July 25, for the purpose of selecting a slate of nominees for all elective offices and for the ten elective memberships of the Executive Committee. In the selection of nominees from the active membership, consideration was given to attendance records, geographical distribution, Conference participation, and other factors deemed by the Committee to be important.

The Committee on Nominations submits the following names in nomination for office to serve during the ensuing year at the 59th National Conference on Weights and Measures:

Chairman: J. H. Lewis, Washington.

Vice Chairmen: L. H. DeGrange, Maryland; L. D. Draghetti, Agawam, Massachusetts; G. E. Mattimoe, Hawaii; W. R. Sevier, Gibson County, Indiana.

Treasurer: C. C. Morgan, Gary, Indiana.

Chaplain: J. I. Moore, North Carolina.

Executive Committee: R. E. Bowers, Ohio; A. W. Fenger, Minnesota; G. S. Franks, Cumberland County, New Jersey; E. Keeley, Delaware; R. K. Lorenz, Sheboygan, Wisconsin; L. A. Rick, St. Louis County, Missouri; N. M. Ross, Omaha, Nebraska; H. E. Sandel, San Bernardino County, California; J. C. Stewart, Virginia; C. Wooten, Florida.

E. H. BLACK, *Chairman*, Ventura County, Calif.

S. H. CHRISTIE, New Jersey

L. A. GREDY, Indiana

M. JENNINGS, Tennessee

C. C. MORGAN, Gary, Indiana

J. L. O'NEILL, Kansas

C. WOOTEN, Florida

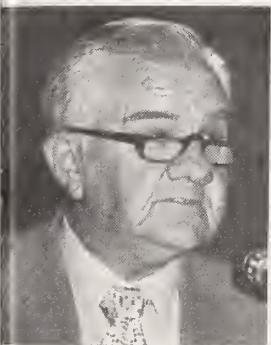
Committee on Nominations

(There being no further nominations from the floor, nominations were declared closed and the officers nominated by the Committee were elected unanimously by voice vote.)

REPORT OF THE COMMITTEE ON RESOLUTIONS

Presented by C. B. NOBLIN, *Chairman*, Deputy Director, Weights and Measures Division, Mississippi Department of Agriculture and Commerce

(Thursday, July 26, 1973)



The Committee on Resolutions wishes to express the appreciation of the 58th National Conference on Weights and Measures to all who contributed in any way toward the conduct of a successful meeting. A special vote of thanks is extended to the following:

1. To the Honorable Karl E. Bakke, Acting General Counsel, Department of Commerce, for his participation on the program and interest in the concerns of the National Conference on Weights and Measures.
2. To Dr. Richard W. Roberts, Director of the National Bureau of Standards, for his excellent address and his recognition of the importance of weights and measures administration in the United States.
3. To Warren E. Czaia, Raymond A. Tharalson, and John G. Gustafson for their superb assistance to the Executive Secretary of the National Conference in arranging the many local details incident to holding the Conference in Minneapolis.
4. To all weights and measures officials and delegates from the States of the Northwest Weights and Measures Association for their overall support of the Conference and for serving so generously as hosts to all delegates from other parts of the country.
5. To all speakers of the Conference for their valuable contributions to the program.
6. To all officers and appointed officials of the 58th National Conference on Weights and Measures for their valuable service and contributions to the functioning of an orderly and successful Conference program.
7. To all committee members for having given generously of their time and efforts during the year and in the preparation and presentation of their reports.
8. To the governing officials of all state and local jurisdictions for their manifest interest in the progress of weights and measures administration in the United States.
9. To Mr. Fred Steen, Sales Manager, and the staff of the Radisson Hotel for their fine facilities and many courtesies which contributed to the enjoyment and comfort of the delegates.
10. To representatives of business and industry for their liberal cooperation and hospitality.

11. To the National Bureau of Standards, and in particular the staff of the Office of Weights and Measures, for planning and administering the many details involved in the work and program of the National Conference.

The following resolutions are presented in their entirety for consideration of the members of the Conference :

OIML Translations

Whereas, the sole official language of the Organization of International Legal Metrology (OIML) is French, and the legal and predominant language of the United States of America is English : Therefore, be it

Resolved that the National Conference on Weights and Measures strongly urges the ultimate adoption of English as a second official language of OIML : And be it further

Resolved that the Committee on Liaison with the Federal Government is to use all possible means to cause the Government of the United States to provide English translations of all draft regulations, approved international recommendations, policy documents, and official meeting minutes within thirty days following receipt of the French language text continuing until such time as English becomes the second language of OIML : And be it further

Resolved that any and all documents received and intended for further domestic distribution to the National Conference or any of its members should, at a minimum, have attached an English language title or table of contents, and an abstract of not more than 100 words summarizing each separate subject within the basic document : And be it further

Resolved that the representative of the National Conference to the U.S. National Committee shall not authorize further distribution of OIML material to Conference committees and members until one of the aforementioned conditions has prevailed to his satisfaction.

