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DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
S. W. STRATTON, DIRECTOR

Weights and Measures

NINTH ANNUAL CONFERENCE
OF REPRESENTATIVES FROM VARIOUS STATES
HELD AT THE BUREAU OF STANDARDS
WASHINGTON, D. C., MAY 26, 27, 28, AND 29, 1914

WASHINGTON
GOVERNMENT PRINTING OFFICE
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CONTENTS.

REPORT OF THE NINTH ANNUAL CONFERENCE ON WEIGHTS AND MEASURES OF THE UNITED STATES.

HELD AT THE BUREAU OF STANDARDS.
WASHINGTON, D. C., MAY 26, 27, 28, AND 29, 1914.

FIRST SESSION (MORNING OF TUESDAY, MAY 26, 1914).

The conference was called to order at 10 a. m. by the chairman, Dr. S. W. Stratton, Director of the Bureau of Standards.

The CHAIRMAN. Gentlemen, the Secretary of Commerce needs no introduction to you, and his time is limited, as he must attend a Cabinet meeting at a quarter to 11 o'clock. However, I will let him speak for himself.

ADDRESS OF WELCOME BY HON. WILLIAM C. REDFIELD, SECRETARY OF COMMERCE.

Dr. Stratton and gentlemen of the Conference on Weights and Measures, it seems a very unnecessary thing for me to say you are welcome here—unnecessary, I mean, because I am sure you all know it and because we on our part will try to make it so obvious in all that we have to do and to say to you that it will speak for itself.

You are a sort of an object of envy to me. This particular place, this particular branch of our department's activity, has always appealed to me in a peculiar way. Years ago, before there was any such thing as a Bureau of Standards, I used to want, and to go in the want of, the information and the accuracy here supplied. In a very small way I had to build up on a private basis that which is now here freely supplied to all the world that needs such knowledge, and this particular Bureau of Standards, therefore, makes a strong appeal both to my judgment and to my interest. It has in a very marked way the confidence of both Congress and the Executive, and I need not say to you (now that Dr. Stratton has gone out) that we have in him one of the most useful and efficient public servants, leading a staff as admirable for its character and skill as he is remarkable as a leader.

I like to think of this as the place where selfishness stays outside and where profit has no room within. For here we seek and find truth. We do not estimate the cost of finding the truth, but we seek the truth with infinite belief in its value as truth. Here, in searching for knowledge, we search without the commercial necessity of finding that knowledge at such a time and in such a way that we can earn something thereby. We are happily free from that embarrassment. So this is one of the few places—one of the rare spots in the world—where truth is sought and truth is taught merely for its own sake and for its great public and general usefulness. That distinguishes

this Bureau of Standards from many another place where similar work is done. Here we act on behalf of us all, to find that which is of interest and use for us all. This is catholic in its sympathies and universal in its scope and is one of those places where the good of everyone is the only thing that we can consider, for into these doors no private interest can enter.

I like to think of your conference, too, as one of the most efficient branches of the great informal society for the suppression of American liars. You are the very apostles and soldiers of truthfulness. Your business is to get the liar in the act of lying and to punish him; to preach the real truth about things; to get away from hysteria; to avoid the superficial and deal with the fundamental. You do not bother with the headlines of your art; you are concerned with fundamental facts that are so often concealed beneath a lurid headline. And I am glad that there is this body of men gathered from all over the land whose duty it is to get the real truth and to see that the real truth is followed, squarely and honorably followed, by others over whom you have jurisdiction. I am glad of that, for it is a thing sorely needed in this America of ours—to pierce beneath the shadows; to get below the superficial; not to mistake the foam on the crest of the tossing wave for the mighty currents of the ocean itself that lie beneath. We need so much in this land of ours—more now, I sometimes think, than ever before—to get at the truth beneath, as distinguished from that which is purely on the surface above.

And so I value this conference, and I value your going from this conference. Now, in a word of welcome, it may seem strange to you that I should say that I value your going, but I do; because I look at you gentlemen, collectively and individually, as the antennæ by which from here we reach out into communities all over the land, and through which, in your own particular communities, this bureau reaches down into practical usefulness. You are the wires—the live wires—by which we convey the currents of our activities. We need you in our business. Our business would not be thoroughly well done without you to carry it down into the little places as well as the large places, and translate into business honor and practice the fundamental truths of science which here are taught.

That is a high commission; that is a fine thing. It means that the work of thoughtful, unselfish, and able men is by you translated into honorable dealing for the humblest citizen. That is a good job; that is a man's job, and infinitely well worth doing. So you are preachers, all of you; you are preaching the gospel of plain truth and a square deal. That is a good gospel to believe in; it is a good gospel to preach, and the world is a better place and men and women are better off for what is here taught and what is by you conveyed throughout our beloved land.

I thank you, gentlemen.

ADDRESS BY THE PRESIDENT, DR. S. W. STRATTON, DIRECTOR OF THE BUREAU OF STANDARDS.

Gentlemen, there is little that I can say, after the splendid address of the secretary, that will add to your welcome here. It gives me great pleasure, however, to note the new faces. My mind goes back to the early conferences, when we had but a baker's dozen or

less. I thought we were exceedingly fortunate last year in our conference, and I know now that the present conference is going to exceed that.

During the past year the bureau has been keenly alive to your interests. We have looked forward to this meeting and have made preparations for it. Some things have happened during the year which may be of interest to note in passing.

One of the events was the Fifth International Conference of Weights and Measures. I presume that most of you know that the international standards are preserved at Paris, at the International Bureau of Weights and Measures, and that all of the countries contributing to the support of that institution send representatives once in every six years to the international conference. It is true that that has primarily to do with the metric system of weights and measures, but that of itself is very far-reaching, because most of our modern weights and measures, our units and standards of all kinds, are referred to the metric standards as reference standards.

Furthermore, the international bureau itself is taking a greater interest in affairs such as you are interested in. The smaller countries are appealing to this bureau for assistance. At this conference there was reported the new weights and measures law for the Republic of China. The international bureau gave to that Republic all the assistance possible in the formulating of the new laws. The French Republic is modifying its weights and measures laws; the international bureau gave great assistance to the French Republic, and their new weights and measures law was reported upon.

Hence this international bureau, besides being our reference bureau for the physical standards of mass and length and some of the thermometric standards, is acting in an advisory capacity in the common weights and measures to all of the countries of the world. Even those that do not subscribe to its maintenance can secure information and benefit by applying to the International Bureau of Weights and Measures. The affairs of the bureau are administered by a committee of 17. This committee meets every two years, but the conference meets every six years.

During the past summer I was very much surprised and gratified to receive an invitation from the Wholesale Grocers' Association to address them at their annual meeting at Atlantic City, upon the subject of the metric system. A few months ago I received a similar invitation to address the Retail Grocers' Association on the same subject, at Louisville last week. At both of these conferences I was especially pleased with two things. The first was their interest in the metric system; and I made it perfectly clear that I came, not to advocate the metric system, but to make them familiar with it. They showed a desire to know more about the metric system, and that was the object of my lecture at both places. The second was that in both of these meetings the attitude of all present was such—many of the speakers referred to weights and measures affairs—that there was no doubt whatever in my mind that the members of both associations are keenly alive to the importance of correct weights and measures, and I had no doubt in my own mind that the members of both associations are just as interested in bringing about correct conditions regarding weights and measures as you are. It was a

great surprise to me that they had taken these measures into account to the extent that they have. At the Louisville meeting, one of the representatives from a western State said that the grocers in his community had joined together and purchased a set of standard weights and measures, and that this was in continual use; that it was passed about from one to the other, and that one had to make an application weeks ahead to get the use of that set of standards.

Now, those associations can be of the greatest assistance to us. I pointed out to them that this was not necessary; that the association should demand, in every city in which they have a branch, a weights and measures official equipped with all of the apparatus necessary for making it possible for them to have honest weights and measures.

At both of these meetings I was surprised to find the keen interest that the members took in the metric system and its operations. I understand that the Wholesale Grocers' Association has a committee looking into the merits of the system, and Mr. Drake is with us to-day and will address us on that subject. At the meeting of the retail grocers in Louisville it was proposed to pass some resolution favoring it, but I cautioned them against it. I think it would have been unwise for them to have taken that premature action. I merely wanted to have them investigate the subject, to look into it thoroughly, which I think is the preliminary step.

There is another point which will interest you, and that is that the retail grocers were pleased to know that this convention had taken a stand for the sale of commodities by weight only. They had not heard of your action at the last meeting, and were pleased to hear of it, and they passed a similar resolution at their meeting, and I am sure you will have the support of that very large association in your efforts to bring about the sale of commodities by weight only. I believe that that association would join you in recommending the abolishment of the various bushels as capacity measures.

I had hoped to have with us to-day a gentleman who is one of the most distinguished scientists of Germany. He is president of the international conference, and also chairman of the International Committee of Weights and Measures—Prof. Förster, of Berlin. For many years he was director of the Normal-Eichungs Kommission, which is the institution in Germany having to do with weights and measures, and held this position when the metric system was adopted in Germany. He is now connected with the University of Berlin. But Prof. Förster was here for only a few hours, and sails this morning on the *Vaterland* for Germany. He was in this country but five days. I have often heard him speak of what he went through during the adoption of the metric system in Germany. He has often said that it presented no very great difficulties so far as the ordinary commodities are concerned, and I have listened to him many times with a great deal of interest in regard to that matter. I am sorry that he could not be with us a few hours longer and talk to us this morning. He is 84 years old, is still actively engaged in weights and measures work, and takes the keenest interest in weights and measures affairs all over the world.

REPORT OF THE SECRETARY, MR. L. A. FISCHER, CHIEF, DIVISION OF WEIGHTS AND MEASURES, BUREAU OF STANDARDS.

Mr. President and members of the National Conference on Weights and Measures, it is my privilege as secretary of the conference to review briefly the general progress of weights and measures throughout the country, mentioning only such matters as are likely to be of interest to the conference as a whole.

In regard to the tolerances and specifications which were adopted at the last conference it might be said that they have been adopted and put into effect during the past year by the following States: Indiana, Massachusetts, Ohio, Wisconsin, and Washington, and partially by Michigan and Kansas. The island of Porto Rico and the city of Chicago have also adopted them. On the whole they have proved to be very satisfactory indeed, although as was well known when they were adopted by the conference, there were a number of provisions which would undoubtedly have to be modified to some extent.

A splendid opportunity was offered during the year to put them into effect in a place where it was not necessary to consider past laws and methods. I refer to the island of Porto Rico, where Mr. Holbrook, as a representative of this bureau, prepared rules and regulations for the enforcement of the new weights and measures law, and also organized an inspection department and administered the law for a short period. Since Mr. Holbrook is on the program to give an account of his work on the island, I shall leave it to him to go into the details.

In regard to the report of the last conference which we had hoped to get out promptly, I will say that it was absolutely impossible to do this without neglecting work which seemed to be more urgent. The report is of great volume and contains more technical papers than the report of any previous conference, and these two items were largely responsible for the delay. In addition to this, the railway track scale testing investigations of the bureau, which had to be inaugurated, for the while absorbed the larger part of the time of the force devoted to weights and measures work. I believe, however, that the majority of the members will agree with me that the report is a credit to the conference. I do not myself know of any single weights and measures report, either in this country or any other, that contains as much real information as will be found in this report. Furthermore, it contains information that will be appreciated more and more as the weights and measures work develops.

Anticipating that it might be decided to hold the conference next year at San Francisco, the manager of the bureau of conventions and societies of the Panama-Pacific International Exposition was asked to reserve the dates of June 16, 17, 18, and 19 for our conference. If the conference is held at San Francisco at those dates, June 17 will be known at the exposition as national conference on weights and measures day. I do not wish it to be understood by the members of the conference that I am advocating that the next meeting be held at San Francisco, for I can, as a matter of fact, see grave objections, not the least of which is that it would be very difficult, indeed, for members of this conference from the East to have their States and cities appropriate money for the purposes of send-

ing them to an international exposition. Also, it is the general consensus of opinion of those whom I have consulted that conventions held at such expositions transact very little business on account of the divers attractions with which they are surrounded. On the other hand, the Western States have recently become quite active, and have every reason to feel, and some of them do feel, that the conference should occasionally be held at some place convenient of access to them. This matter will come up later and the members of the conference will have an opportunity to express their views.

Under the so-called net-weight amendment to the national food and drugs act the Secretary of Commerce, the Secretary of the Treasury, and the Secretary of Agriculture are required to draw up rules and regulations for the administration of this law, which is to be enforced by the Department of Agriculture. The committee appointed to represent the three Secretaries in this matter had a great many hearings and conferences and finally agreed upon certain regulations, which were within the present month approved and promulgated by the Secretaries. Dr. Alsberg, Chief of the Bureau of Chemistry, who is charged with the enforcement of this act and who, as chairman of the committee which drew up the rules and regulations referred to, is on the program and will no doubt tell you what they are and how to interpret them.

The net-weight law referred to has been supplemented by similar legislation in the following States, and thus a distinct advancement has been made in practicable weights and measures, which is due in no small measure to the activity of this conference and to its members individually: California, Connecticut, Florida, Indiana, Iowa, Montana, Nevada, North Dakota, New York, Pennsylvania, South Dakota, Tennessee, Utah, Wisconsin, and Wyoming, while a few other States have passed laws of this character which apply only to some certain commodities or classes of products. So far as national legislation subsequent to the enactment of the net-weight amendment to the food and drugs act is concerned, there is very little to report.

The so-called Tuttle bill to establish a standard barrel for dry commodities received the unanimous indorsement by the Committee on Coinage, Weights, and Measures of the last Congress and was reported to the House, but it failed of passage because of the pressure of other business. It was not introduced at all in the Senate during the last Congress. Soon after the present Congress met the same bill was again introduced by Mr. Tuttle in the House and by Senator Weeks in the Senate. The present status is that the bill has been passed by the Senate and is now pending in the House, where it has met with considerable opposition from some of the newer Members of Congress unfamiliar with the necessity of such legislation. The prospects are, however, very favorable that it will pass the House. This measure has been indorsed by the last conference and by practically every weights and measures official in the United States.

During the year the Bureau of Standards acquired an equipment for testing railroad track scales, the operation of which will be demonstrated for the benefit of the members of the conference at the navy yard to-morrow afternoon. The appropriation for this equipment became available the 1st of last July and the equipment was completed the following September. The first tests made with

this equipment was on the New York, New Haven & Hartford Railroad at Bridgeport and Meriden, Conn., for the purpose of trying it out. After this a number of tests were made in the State of Vermont at the request of the State commissioner of weights and measures, Mr. Henry, and later the track scales used by the customs service in the vicinity of New York were tested. In all, 34 tests were made on this tour, of which 25 scales, or 73.54 per cent, would fail to pass if the tolerance was placed at 2 pounds per thousand; 19, or 55.8 per cent, would fail to pass if this tolerance is doubled; 10 scales, or 29.4 per cent, would fail to pass if the tolerance is fixed at 1 per cent, or 10 pounds, per thousand. In arriving at these results test loads of less than 25,000 pounds were not considered.