By endorsement of the National Conference on Weights and Measures, the Office of Weights and Measures is otherwise requested to automatically seek an appropriate extension of deadline so as to allow at least a thirty-day period for comment on any document requiring advice or review by Conference members.

Metric Conversion

Whereas, industry, state and local governments of the United States are increasing their voluntary use of the Metric (SI) System of weights and measures at an ever-expanding rate ; and

Whereas, federal legislation under consideration is intended to cause the predominant usage of the Metric (SI) System, and in all cases does create a national planning and coordinating agency for this purpose : Therefore, be it

Resolved that the National Conference on Weights and Measures empowers its Committee on Liaison with the Federal Government to act on its behalf in assessing, evaluating and planning for the impact of conversion : And be it further

Resolved that the Liaison Committee shall have authority to draft a special committee to advise it, made up of members of the National Conference, equally drawn from government and industry, who shall :

- (a) Identify specific weights and measures regulations and publications which require modification to accommodate conversion.
- (b) Draft proposed remedial phraseology to authorize the use of metric language.
- (c) Through participation in appropriate forums of all affected interests, propose a timetable for modification of model laws and dependent state regulations.

- (d) Submit all recommendations to the Liaison Committee for coordination with all other committees of the Conference as well as the federally appointed national conversion board.
- (e) Establish a report system to at least annually review the effectiveness of the conversion plan within the weights and measures community.

By endorsement of the National Conference, the Committee on Liaison with the Federal Government is instructed to commence immediately in preparing advice needed to ensure a rational and orderly National Conversion to the Metric (SI) System of weights and measures.

Whereas, the Committee on Education, Administration and Consumer Affairs of the National Conference on Weights and Measures has urged the National Education Association to encourage its membership to begin a program of instruction in the metric system at all education levels; and

Whereas, the NEA has responded by resolving that teachers of all grades should teach the metric system to assure, as a national goal, the orderly transition to the use of the metric system as a primary system by 1980; and

Whereas, the State of California has taken the initiative by enacting a law requiring metric education in the California Public School System by 1976: Therefore, be it

Resolved that all State Departments of Education follow the recommendation of the NEA and the action taken by the State of California in initiating a program of instruction in the metric system.

C. B. NOBLIN, *Chairman*, Mississippi
L. D. DRAGHETTI, Agawam, Massachusetts
A. HELGESON, North Dakota
W. B. KELLEY, Connecticut
W. D. SCOTT, Allegheny County, Pennsylvania
C. T. SMITH, South Carolina
J. F. TUCKER, New York

Committee on Resolutions

(On motion of the Committee Chairman, seconded from the floor, the report of the Committee on Resolutions was adopted by voice vote.)

REPORT OF THE AUDITING COMMITTEE

Presented by T. A. CONSIDINE, *Chairman*, Chief, Division of Tests
Department of Public Works, Bureau of Inspection,
Baltimore, Maryland

(Thursday, July 26, 1973)



The Auditing Committee of the 58th National Conference on Weights and Measures met on July 25, 1973 for the purpose of reviewing the financial records of the Conference Treasurer, C. C. Morgan. The Committee finds these records to be in accordance with the Conference procedure and correct.

T. A. CONSIDINE, *Chairman*, Baltimore, Maryland
W. B. HARPER, Birmingham, Alabama
E. H. STADONIK, Massachusetts
R. N. SMITH, *Staff Assistant*, NBS

Committee on Auditing

(On motion of the Committee Chairman, seconded from the floor, the report of the Auditing Committee was adopted by voice vote.)