After completing the tests in the vicinity of New York the equipment was shipped to the Washington Navy Yard, where two scales were tested for the Naval Gun Factory and where the equipment has since remained, except for a period of a couple of days, when a scale was tested at Relee, Va., to settle a dispute between a shipper in South Carolina and the consignee in Virginia.

Numerous requests for tests have been received from various State and city officials, and it is hoped that during the coming season many of these requests will be complied with. Manifestly one equipment can not be expected to satisfy all the demands of this vast country for such tests, and in order to provide additional equipment the bureau has asked for an increase in its appropriation for this work the coming year.

The results obtained thus far amply demonstrate the necessity for the inspection of railroad track scales, and they also furnish exact data which will be extremely valuable in drawing up specifications for the construction and operation of such scales.

Your executive committee had one meeting in Washington on April 15 for the purpose of making final arrangements regarding the program and to discuss a number of other matters in connection with the present conference.

The meeting was attended by Dr. Stratton, Mr. Waldron, Mr. Henry, Mr. Mikesell, Dr. Hand, and the secretary, and suggestions were also obtained from those members of the committee who were unable to attend. The present program is a compromise of the extreme views of those who wished to devote the whole time to work and those who believe that about one half of the time should be devoted to social features. The program also represents an attempt to meet the conflicting views of those who believe that the subjects selected should be so elementary as to be readily comprehended by the most inexperienced official and those who feel that the subjects should be more technical in character.

Your secretary does not believe that the papers are by any means the most important thing in connection with the conference, but the informal discussions among members and the opportunity afforded to get acquainted are of vastly more value.

The growing interest in weights and measures throughout the country was very forcibly brought to the attention of your secretary by the increased correspondence in connection with the present conference. More than 350 special letters were sent out, about 3,700 circular letters, and 150 stencil copies of the program were made.

THE NET-WEIGHT AMENDMENT TO THE NATIONAL FOOD AND DRUGS ACT.

By Dr. Carl L. Alsberg, *Chief, Bureau of Chemistry, Washington, D. C.*

Mr. President and gentlemen, in coming before you to talk on this matter I feel more or less as a beginner, because the Bureau of Chemistry has not in the past had a great deal to do with the enforcement of any laws like those with the enforcement of which you gentlemen have been charged. We had a regulation, as you are probably well aware—those of you who also are in touch with the food and drugs acts of your respective States—which provided that if a man stated the weight on a package, or described the contents in any way, it had to be correct. Beyond that we had nothing in the food and drugs act which had to do with weights and measures or with protecting the consumer in so far as short weighting or short measuring was concerned.

During the past years, however, we have had more or less to do with enforcing weights-and-measures legislation, because a number of States had passed laws. Many manufacturers were putting the contents on their packages, no matter where their packages went, so as to avoid the accident that a package which was not marked might reach a State where there was such a law. So, we were getting a little experience in that matter.

When this amendment to the food and drugs act was passed it became necessary for us to look into the question more thoroughly. In studying the matter it became apparent that the enforcement of this amendment, so far as the Federal Government is concerned, is on rather a different basis from the enforcement of a similar law inside the States. It is a far less simple matter than to enforce a net weight and measure act which applies to a State. As you are probably aware, the control that the Federal Government exercises over food and drugs goes back to Chief Justice Marshall's interpretation of interstate commerce. We simply have jurisdiction over those articles of food and drugs which pass into interstate commerce. We have not any jurisdiction over any articles before they are offered for shipment in interstate commerce.

Now, because the Federal Government has jurisdiction only over that which goes into interstate commerce, it is very much more difficult for us in practice to enforce an act such as this than it is for you gentlemen. The offense is the offering for shipment or the shipping in interstate commerce; and, therefore, as we can not catch the goods in most cases exactly at the time they go into interstate commerce, we must be prepared to meet in court a defense based on alleged changes subsequent to shipment in interstate commerce.

This made it apparent that we would have to study in the Bureau of Chemistry the question of shrinkages, the question of variations due to moisture changes during shipment, to subsequent storage, to sifting, and whatnot, in a way that is entirely unnecessary for you gentlemen in the States. You have the goods in your States, and your laws are such that in many cases you need not worry concerning the history of those goods. We have to be concerned not merely with the status of the goods, but with their history. Let me give an example. Some years ago the Bureau of Chemistry endeavored to

prosecute a shipper of large-size cheeses, weighing a great many pounds, for short weight. The bureau was convinced that this concern was short-weighting constantly and continuously, but when it came to prosecution it became apparent that we would have to prove that the shortage in weight was not due to subsequent shrinkage. So we had to wait awhile and make some experimental shipments of cheeses to various sections of the country under known and controlled conditions and determine that this plea was merely an excuse. We found that the shrinkage was very slight, and then made some fresh prosecutions.

That is the sort of difficulty that we are up against that you gentlemen do not encounter. So, for the purpose of enforcing the Federal act, the Bureau of Chemistry is considering two types of phenomena. For our own use we speak in the bureau—I am not sure that legally and technically our usage of the words is correct—we speak of tolerances and we speak of variations. Every one of us in the bureau has a different definition for what a tolerance is and what a variation is; some of us say there is no difference and some of us say that a tolerance is a permitted variation, and some say that there is a difference; and the use of those two words in the act has given us more difficulty than any one single thing in the act. But for practical purposes I think we have gotten in the bureau to consider a tolerance and a variation as somewhat different. We are inclined to consider, or at least we are calling, a tolerance such a small departure from the stated weight as is due to the inevitable error in packing and putting up the article. Now, automatic machinery is not absolutely accurate; weighing is not absolutely accurate; sorting, measuring, and packing generally is not absolutely accurate; and it is quite evident that Congress intended that some allowance should be made for the unavoidable discrepancies from the stated weight which would take place in honest packing of goods. Congress, it is clear, did not intend that every individual who puts up goods should weigh them with the accuracy of the scientist, for obvious reasons. It is a question what degree of variation shall be permitted from the stated quantity, and the Bureau of Chemistry has been at work ever since the passage of the act in studying the packing of various sorts of foods in factories all over the country and in studying the errors of automatic weighing and packing machinery. It is a long job, and we are nowhere near through yet. It will be some time longer before we will have all the data that we need on all articles.

Many curious facts have come out in connection with that study. One would think offhand that the weighing of large-size packages—packages that contain 100 or 200 pounds—would be apt to be less accurate than the weighing of small packages; that is to say, that the absolute discrepancy from the stated weight—not the percentage discrepancy—would be relatively greater; that is to say, that a barrel of sugar would be pounds out of the way where a small package would be not more than ounces out of the way. But, as a matter of fact, that does not seem to be the case. In such staples as sugar and flour the manufacturer seems to be weighing the larger packages with accuracy; so that we are confronted with the question, in deciding on tolerances, Shall we make them as close as the large manufac-

turer can weigh, and perhaps handicap the small manufacturer by so doing, or shall we take the chance of giving the large manufacturer a slight leeway in order not to handicap unnecessarily the small manufacturer? One sugar refinery from which we have a report claims to weigh sugar in barrels to ounces, and states that an overweight of 1 ounce to the barrel means $10,000 to the refinery in one year, and they have accordingly claimed that they weigh accurately within an ounce. The same line of reasoning applies to flour. There is not any question that the millers in the great mills weigh flour with exceeding accuracy. I have forgotten what the greatest range that we have noticed was in one of the large mills. If I remember, it was only about a quarter of a pound—4, 6, or 8 ounces; not over that—not over half a pound, which, when you consider an article like flour, which is weighed in the barrel, of 196 pounds, is doing pretty well. The problem that the bureau has to struggle with is: If millers with an output of several thousand barrels a day can do that, can the small miller do it, and is it fair to demand of the small miller the same degree of accuracy?

In the tolerances, then, for our own purposes, we have considered these variations which are due to packing. Another problem, as you know, is the variations in bottles which can not always be made absolutely accurate; and for our purposes we have considered variations—I am talking of the Bureau of Chemistry and not the committee that drafted the preliminary regulations—that occur in a package of food due to climatic conditions and storage. You can, for instance, send sharply dried corn meal to the Gulf States and have it gain in weight, and you can send it to Denver and have it lose in weight. We have had to make studies of that type of variation, and we have run into a lot of curious things. We found in studying the tolerances that on the whole automatic machinery does better work than hand packing; we have found that the accuracy of hand packing and of machinery vary enormously with the article and with the condition of the same article. Take spices, for instance. Machine and hand packing varies in accuracy according to the fineness of the grinding of the spices—according to whether they are fibrous or fine powders.

We found a curious situation in the cracker industry, where it seems to be absolutely impossible for the manufacturer to put up crackers anywhere near the correct weight. The result is that most of the cracker concerns understate the weight so as to be sure that they will not violate the act. We have found that at times packages of oysterettes, for instance, were understated over 50 per cent, simply because the manufacturer wanted to be safe. The manufacturer has to fill the paper carton, and the amount of weight that goes into that paper carton depends entirely upon whether the yeast feels like working that day or not. Nobody knows exactly how to get a uniform baking effect with yeast. Some days it seems to be something in the weather—that at least is what the bakers say; some days they get a light, fluffy biscuit which is large in volume and low in weight. They are giving the consumer something which suits him very well. and which he regards as excellent, yet when they fill their carton they do not get anywhere near as much weight into it as they do on another day when the conditions are such that the dough does not raise well and they get a hard, rather tough, and smaller cracker.

Each one of these weighs more, they occupy less volume, and more go into the box. So on the days when the factory is putting out what they call their poorest product they are giving the largest amount of weight. It is a very peculiar situation and the facts are that many biscuit manufacturers understate certain kinds of goods as much as 50 per cent so as not to take a chance of being hauled into court. We have known packages to be understated as much as 56 or 58 per cent.

Then we are confronted with the difficulty, which is one that you gentlemen have also to consider: What is a package? I am not going to try to define what a package is. The committee which drew up the regulations labored for many months over the question of what is a package, and finally submitted a definition which all the attorneys said was not much good, and so it was finally stricken from the regulations, and the regulations contain no definition, direct or implied, of a package. This was done on the theory that in probably 95 or 98 per cent of the cases, or perhaps 99 per cent of the cases, no one with any common sense would have any difficulty in telling whether a given food was in package form or not, and that it was better to leave the decision in the remainder to be settled in each individual case on its individual merits.

Then there is the question that has to be considered of the shipping case. Are you going to require the wholesale grocer or the jobber who sends a shipment of mixed goods to the retailer—a dozen cans of this and a dozen boxes of that, and a dozen packages of spices, and so on, each one of which is labeled in compliance with the law—to put a statement on the outside of his shipping case stating exactly what is in the shipping case? In other words, will he have to duplicate his invoice or his bill of lading on the shipping case? The committee was of the opinion that Congress did not mean to define such a shipping case as a package and that there was nothing to be gained by making that requirement; that such packages always went to the wholesaler or jobber, who was well able to protect himself, and that as long as the individual packages in such shipping cases were marked the consumer was protected, and that that was all that Congress was apparently concerned with.

Now, gentlemen, I think I have covered the two or three points I wanted to raise, the first of which was that the method of enforcing our law has to be different from that of the States, for the simple reason that we are limited by the interstate-commerce requirements; that it is not sufficient for us in every case to take a sample off the grocer's shelf, even if it has been there for 10 years, and weigh it and find it short weight, but that we have also got to present in such a case some evidence to show that the short weight was not merely the result of storage. In this connection, of course, we will have to consider the normal moisture content of the article. We are obviously not going to allow a man who sells dried fruit and puts 35 per cent of water into it to ship his fruit, figuring the water in as fruit, and then escape punishment if he short-weights, on the plea that the short weight was due to shrinkage.

Then, under tolerances, we in the bureau have been considering such errors as are permissible in good honest packing, and under variations we have been considering such changes as take place in a package subsequent to its shipment, to decide which changes are

and which are not legitimate. You will see, gentlemen, that a certain amount of shrinkage is legitimate in certain products. Take some of these old Smithfield hams that have hung for a year or so. They have lost water; they have lost an enormous quantity of water. They have not lost anything that is of any food value, and the consumer, after all, if he is getting a pound of this desiccated, dried-up ham, is getting as much food value as though he were getting a larger quantity with all the moisture in it of the green ham. We have to consider such questions.

Then we have to consider the wholesale package and the shipping case, which again is a matter that does not particularly concern you gentlemen; and we have to consider variations and shrinkages throughout the country as a whole, which also does not concern you gentlemen. We have to consider that a package may shrink 1 per cent in going to a Gulf State, and that a 2 per cent shrinkage when it goes to Denver or Utah may be the equivalent—the exact equivalent—of a 1 per cent shrinkage at New Orleans, and we have to make our allowances such, in administering the law, that we will not let the man who ships to New Orleans get by and punish the man who ships to Denver, just because he has the misfortune to ship to a dry climate, whereas the other one who is short-weighting ships to a moist climate.

Those are the points I wanted to make, gentlemen. I wanted to point out that we have in many ways an entirely different problem from that which you gentlemen have.

DISCUSSION.

Mr. NEALE. Mr. President, I would like to ask if such marking as so many pounds, when packed, will be allowed; also, would such a marking as this be allowable: "Not less than 4 pounds," or not less than 7 or 6?

Mr. ALSBERG. We would not want to permit an undermarking which is going to be ridiculous and which does not tell the story. We would not allow a man to take a gallon and mark it "1 fluid ounce." But if there is a good, reasonable undermarking, as in this biscuit case, where the man does it to be safe, we are inclined to permit it, but not to the extent of making the law ridiculous or making it so far under the actual contents that it ceases to convey any information.

Mr. NEALE. Do the words "when packed" have any significance?

Mr. ALSBERG. We are not going to stand for that, as far as we are concerned. We do not care anything about when it is packed; the only thing we are concerned with is when it goes into interstate commerce and as long as it stays subject to our jurisdiction. The "when packed" we do not approve of.

Mr. HANSON. Mr. Chairman, I would like to ask Dr. Alsberg this question: If a ham comes from Chicago and is weighed while there—say the net weight of the ham is 40 pounds—and it is shipped in interstate commerce into Massachusetts, and then the same ham is sold to a grocer there for 41 pounds; in other words, it is sold by gross weight and not net weight. Have you any jurisdiction over that?