REPORT OF THE TREASURER

Presented by C. C. MORGAN, City Sealer of Weights and Measures,
Gary, Indiana

(Thursday, July 26, 1973)



Balance on hand July 1, 1972----- \$1, 840. 03

RECEIPTS:

Registrations, 377 at \$25.00----- \$9, 425. 00
Total ----- 11, 265. 03

DISBURSEMENTS:

Refund on Overpayment-----	25. 00
Speaker, Consumer's Affairs-----	66. 45
Shoreham Hotel, Master Account Charges, Registration, Meeting Rooms and Social Functions, Services and Expenses-----	1, 723. 12
Howard Devron Orchestra-----	560. 00
Atwood Transportation Line-----	137. 50
Visual Aids Elec. Corp.-----	12. 50
Committee on Specification and Tolerances--	1, 581. 80
Committee on Education, Administration, and Consumer Affairs-----	1, 394. 82
Committee on Laws and Regulations-----	1, 124. 00
Committee on Liaison with the Federal Gov- ernment-----	487. 00
Conference Chairman-----	627. 80
Franklin Press-----	71. 90
Miscellaneous Operating Expenses, Cash----	178. 62
David Edgerly (Cash)-----	128. 00
Bank Charges-----	5. 39
Subtotal -----	8, 123. 90
Balance on hand July 1, 1973-----	3, 141. 13

Depository: Bank of Indiana

(Signed) C. C. MORGAN, *Treasurer*

(On motion of the Treasurer, seconded from the floor, the Report of the
Treasurer was adopted by the Conference.)

PERSONS ATTENDING THE CONFERENCE

State, City, and County Weights and Measures Officials

ALABAMA

City Sealers of Weights and Measures :

- Birmingham 35203---- W. B. HARPER, Chief, Weights and Measures Division, Inspection Services Department, 710 20th Street North (205 : 252-0251)
- Huntsville 35805----- T. E. MORGAN, Chief Inspector, Weights and Measures, Old Huntsville Airport, Huntsville Field (205 : 883-8332)

ARIZONA

- State ----- RAYMOND H. HELMICK, State Inspector, Department of Weights and Measures, 2844 West Weldon Avenue, Phoenix 85017 (602 : 271-4185)

ARKANSAS

- State ----- BILLY W. SULLIVANT, Laboratory Metrologist, Weights and Measures Division, Department of Commerce, Weights and Measures Center, 4608 W. 61st Street, Little Rock 72209 (501 : 371-1759)

CALIFORNIA

- State ----- WALTER S. WATSON, Chief, Bureau of Weights and Measures, Department of Agriculture, 1220 N Street, Sacramento 95814 (916 : 445-7001)

County Sealers of Weights and Measures :

- Alameda ----- PATRICK E. NICHOLS, Director of Weights and Measures, 333—5th Street, Oakland 94607 (415 : 874-6736)
- Riverside ----- JOSEPH W. JONES, Director, Weights and Measures, 2950 Washington Street, Riverside 92507 (714 : 787-2620)
- San Bernardino----- H. E. SANDEL, Director, Weights and Measures and Consumer Affairs, 160 East Sixth Street, San Bernardino 92415 (714 : 383-1411)
- San Mateo----- H. E. SMITH, Director of Weights and Measures, 702 Chestnut Street, Redwood City 94063 (415 : 364-5600, Ext. 2227)
- Santa Clara----- ROBERT W. HORGER, Director of Weights and Measures, Dept. of Weights, Measures and Consumer Affairs, 1555 Berger Drive, San Jose 95112 (408 : 299-2105)
- Ventura ----- WILLIAM H. KORTH, Director, Dept. of Weights and Measures and Consumer Affairs, 608 El Rio Drive, Oxnard 93030 (805 : 487-5511, Ext. 4378)
- EVERETT H. BLACK, Administrator of Consumer Protection Agency, 666 El Rio Drive, Oxnard 93030 (805 : 487-5511, Ext. 4460)

COLORADO

- State ----- EARL PRIDEAUX, Chief, Weights and Measures Section, Department of Agriculture, 3130 Zuni, Denver 80211 (303 : 892-2845)

CONNECTICUT

State ----- JOHN T. BENNETT, Chief, Weights and Measures Division, Department of Consumer Protection, Room G-17, State Office Building, Hartford 06115 (203: 566-4778 and 566-5230)
JOHN SMUTNICK, Senior Inspector (203: 566-3388 and 566-4716)

City Sealers of Weights and Measures :
Middletown 06457----- GUY J. TOMMASI, City Sealer of Weights and Measures, Municipal Building (203: 347-4671)

DELAWARE

State ----- EUGENE KEELEY, Supervisor of Weights and Measures, Division of Standards, Department of Agriculture, Drawer D, Dover 19901 (302: 678-4824)

DISTRICT OF COLUMBIA

District ----- KENNETH G. HAYDEN, Chief, Division of Weights and Measures, Bureau of Building, Housing & Zoning, Dept. of Economic Development, 1104 You St. S.E. Washington D.C. 20020 (202: 629-4661)

FLORIDA

State ----- SYDNEY D. ANDREWS, Director, Division of Standards, Dept. of Agriculture and Consumer Services, Mayo Building, Tallahassee 32304 (904: 877-8161, Ext. 146)
COUNCIL WOOTEN, Chief, Bureau of Weights and Measures (904: 877-8161, Ext. 112, 113)

County Sealers of Weights and Measures :

Dade ----- JOHN C. MAYS, Director, Consumer Protection Division, Justice Building, Room 903, 1351 N.W. 12th Street, Miami 33125 (305: 377-5111)

GEORGIA

State ----- THOMAS E. KIRBY, Director of Weights and Measures Laboratory, Georgia Department of Agriculture, Atlanta Farmers Market, Forest Park 30050 (404: 361-6764)

HAWAII

State ----- GEORGE E. MATTIMOE, State Deputy Director of Weights and Measures, 1428 S. King Street, P.O. Box 5425, Honolulu 96814 (808: 941-3071)
JAMES MAKI, Metrologist (808: 941-3071, Ext. 143)

IDAHO

State ----- LYMAN D. HOLLOWAY, Supervisor, Weights and Measures, Department of Agriculture, P.O. Box 790, Boise 83701 (208: 384-2345)

ILLINOIS

State ----- EDWARD MCGUIRE Assistant Superintendent, 531 E. Sangamon Avenue, Springfield 62706 (217: 525-7655)
SIDNEY COLBROOK, Laboratory Technician II

City Sealers of Weights and Measures :

Chicago 60602----- HERBERT RIEDERER, Consumer Service Supervisor,
Dept. of Consumer Sales, Weights and Measures,
121 North LaSalle Street (312: 744-4008)
JAMES T. LANE, Consumer Service Officer
JESSE BLACKMON, Consumer Service Officer II (312:
744-4092)
JOSEPH SILKA, Consumer Service Officer II

INDIANA

State ----- LORENZO A. GREY, Director, Division of Weights and
Measures, 1330 W. Michigan Street, Indianapolis
46206 (317: 633-6860)
HAL B. RAYBORN, Inspector, State Board of Health,
Division of Weights and Measures, R.R. 12, Box
313A, Bloomington 47401 (317: 336-5881)

County Inspectors of Weights and Measures :

Clark ----- ROBERT W. WALKER, Inspector of Weights and Meas-
ures, City-County Building, Room 314, Jefferson-
ville 47130 (812: 283-4451)
Floyd ----- EDWARD G. SILVER, Inspector of Weights and Meas-
ures, P.O. Box 362 (County Bldg., Room 325),
New Albany 47150 (812: 945-5357)
Gibson ----- WILLIAM R. SEVIER, Inspector of Weights and Meas-
ures, Courthouse Annex, Princeton 47570 (812:
385-2426)
Grant ----- HARVEY CLINE, Inspector of Weights and Measures,
P.O. Box 421, Marion 46952 (317: 664-5239)
Greene ----- EDWIN D. GOODMAN, Weights and Measures Inspector,
130 W. Spring Street, Bloomfield 47424 (812: 384-
4266)
Johnson ----- WAYNE E. HANDY, Inspector of Weights and Meas-
ures, Johnson County Courthouse, Franklin 46131
(317: 736-5774)
Knox ----- WILLIAM D. LIDDIL, Inspector of Weights and Meas-
ures, Couthouse, Vincennes 47591 (312: 882-2358)
Lake ----- NICHOLAS BUCUR, Sealer of Weights and Measures,
400 N. Lake Park Avenue, Apt. 10, Oxford West,
Hobart 46342 (219: 942-4455)
LaPorte ----- ED HANISH, Inspector of Weights and Measures, 119
Tilden Avenue, Michigan City 46360 (219: 879-
9486)
Madison ----- CHARLES W. MOORE, Inspector of Weights and Meas-
ures Box 84, Lapel 46051 (317: 534-3328)
Marshall ----- GORDON W. SCHULTZ, Inspector Route #1, Bremen
46506 (219: 546-2949)
Porter ----- RICHARD H. CLAUSSEN, Inspector, Franklin Street,
Valparaiso 46383 (219: 402-5751)
St. Joseph----- CHESTER S. ZMUDZINSKI, Inspector, County-City
Building, 217 W. Jefferson Blvd., South Bend
46601 (219: 284-9751)
Tippcanoe ----- WEBSTER McMURRY, Inspector, P.O. Box 444, Lafay-
ette 47902 (317: 742-0626)
Vigo ----- ROBERT J. SILCOCK, Inspector, Room 4, Courthouse,
Terre Haute 47885 (812: 232-5746)

City Sealers of Weights and Measures :