Mr. ALSBERG. The grocer can buy hams either wrapped or unwrapped. If he buys them wrapped, he pays for the wrapping at the same price that he pays for the ham; and the wrapping (as our

information goes) costs about as much as the equivalent amount of ham. We have no jurisdiction over the thing after it passes out of interstate commerce; that is to say, we can not control it in any way after the grocer gets it.

Mr. HANSON. Do you consider it proper, for instance, in the case of hams, that the grocer should pay 8 or 10 cents a pound for paper that probably costs 2 or 3 cents a pound?

Mr. ALSBERG. I do not know whether that is proper or not. But what are you going to do with the rulings of the court which indicate that a ham is not to be regarded as a package?

Mr. HANSON. Well, if you do not regard it as a package, would you not regard it as under the net-weight law?

Mr. ALSBERG. If it is not regarded as a package by the courts, we can not exercise jurisdiction over it. The only case where that has been tried out is in the State of Nebraska. The supreme court of the State ruled, virtually, that a thing was a package where the covering determined the quantity that was in it; that inasmuch as the covering of the ham did not determine the quantity of the product and was beyond the control of the man who put it up—as it was sold by weight and as the man had his choice to buy either the wrapped or the unwrapped ham—he had no cause for grievance and the State had no jurisdiction, because it was not a package in that sense.

Mr. BROWN. Are you going to be bound by the decisions handed down by State courts?

Mr. ALSBERG. No; we are not going to be bound by State decisions except in so far as the Attorney General thinks we ought. What do you think about the ham question, Dr. Barnard?

Mr. BARNARD, of Indiana. I do not think it is a good decision.

Mr. VAN DUYN. Mr. Chairman, if a ham that is marked 22 pounds and weighs 18 is sold as a package at retail by the grocer to the consumer, do the State authorities have a right to prosecute?

Mr. HANSON. Mr. Chairman, if I can answer that question, I will say that in Massachusetts, for instance, if a grocer sold a ham to a consumer as weighing 22 pounds and the net weight was only 18 pounds, we would prosecute immediately under the net-weight law. Our law says that all goods sold by weight shall be sold by net weight.

Mr. MCGRADY. Mr. Chairman, in Pittsburgh hams, lard, etc., were marked gross weight. We simply went in and made a purchase; asked for a ham and the price per pound, weighed it, and laid information against five or six dealers. So it was always net weight after that time.

But I want to ask something about butter. We have had a great deal of trouble with print butter from the West. We weighed 10,000 or 15,000 pounds of butter there last month a year ago, and there were only about 2 brands out of 93 brands that held out. We have tried every place to get some instructions on shrinkage of butter and can not get any anywhere.

Mr. ALSBERG. We are collecting a lot of information which we hope to make public. We do not believe that the shrinkage amounts to anywhere near as much as is ordinarily claimed. In the first place, you have to remember that all our dairy schools are training people to put out butter that has the maximum amount of water and the maximum amount of curd and the maximum amount of salt

that the law will allow. The way we propose in practice to deal with a good many of those cases is not merely to weigh the print, but also to find how much water is in it. We would feel inclined to be much more lenient with a man who was a quarter of an ounce or so off in a print of butter if his water and salt content was lower than the maximum the law allowed, because such a man is really giving more value than another man who has got his full 16 per cent of water and 3 per cent of salt, and so on, and may be giving only a very slight shortage. We propose in all these cases to take such things as the moisture content into consideration. I think you will have to, and it is another argument for the need of uniform and universal standards. One of the troubles we have to deal with in this matter is the variation in water content. If we knew just what the honest water content of everything was, it would be a very simple matter to overcome a great many of these difficulties.

Mr. CUMMINGS. Mr. Chairman, I would like to ask the doctor under what conditions a print of butter is considered a package by his department; whether it would be considered a package if simply wrapped in paraffin paper, or whether it must be inclosed in a cardboard container?

Mr. ALSBERG. I regret to say I am unable to give that information, because I am not personally carrying on these experiments. I have turned those experiments over to one of the men in the bureau, and I have not inquired exactly the conditions that he has been following. The instructions were to follow the various conditions which are customary in commercial handling. I do not know how closely he has complied with that.

Mr. HARRIS. Mr. Chairman, we had a case in Massachusetts lately with reference to our package of borax. The commissioner of weights and measures held up some of our packages, claiming they were short weight. I called on him and found that the package in question was an old 10-ounce package that had been on the market for four or five years, and had lost about 2 ounces of the water content. Borax contains 47 per cent of water of crystallization. Now, under certain climatic conditions over which we have no control this moisture content will evaporate. If the substance is used, however, in a solution, it will take up the water it has lost. If it lost all of its water, it would be in an anhydrous condition and would be worth twice as much as it is with its 47 per cent of moisture content.

The PRESIDENT. It would be a good thing to ship it in that condition, would it not?

Mr. HARRIS. Well, it would absorb moisture; it would increase in weight all the time if it was shipped in an anhydrous condition.

The PRESIDENT. Let me ask you a question right there. What do you want to do about it? What is your suggestion as to the solution of that case?

Mr. HARRIS. Why, we always pack our packages full weight.

The PRESIDENT. But how is the other man going to know it? He has just as much right to know that as you have.

Mr. HARRIS. Certainly, he has.

The PRESIDENT. And you ought not to compel him to be in the position of always taking your word.

Mr. HARRIS. No.

The PRESIDENT. Now, how would you solve the problem? It is easy enough to get up and state an objection to a thing, but that objection has got to be met. How would you propose to meet it?

Mr. HARRIS. Why, we are now sending half a dozen packages to commissioners of weights and measures to let them determine what the natural evaporation of moisture content in borax is. We do not know of any way by which we can prevent the moisture from evaporating, and we do not know of any business house that would put in 18 or 20 ounces for 16 ounces to take care of this moisture evaporation.

The PRESIDENT. No; that is quite true, but there must be some equitable basis for handling those things.

Mr. HARRIS. There should be a reasonable tolerance permitted—variations according to the articles as packed and according to the moisture content contained in them.

The PRESIDENT. You do not mean to say that a tolerance would cover a case of that kind, do you?

Mr. HARRIS. Ordinarily; yes.

The PRESIDENT. I think a good many of those questions are going to be taken care of along the line Dr. Alsberg has suggested. Regarding that active principle in borax, the question of how much water is contained in it is of no concern except that if you are going to have an equitable arrangement which will be understood by both the buyer and the seller, we must agree on what that principle is.

Mr. HARRIS. Certainly. It would depend, as Dr. Alsberg said, whether you sent it to Denver or whether you sent it to San Francisco, where fogs are prevalent.

The PRESIDENT. Well, it has got to be sent to both places, and the extremes are so great that you can not allow for them in a tolerance. Now, there is one thing there that is constant; that is, the amount of active principle; and the fault is in trying to measure water when it is the other thing that should be measured. I believe that all those cases will be settled in the end along those lines. Don't you agree with that, Dr. Alsberg? Is it not true that many of those cases will become simplified if we can make our measurement independent of the water concerned?

Mr. ALSBERG. Yes; I think that is true. If we had definite food standards which said, for instance, that dried fruit shall not contain over 22 per cent of moisture, we could demand that the manufacturer give his weight on that standard basis. If he had very moist material that was going to shrink, he would have to put that much more in it and everybody would be buying on the same basis. One of the most important things agriculturally that this country has got to come to is buying things the same as they buy coal and steel, on the actual basis of the value of the thing. Take corn, for instance. I have seen commercial corn with 33 per cent of moisture in it. It should not contain over 15 per cent. Now, there ought to be some definite standard, and the Department of Agriculture is endeavoring to introduce it now, so that the price would be shaded according to moisture content, and the weight of the bushel would take into consideration the amount of moisture in the corn. That is the sort of thing you have in mind, is it?