Anderson 46011----- EARL GADBERRY, Inspector, Department of Weights
and Measures, Anderson City Building, P.O. Box
2100 (317: 646-5814)
Gary 46407----- CLEO C. MORGAN, Sealer, 1100 Massachusetts Street
(219: 944-6566)
Hammond 46320----- DEAN BRAHOS, Sealer, Room 315, City Hall, 5925
Calumet Avenue (219: 931-3330)

Indianapolis 46204----- JOE ROBERTS, Deputy Inspector, Room 6G, City-
County Bldg. (317: 633-3733)
FRANK L. BRUGH, Administrator
RUSSELL COX, Deputy Inspector
W. ROSS COPELAND, Deputy Inspector

Mishawaka 46544----- GEORGE STAFFELDT, Inspector, 420 Indiana Avenue
(219: 255-2281)

South Bend 46621----- BERT CICHOWICZ, Sealer, Central Services Facility,
West Wing, 701 W. Sample Street (219: 284-9297)

IOWA

State ----- J. CLAIR BOYD, Chief, Weights and Measures Division,
Department of Agriculture, Metrology Laboratory,
East 7th & Court, Des Moines 50319 (515:281-
5716)

CURTIS W. McNEIL, Sealer of Weights and Measures

KANSAS

State ----- JOHN L. O'NEILL, Sealer of Weights and Measures,
Dept. of Agriculture, State Office Bldg., Rm. 1056,
Topeka 66612 (913: 296-3846)

City Sealers of Weights and Measures:

Kansas City 66101----- DONALD L. LYNCH, Chief, Weights and Measures
Control, Municipal Office Bldg., One Civic Plaza
(913: 371-2000)

KENTUCKY

State ----- GEORGE L. JOHNSON, Director, Weights and Measures,
Dept. of Agriculture, 106 West Second Street,
Frankfort 40601 (502: 564-4870)

CLEMENT T. GREENWELL, Assistant Director
VIRGIL PRICE, Supervisor
GILBERT C. WALLACE, Supervisor

MAINE

State ----- HARLON D. ROBINSON, Deputy State Sealer of
Weights and Measures, State House, Augusta 04330
(207: 289-3841)

MARYLAND

State ----- RICHARD L. THOMPSON, Chief, Weights and Measures,
Dept. of Agriculture, Symons Hall, Room 3205, Col-
lege Park 20742 (301: 454-3551)

LACY H. DeGRANGE, Field Supervisor, 360 Symons
Hall, University of Maryland, College Park 20742
(301: 454-3551)

County Sealers of Weights and Measures:

Montgomery ----- PAUL L. PETERSON, Chief, Weights and Measures
Unit, County Office Building, Rockville 20852 (301:
279-1443)

Prince George's----- ROBERT J. CORD, Sealer of Weights and Measures,
5012 Rhode Island Avenue, Hyattsville 20801 (301:
779-3850)

City Sealers of Weights and Measures:

Baltimore 21202----- THOMAS A. CONSIDINE, Chief, Division of Tests, 1103
Municipal Building (301: 396-3457)

MASSACHUSETTS

State ----- EDWARD H. STADOLNIK, Executive Officer of Consumer
Affairs, Division of Standards, Room 194 State
House, Boston 02133 (617: 727-3480)

City Sealers of Weights and Measures :

Agawam 01001-----	LOUIS D. DRAGHETTI, Inspector, 36 Main Street (413 : 786-0400)
Fitchburg 01420-----	WILFRED T. DELOGE, Inspector, City Hall, Main Street (617 : 343-7012)
Springfield 01103-----	ROBERT E. CLARK, Sealer, Municipal Bldg., Court Street (413 : 736-2711)
West Springfield 01089--	PAUL T. GAMELLI, Inspector, 61 Morgan Road (413 : 781-7550)

MICHIGAN

State -----	RONALD M. LEACH, Chief, Food Inspection Division, Dept. of Agriculture, Lewis Cass Building, 5th Floor, Lansing 48913 (517 : 373-1060)
	SAM P. HANSEN, Jr., Supervisor, Food Inspection Division, Dept. of Agriculture, 2189-M-139, Benton Harbor 49022 (616 : 925-2461)
	HAROLD BIRGY, Metrologist, Dept. of Agriculture, Lewis Cass Building, Lansing 48913 (517 : 373-1060)

County Sealers of Weights and Measures :

Saginaw-----	WILLIAM E. HOFFMAN, Sealer, 6358 Mackinaw Road, Saginaw 48604 (517 : 792-3809)
Washtenaw-----	ROBERT HARTER, Sealer, 4133 Washtenaw Road, Ann Arbor 48104 (313 : 971-6054)