The PRESIDENT. That is it; and the gentleman has just brought up the borax question. I have encouraged the discussion on it because

it represents a type of all such cases—that is, water of crystallization—and to my mind there is nothing to prevent them from stating on the package how much there is present of the active principle that is wanted, regardless of water of crystallization.

Mr. ALSBERG. That is to say, so much anhydrous borax.

The PRESIDENT. Exactly, or the equivalent of it.

Mr. DOWNING. Mr. Chairman, I understand that in the marketing of dry commodities the United States bushel is used. Does that mean stricken measure or heaped, or are we to take into consideration the matter of weight?

The PRESIDENT. That is really a Bureau of Standards matter, but I am very glad that you brought it up.

Mr. ALSBERG. Anything like that we want to put up to the Bureau of Standards.

The PRESIDENT. The Bureau of Standards views the bushel as a capacity measure, as a certain number of cubic inches. The bureau does not recognize the bushels by weight because the United States Government has never taken any action in regard to that; it is a State affair. The question you bring up is an exceedingly important one, and I would like to have you bring that up again when the weights and measures officials are discussing that question, as they undoubtedly will later.

Mr. BROWN. Mr. Chairman, I would like to ask Dr. Alsberg a question. He made the suggestion just now that the differences in large units had been found to be less than in small units. I would like to ask what the bureau's experience has been regarding the small sacks of flour—12, 24, and 48 pounds—as compared with the barrel.

Mr. ALSBERG. I can not tell you the exact difference there, but the percentage error, of course, was greater; the absolute error was, of course, smaller. I do not remember the exact figures; but they were pretty close from the big mills. Unfortunately, we have not got enough data yet from the little mills and do not know whether the small men are doing as good work in that respect as the large men. I think it is something like this: That a 5-pound sack would be right within about 2 ounces, or something like that; a 196-pound barrel, within 6 or 8 ounces, or something like that; so that the percentage of 2 on 5 is, of course, very much greater than 6 on 196. But they were pretty close. That applies only to the large mills; we have not weighed small packages in some of the small minor mills.

Mr. RICHARDSON of Illinois. Gentlemen, we are not so much interested in borax in Illinois as we are in hams and corn, and I would like to ask the doctor one question in regard to the ham proposition. In regard to a 20-pound ham, I was wondering if we could not arrange so that in the package it could speak in the way that flour does, so that it might be understood to be a pound or a pound and a half, or whatever it was, with the wrapper—to be taken away from the amount sold to the consumer. I ask the doctor's opinion on that.

Mr. ALSBERG. This law requires, of course, that the weight of the contents shall be stated on the package. If you define a ham that is wrapped as a package, then you can demand that the weight of the contents be stated on the outside of the package. If you do not define it as a package you can not do that. But the great difficulty there is in the enormous changes and shrinkage which take place subsequently, and which do not really mean much change in food value.

Mr. STEINEL. I would like to ask the doctor what his department would consider the correct marking of a liquid package. I have seen it marked, for instance, "10 fluid ounces," "10 liquid ounces," or just "10 ounces." Which would be correct?

Mr. ALSBERG. Ten ounces is incorrect, because you do not know whether it is fluid ounces or avoirdupois. It should be "10 fluid ounces." I do not know that we would penalize a man who said "10 liquid ounces," instead of "10 fluid ounces." I do not think that makes any particular difference, but to say "ounces" and not state whether it is avoirdupois or liquid measure, is not correct. There is one point in that connection that I would like to bring out. It is on the marking of bottles. A quart of champagne used to be a quart, and a quart of whisky used to be a quart; but it has come down half an ounce, or an ounce or so, every once in a while, so that now a quart bottle of champagne or a quart bottle of whisky has 28, 29, 30, or 31 ounces, never 32 ounces; you will notice that in the best hotels they no longer have on the bill of fare, "Champagne," "Quarts" and "Pints," but it is "Large bottles" and "Small bottles." Now, since some of the States require the marking of the contents of bottles, most of these people who are putting out these short-measure quarts are labeling them 28, 29, or 30 ounces—fluid ounces, as it should be. According to these regulations that is no longer permissible, because if it is 16 ounces or more it has got to be "A pint and so many ounces." The committee did that purposely, I believe, because we felt that it penalized the short-measure bottle more than to say "30 ounces." That is to say, "One pint and 10 ounces" tells the man plainly that it is not a full quart. The average citizen does not know whether there are 30 ounces, 32 ounces, or 40 ounces, in a full quart.

THE METRIC SYSTEM.

By FRED R. DRAKE, of the National Wholesale Grocers' Association.

Mr. President, Mr. Secretary, and members of the Ninth Annual Conference on the Weights and Measures of the United States, the National Wholesale Grocers' Association of the United States, which I have the honor to represent, sends greetings and wishes me as the representative of that organization to express thanks for the cordial invitation to meet with you and appreciation of your wish to have me address you on the subject of "The metric system," in which we are so much interested, and on which we have for two years now been conducting an educational campaign looking to the eventual compulsory adoption of the system by congressional enactment.

The National Wholesale Grocers' Association of the United States, with membership in 45 States, has been the pioneer as a national trade organization in advocating uniformity in national and State legislation in all matters pertaining to the grocery business, and is wielding great influence for good in its own proper sphere.

One of the first acts of our association at its organization in Buffalo in 1906 was to urge upon Congress the passage of the pure food and drugs law enacted that year.

We have favored and used every proper effort at our command to obtain the passage of the net-weight amendment to that law passed March 3, 1913, on which food-inspection decision No. 154 has just

been issued, and in which the members of our association are vitally interested.

In this decision under caption (*e*) we read:

> Statements of weight shall be in terms of avoirdupois pounds and ounces; statements of liquid measure shall be in terms of the United States gallon of 231 cubic inches and its customary subdivisions, i. e., in gallons, quarts, pints, or fluid ounces, and shall expres the volume of the liquid at 68° F. (20° C); and statements of dry measure shall be in terms of the United States standard bushel of 2,150.42 cubic inches and its customary subdivisions, i. e., in bushels, half bushels, pecks, quarts, pints, or half pints: *Provided*, That, by like method, such statements may be in terms of metric weight or measure.

The metric provision is the simplest thing in the caption.

When the National Wholesale Grocers' Association adopted their resolution favoring an educational campaign looking to the eventual compulsory adoption of the metric system for all uses, it was done with the idea of harmonizing the diversity now existing in the laws of the various States and simplifying our Federal practice, which now recognizes three distinct systems of weights and measures in addition to the metric system, which was made legal by the Thirty-ninth Congress in 1866, and has been slowly working its way into more general use by sheer force of its value as an international system adapted to our own modern needs.

Our association foresaw the desirability of studying the metric system in 1912, for the net-weight amendment was at that time being urged in Congress.

It is not necessary to remind this company of weight and measure officials that the absolute legal standard of measure of the United States is the international meter, and that the yard, by enactment, is an integral part of the meter.

To the lay mind this is generally not known, or if known, not remembered, and it may be therefore not amiss here to review hastily the history of the meter, which is the basis of the international metric system of weights and measures, known for many years as the French system because of its history and adoption first by France.