MINNESOTA

State-----	WARREN E. CZAIA, Director of Weights and Measures, 1015 Currie Avenue, Minneapolis 55403 (612 : 333-3249)
	ROBERT CARLSON, Commissioner, Department of Public Service, 400 State Office Building, St. Paul 55155
	MARLOWE C. AXELL, Supervisor, 1015 Currie Avenue, Minneapolis 55403 (612 : 333-3249)
	RAYMOND A. THARALSON, Supervisor Inspector
	HENRY F. KIEKOW, Supervisor
	EUGENE L. LOFGREN, Supervisor
	HOWARD R. WEISS, Supervisor
	RALEIGH C. ZEYER, Metrologist
	ARVID W. FENGER, Senior Inspector
	LEWIS ANDERSON, Inspector
	CLIFF BERGLUND, Inspector
	MICHAEL PLACIK, Inspector
	NORMAN H. BORCHARDT, Inspector
	HUBERT E. DICKEY, Inspector
	JOSLYN DONNAN, Inspector
	RUSSELL ENGSTROM, Inspector
	ALLAN ERIE, Inspector
	BURTON W. HAMMEL, Jr., Inspector
	MILBERT HARTJEN, Inspector
	CARL L. KELM, Inspector
	HOWARD LHOTKA, Inspector
	ORVILLE LHOTKA, Inspector
	GEORGE W. MACDONALD, Inspector
	ELDEN MALOTT, Inspector
	DENNIS NELSON, Inspector
	LEROY PETERSON, Inspector
	ELDEN PLYMATE, Inspector
	GAYLORD RUDD, Inspector
	JAMES SANDMANN, Inspector
	GEORGE SHIMON, Inspector
	FRED VOKOVAN, Inspector
	WALTER VOSS, Inspector
	ALVIN CHRISTOFFERSON

VINCE A. MEUWISSEN
EDWARD P. SKLUZACEK
FRAN HANDZEL, Secretary

City Sealers of Weights and Measures :

Minneapolis 55415----- JOHN G. GUSTAFSON, Chief Inspector of Weights and Measures, Dept. of Licenses, Weights and Measures, City Hall, Room 101A (612 : 348-2080)
LAWRENCE ANDERSON, Inspector
JOHN BERGQUIST, Inspector
EDWARD GRABOWSKI, Inspector
HOWARD SCHWAB, Inspector
RICHARD SCULLY, Inspector
ROBERT SORMAN, Inspector

MISSISSIPPI

State ----- JOE B. HARDY, Director, Consumer Protection Division, Department of Agriculture and Commerce, Box 1609, Jackson 39205 (601 : 354-6258)
C. B. NOBLIN, Deputy Director (601 : 354-6585)

MISSOURI

State ----- WILLIAM M. BAKER, Director, Weights and Measures, Dept. of Agriculture, P.O. Box 630, Jefferson City 65101 (314 : 751-4278)

County Sealers of Weight and Measures :

St. Louis ----- LOUIS A. RICK, Supervisor of Weights and Measures, 7900 Forsyth, Clayton 63105 (314 : 889-2079)

City Sealers of Weights and Measures :

St. Louis 63104----- DANIEL I. OFFNER, Commissioner of Weights and Measures, 1220 Carr Lane Avenue, Room 145 (314 : 453-3251)

MONTANA

State ----- GARY L. DELANO, Administrator, Division of Weights and Measures, Department of Business Regulation, 805 North Main, Helena 59601 (406 : 449-3163)

NEBRASKA

State ----- ROGER SANDMANN, Assistant Director, Department of Agriculture, P.O. Box 4844, State Capitol, Lincoln 68509 (402 : 471-2341)

STEVE MALONE, Program Administrator, Weights and Measures Division

ROBERT N. MUES, Assistant Metrologist, 3701 South 14th, Lincoln 68503 (402 : 471-2536)

City Sealers of Weights and Measures :

Omaha 68102 ----- NORMAN M. ROSS, Chief, Weights and Measures Section, 108 So. 18th Street (402 : 341-8122, Ext. 245)

NEW HAMPSHIRE

State ----- WALTER J. TUSEN, Chief Inspector, Bureau of Weights and Measures, Division of Markets and Standards, Dept. of Agriculture, State House Annex, Room 201, Concord 03301 (603 : 271-3700)

NEW JERSEY

State -----	SAMUEL H. CHRISTIE, JR., State Superintendent, Office of Weights and Measures, Dept. of Law and Public Safety, Division of Consumer Affairs, 187 W. Hanover Street, Trenton 08625 (609: 292-4615) JAMES R. BIRD, Deputy State Superintendent
County Sealers of Weights and Measures:	
Bergen -----	JAMES A. POLLOCK, Superintendent, 66 Zabriskie Street, Hackensack 07601 (201: 646-2729)
Burlington -----	JAMES CARNIVAL, Deputy Superintendent, 54 Grant Street, Mt. Holly 08060 (609: 267-3300, Ext. 210)
Camden -----	AUGUST J. FRANCESCONI, Superintendent, County Courthouse, Camden 08101 (609: 964-0242)
Cape May -----	A. DAVID GIDDING, Superintendent, 6807 Seaview Avenue, Wildwood Crest 08260 (609: 522-4861)
Cumberland -----	GEORGE S. FRANKS, Superintendent of Weights and Measures, Dept. of Weights and Measures and Consumer Protection, 1142 Landis Avenue, Vineland 08360 (609: 451-8000, Ext. 296) NICHOLAS DiMARCO, Deputy Superintendent of Weights and Measures, Cumberland County Courthouse, Bridgeton 08302 (609: 451-8000)
Essex -----	WILLIAM C. LESINO, Superintendent, 520 Belleville Avenue Belleville 07009 (201: 961-7633)
Gloucester -----	ROBERT J. MORRIS, Superintendent, County Building, 49 Wood Street, Woodbury 08096 (609: 845-1600, Ext. 252) JOSEPH SILVESTRO, Assistant Superintendent (609: 423-5387)
Mercer -----	RALPH M. BODENWEISER, Superintendent, Mercer County Administration Building, 640 S. Broad Street, Trenton 08607
Middlesex -----	JOHN M. CHOIAMIN, Superintendent, County Administration Building, Kennedy Square, New Brunswick 08901 (201: 246-6297)
Monmouth -----	WILLIAM I. THOMPSON, Superintendent, Hall of Records, Freehold 07728 (201: 431-4000, Ext. 401, 402)
Salem -----	ROBERT B. JONES, Superintendent, P.O. Box 24, Salem 08079 (609: 935-3152)
Sussex -----	JERRY M. HEATER, Superintendent, R.D. #3, Box 140, Newton 07860 (201: 948-5464)
City Sealers of Weights and Measures:	
Kearny 07032 -----	JAMES POLLOCK, Superintendent, 402 Kearny Avenue (201: 991-2700)
Linden 07036 -----	ALEXANDER L. ESKA, Superintendent, City Hall (201: 486-8429)
Trenton 08608 -----	RICHARD J. BONEY, Municipal Superintendent, Trenton Civic Center (609: 392-3441, Ext. 360)

NEW MEXICO

State -----	RICHARD F. SCHULMEISTER, Inspector and Metrologist, Box 3170, Las Cruces 88003 (505: 646-1616)
-------------	--

NEW YORK

State -----	J. FRED TUCKER, Director, Bureau of Weights and Measures, Dept. of Agriculture and Markets, Laboratory Building, 1220 Washington Avenue, Albany 12226 (518: 457-3452)
County Sealers of Weights and Measures:	
Monroe -----	LOUIS P. ROMANO, Sealer of Weights and Measures, 291 Westfall Road, Rochester 14620 (716: 473-8058)

City Sealers of Weights and Measures :

New York 10007----- MOE GREENSPAN, Supervising Inspector, Dept. of Consumer Affairs, Weights and Measures Test Laboratory, 31 Chambers Street, Room 6 (212:566-0559)

NORTH CAROLINA

State----- JOHN I. MOORE, Superintendent, Weights and Measures Div., Dept. of Agriculture, P.O. Box 27647, Raleigh 27611 (919: 829-3315)
MARION L. KINLAW, Supervisor

NORTH DAKOTA

State----- ADIN HELGESON, Director, Dept. of Weights and Measures, Public Service Commission, State Capitol, Bismarck 58501 (701: 224-2412)
OLIVER R. MILLER, Inspector (701: 224-2400)
WALT NIES, Inspector

OHIO

State----- ROGER BOWERS, Chief, Division of Weights and Measures, Dept. of Agriculture, Reynoldsburg 43068 (614: 866-6361)
MARK R. LIST, Deputy Director

County Sealers of Weights and Measures :

Clark----- JAMES S. POWERS, Inspector, Auditor's Office, County Building, Box 1325, Springfield 45502 (513: 324-5871)

Ross----- GAAK D. THACKER, Inspector, c/o Auditor's Office, Chillicothe 45601 (614: 774-2028)

City Sealers of Weights and Measures :

Akron 44304----- ANTHONY J. LADD, Superintendent, 69 North Union Street (216: 375-2612)