Your president, Dr. Stratton, has written a very scholarly article on the subject for the Encyclopedia Americana, and I have not hesitated to borrow from him, for no one has been more helpful to us in our investigation of the merits of the system than he and your secretary, Mr. Fischer.

We are indebted also in this paper to Mr. Alexander Siemens in his address to the members of the Bradford (England) Textile Society.

In early times each locality and industry had its own system of weights and measures, which crudely served local needs and primitive conditions. With increasing intercourse between communities this diversity of units and standards proved confusing and intolerable, and for 250 years a simple universal standard has been the subject of scientific thought, legislative action, and public discussion.

You may say the first person who put it down in black and white was James Watt. Writing to a friend in 1783, he proposed that they should agitate for the adoption of an international unit of weights and measures for scientific purposes.

He wrote also to French savants and the result of the agitation was that in 1790 Prince Talleyrand brought in a bill before the legisla-

tive assembly of France proposing that an international commission should be nominated to deliberate on this subject.

England declined—the royal society would not agree to it because England and France were at war at that time. Eventually, however, some other countries joined and constituted a commission.

At that time the greatest difficulty was to decide upon a unit that would be easily reproducible.

Watt had in his mind particularly scientific people and scientific researches, and so the men nominated to the commission were mostly scientific men and not very practical, and the idea which they adopted at last was also not very practical. It was that the quadrant of the earth should be measured and a ten-millionth part should be the meter or measure of length.

We know that they did not get that. They even went so far as to make a mistake in their calculations, so that the meter has never been their meter.

Following the adoption in 1786 by the Continental Congress of the idea of Gouverneur Morris, of Pennsylvania, of a decimal system of coinage, in 1790 our National House of Representatives referred to Thomas Jefferson, then Secretary of State, the preparation of a plan for establishing uniformity in the currency, weights, and measures of the United States. He made an able report, outlining and favoring a decimal system, but with the English system of measures.

It is regrettable that England and France were at war and that the means of communication at that time were so inferior to the present, else we feel sure that the United States would have cooperated with France and the past century of confusion with our cumbersome system of weights and measures would have been avoided and all our magnificent country would have been surveyed in the simple metric system instead of, as now, in measures of length and area that are constantly passing into disuse, so that it takes a lawyer to understand a deed of 50 years ago.

Before the French National Assembly took the action in 1790 which culminated in the establishment of the metric system in France in 1799 and its compulsory use there in 1841, the important elements and principles of a universal system had already been formulated.

Many of the same points were brought out in masterly fashion by John Quincy Adams, then Secretary of State, in his classic report made to the Senate of the United States in 1821, wherein he says:

> It is one of those attempts to improve the condition of human kind which, should it even be destined ultimately to fail, would in its failure deserve little less admiration than in its success; it is founded upon the following principles, that the unit of linear measure applied to matter in its three modes of extension—length, breadth, and thickness—should be the standard of all measures of length, surface, and solidity. That the cubic contents of the linear measure in distilled water at the temperature of its greatest contraction should furnish at once the standard weight and measure of capacity: that for everything susceptible of being measured or weighed there should be only one measure of length, one weight, one measure of contents, with their multiples and submultiples exclusively in decimal proportions; that the whole system should be equally suitable to the use of all mankind; and that the weights and measures should have the same base ratio throughout.

We are faced by the fact that all people on earth who count, count by tens, and that has fixed the base ratio for any international system. Therefore the base ratic of 10 is absolutely essential.

We want to remind you how many ratios form part of the English system. A statute mile has 8 furlongs, a furlong 40 perches, a perch $2\frac{3}{4}$ fathoms, a fathom 2 yards, a yard 3 feet, a foot 12 inches, and 1 inch 3 barleycorns. Now, an acre is 4 roods, a rood is 40 rods, a rod $30\frac{1}{4}$ square yards, a square yard is 9 square feet, a square foot is 144 square inches.

A barrel has 4 firkins; there are 9 gallons in a firkin, 4 quarts in a gallon, 2 pints in a quart, and 4 gills in a pint.

The table of weights runs: One ton, 20 hundredweight; there are four quarters in a hundredweight, 2 stones in a quarter, 14 pounds in a stone, 16 ounces in a pound, and 16 drams in an ounce, with $27\frac{11}{32}$ grains in a dram.

Can anything be more confusing?

We have taken up so much space on these items in order to call to your attention units that have to be reckoned with that are practically obsolete and very difficult to learn and remember.

It is not necessary to enter into any argument to illustrate the advantages of the metric system for facility of computation and convenience of memorizing its inter-relations.

From this point of view the advantages of the system are universally conceded by those who have made an impartial examination of its merits. It is probably no exaggeration to state that at least one-half of the time involved in the average computations required in daily life would be saved by the use of this system over what is required by the existing system of weights and measures.

It is a harmonious and scientific system that is easily comprehended, and once understood, easily memorized.

It is undoubtedly true that it is as simple for all uses compared to our English system of weights and measures as our United States system of decimal coinage is simple compared to the cumbersome, unrelated arbitrary English system of money, where the component parts bear no decimal or any base relation to the unit of value.

The fundamental unit of the metric system is the meter, or unit of length divided into 1,000 parts or millimeters, and is the distance between two marks on the original meter intended at first to be the ten-millionth part of a quadrant of the earth's surface.

This meter, made of platinum, is kept in a very secure vault at the International Bureau of Weights and Measures, located at Sevres, France, one of the suburbs of Paris.

Last summer a committee of our association visited the bureau and had a conference with the director, Dr. Benoit, and we are now in correspondence with the international bureau through the secretary, Dr. Guillaume, and have received the report on the Fifth General Conference, which met last October, and convenes every six years.

Your president, Dr. Stratton, took part both as a delegate and as a member of the international committee which meets every two years; and, be assured, he occupies a very enviable position in the minds of scientific men throughout the world.

We are in correspondence as well with Mr. G. E. M. Johnston, secretary of the Decimal Association of Great Britain, advocating the metric system.

Capt. George P. Blow, of La Salle, Ill., one of the prominent members of the Illinois Manufacturers' Association, who recently visited

South America under the auspices of the Chicago Association of Commerce, thus expressed himself in the Manufacturers' News for April:

> I know of nothing which in my opinion is as important in the development of our trade relations as the adoption of the metric system, and I believe that the compulsory use of the system in the United States would be the most important industrial advance of the century.

From the fundamental unit of length, the meter, equal to 39.37 inches, the units of volume or capacity, the liter, and mass, the gram, are derived. One-tenth of a meter, or 1 decimeter cubed, is the unit of capacity and is called a liter. A liter of water weighs a kilogram, and a cubic centimeter a gram.

All other units are decimal subdivisions or multiples of these units, the meter, the liter, and the gram.

The metric terms are formed by combining these words with the six numerical prefixes, three used as multiples from the Greek as, deka-meter, deka-liter, deka-gram, equivalent to 10 meters, 10 liters, 10 grams, and similarly hecto for 100 and kilo for 1,000.

For the submultiples the Latin terms deci for tenth, centi for hundredth, and milli for thousandth are used.

As our mile, the unit for great distance, is used instead of rods or furlongs, so 1,000 meters or the kilometer, equal to about five-eighths of a mile, is used in metric countries for distance, and 1,000 grams, or the kilogram, for weight, equal to about $2\frac{1}{5}$ pounds avoirdupois; and for capacity, both liquid and dry measure, a liter, falling between our liquid and dry quarts.