Cincinnati 45214----- LEONARD B. FRANK, Superintendent of Markets, Weights & Measures, 2147 Central Avenue (513: 352-3135)

Columbus 43223----- C. R. MERCURIO, Sealer, 220 Greenlawn Avenue (614: 461-7397)

Youngstown 44503----- ANTHONY C. JULIAN, Sealer, Div. of Consumer Protection, Health Dept., City Hall (216: 746-1892)

OKLAHOMA

State----- ROY A. STAFFORD, Director, Fuel Inspection Division, Oklahoma Corporation Commission, Jim Thorpe Building, Oklahoma City 73105 (405: 521-2487)

H. K. SHARP, Assistant Director, Marketing Division, Department of Agriculture, 122 Capitol Building, Oklahoma City 73105 (405: 521-3860)

G. W. McCrackin, Supervisor (405: 521-3861)

OREGON

State----- KENDRICK J. SIMILA, Superintendent, Agriculture Building, Salem 97310 (503: 378-3792)

PENNSYLVANIA

State----- WALTER F. JUNKINS, Director, Bureau of Weights and Measures, Dept. of Agriculture, 2301 N. Cameron Street, Harrisburg 17020 (717: 787-9089)

RONALD R. ROOF, Laboratory Metrologist, Bureau of Standard Weights and Measures, Dept. of Agriculture, Room B-130, Transportation and Safety Building, Harrisburg 17120 (717: 787-6426)

County Sealers of Weights and Measures:

Allegheny----- WALTER D. SCOTT, Chief, Bureau of Weights and Measures, Room 4, Courthouse, Pittsburgh 15219 (412: 355-4480)
Chester----- ROBERT N. TAYLOR, Chief Sealer of Weights and Measures, Courthouse, West Chester 19380 (215: 696-9100)

City Sealers of Weights and Measures:

Allentown 18101----- ARNOLD L. HEILMAN, Sealer, 425 Hamilton Street (215: 434-9601, Ext. 250)
Chester 19013----- ERNIE TROSINO, Sealer, 5th & Welsh Streets (215: 872-3064)
Philadelphia 19107----- SAM F. VALTRI, Chief, Weights and Measures, Room 622, City Hall Annex, 13th & Filbert Street (215: 686-3476)
Wilkes-Barre 18702----- CHESTER OSTROWSKI, Chief Inspector, 653 Hazel Avenue (717: 824-0134)

PUERTO RICO

Puerto Rico----- MAXIMILIANO TRUJILLO, Assistant Secretary, Commonwealth of Puerto Rico, Dept. of Consumer Affairs, Box 13934, Santurce 00908 (809: 725-7555 or 724-6565)

RHODE ISLAND

State----- EDWARD R. FISHER, Sealer, 235 Promenade Street, Providence 02908 (401: 277-2756)

SOUTH CAROLINA

State----- CHARLES T. SMITH, Director, Consumer Protection Division, Dept. of Agriculture, Wade Hampton Office Building, P.O. Box 11280, Columbia 29211 (803: 758-2426)
JOHN V. PUGH, Director, Metrology Laboratory, Dept. of Agriculture, P.O. Box 11280, Columbia 29211 (803: 758-2130)

SOUTH DAKOTA

State ----- JAMES A. ETZKORN, Supervisor, Heavy Scales, Dept. of Commerce and Consumer Affairs, Division of Consumer Protection, State House, Pierre 57501 (605: 224-3177)

TENNESSEE

State ----- MATT JENNINGS, Director, Division of Marketing, Dept. of Agriculture, P.O. Box 40627, Melrose Station, Nashville 37204 (615: 741-1539 or 741-1561)
DALE WILKERSON, Assistant Director (615: 741-1591)

City Sealers of Weights and Measures:

Chattanooga 37401 ----- O. K. RADER, Supervisor, City Hall (615: 629-0741)
Knoxville 37915 ----- W. C. WELLS, Sealer, 800 E. Church Avenue (615: 546-6220)

TEXAS

State ----- ED WHITESIDE, Director, Consumers Services Division, Dept. of Agriculture, 113 San Jacinto Street, Austin 78711 (512: 475-4304)
CHARLES E. FORESTER, Supervisor (512: 475-4357)

City Sealers of Weights and Measures:

Dallas 75201 ----- CHARLES H. VINCENT, Assistant Director, Consumer Affairs, City Hall (214: 748-9711)

VERMONT

State ----- TRAFFORD F. BRINK, Director, Division of Weights and Measures, 116 State Street, Montpelier 05602 (802: 828-2436)

VIRGINIA

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