Now, as regards a little more of the history of the metric system: In 1861 the old federation of German States instructed a commission to propose a national system of weights and measures, and after deliberating they said to the federation:

> The only thing that would justify the upsetting of the old measures, which were very confusing in Germany at the time—the only reason for disturbing people and introducing new weights and measures would be to have an international system.

At that time the metric system was not as widely introduced as now, and the commission very carefully went into the question whether they should adopt the English or the French system.

Great Britain and her colonies and the United States all had the English system, and this commission, consisting of sensible men, might have decided "we will go with the majority of the manufacturing people and adopt their weights and measures," but when they saw the English weights and measures and went into them they shuddered and unanimously concluded that the metric system was the only possible international system.

The same justification is applicable to the United States to-day.

As stated above, starting with France, the metric system has been adopted by nation after nation until practically the whole civilized world, save ourselves and Great Britain and her colonies, have adopted it and are using it.

And, like ourselves, other nations are so interested in it that 22 nations, the majority of which have adopted the system, sent delegates to the last general conference and support the international bureau, as follows:

The United States, Great Britain, Germany, Russia, France, Austria-Hungary, Belgium, Argentina, Spain, Italy, Mexico, Peru, Por-

tugal, Roumania, Servia, Sweden, Norway, Switzerland, Venezuela, Japan, Denmark, Chile, Uruguay, and Siam.

All these countries have received copies of the metric standards maintained at the international bureau, those of the United States being now carefully maintained in a vault at the Bureau of Standards, Washington.

Following the legalization of the metric system here in 1866 the metric standards became by law in 1893 our fundamental standards, and copies of these standards have been distributed to all the States.

The metric system was made obligatory in Porto Rico in 1899 and made legal in the Philippines in 1901. The United States has already adopted it for many purposes. Foreign postal rates are fixed in metric units and the early limit of 11 pounds for the parcel post was based on the foreign equivalent, or 5 kilograms.

It is used in the scientific investigations of the Government and is required in the medical work of the War and Navy Departments and the United States Public Health Service.

In 1904 Congress adopted the international electric units based on the metric system as the legal units of electrical measures in the United States.

In July, 1913, the metric carat of 200 milligrams, adopted by the jewelers and dealers in precious stones, went into effect, and the Secretary of the Treasury issued an order to all collectors of customs recognizing the new standard as the official standard of the United States.

This additional action of the United States Government in conforming our standards to the metric units of the other nations of the world shows that the metric system is increasing in usefulness in harmonizing the weights and measures of the world.

In a most interesting paper in the April number of the Popular Science Monthly on "Recent developments in weights and measures in the United States" your secretary, Mr. Fischer, says:

> The founders of our Government evidently realized the necessity of uniform standards or they would hardly have provided for it in the Constitution in the same clause that gives Congress the power to coin money and to regulate the value thereof. Under that authority the Government coins all money, and enforces the severest penalties for counterfeiting. On the other hand, it has enacted practically no weights and measures legislation, but has left the question entirely to the States. Even the pound, yard, gallon, and bushel in common use have never been adopted by Congress, but owe their use to the fact that the Government uses them in the collection of revenue and to the fact that they have voluntarily been adopted by the States.

This state of affairs is generally not realized by the public.

Just as was the national food and drugs law necessary to harmonize and make effective legislation on food and drugs so is there a necessity for a national weights and measures law, and when that law is enacted the National Wholesale Grocers' Association of the United States believes the system of weights and measures enacted into the law of the land should be the international metric system in simplification, not only of our international transactions, now grown so enormous, but of our wonderful interstate commerce, where the amount of time, labor, and annoyance saved would be almost incalculable.

Strictly speaking, we are at the present time not in accord with any country in the world, our capacity measures being entirely different from those in use in Great Britain and her colonies, including Canada.

The National Wholesale Grocers' Association of the United States does not want to see repeated the late failure to enact Federal legislation on the metric system, due largely, we believe, to unfamiliarity with the subject by our citizens reflected in many views expressed by their legislators at the time.

We are endeavoring, therefore, to conduct a campaign of education on this subject that shall cover not only the wholesale grocer and the retail grocer, but the ultimate consumer; and we believe that where the metric system equivalents are used in compliance with food inspection decision No. 154, it will greatly aid in educating the ultimate consumer with regard to the metric system in the millions of homes where every package of every kind of food is closely inspected.

Resolutions favoring this campaign have been passed in many State association meetings of grocers, including Pennsylvania, New Jersey, Delaware, West Virginia, Ohio, Indiana, Illinois, Iowa, Missouri, Kansas, and Nebraska. Various scientific bodies, including the American Metrological Society, have passed resolutions favorable to the adoption of the metric system; speeches have been made on the metric system; books have been written on the metric system, the mere bibliography of which would make a respectable volume in itself; but the National Wholesale Grocers' Association of the United States is the first great trade organization to come forward and advocate the needed reform in our weights and measures system by striking at the root of the trouble and advocate the adoption of the simplest system known, the metric system. There have been protests by a portion of the machinery trade and a portion of the textile industry, but these objections have been met in other countries and will be more easily met in our own country.

Opposition to any reform is not unusual, and the adoption of the metric system would work some temporary hardships and cause some necessary expense, but the advantages gained would far outweigh the temporary annoyances endured. And what a glorious thing it would be if this were to be brought about by 1916, the fiftieth anniversary of its legalization by the Thirty-ninth Congress in 1866.

If all the friends of the metric system would join hands in a publicity campaign setting forth the merits of the reform, it could be done; and you, gentlemen, coming from most of the States of the Union, are in a position to do more to bring this about than any other class of citizens who occupy positions under the Federal Government or the States.

And if all officials and organizations were to give the encouragement your organization has, the metric system would be far on the road to success, if not an accomplished fact by that time.

Again I thank you for your invitation to be here and for your kind attention to my remarks.

APPOINTMENT OF COMMITTEE ON RESOLUTIONS.

The SECRETARY. Mr. Chairman, before we adjourn I would like to move that the chairman be authorized and directed to appoint a committee on resolutions. I think we ought to have that committee working. I make that motion.

(The motion was seconded and agreed to.)

The PRESIDENT. That committee will consist of Messrs. Henry, Van Duyn, and Sherman.

(Thereupon, at 12.15 p. m., a recess was taken for luncheon.)

SECOND SESSION (AFTERNOON OF TUESDAY, MAY 26, 1914).

The conference reassembled at 2 p. m.

The PRESIDENT. The first paper of the afternoon will be by Mr. Neale, of Minnesota, "Demonstration showing the necessity of maintaining scale levers level and lever connections plumb."

DEMONSTRATION SHOWING THE NECESSITY OF MAINTAINING SCALE LEVERS LEVEL AND THE LEVER CONNECTIONS PLUMB.

By C. C. NEALE, *Commissioner of Weights and Measures for Minnesota.*

Mr. Chairman and gentlemen of the convention, this series of experiments is not an effort to teach new principles or to advance new theories pertaining to weighing machines, but it is intended to present in simple and diagrammatic form certain phenomena having a direct relation to practical scalework.

The apparatus used is made up of an ordinary 5-ton wagon scale beam A, ratio 10 to 1, coupled by means of a beam rod B to an intermediate lever C, ratio 2 to 1, said intermediate lever being fulcrumed by the rod D and being coupled by a connection E to an even arm lever F, from the opposite end of which depends a pan to receive the load of 50 pounds applied for loaded condition. (Cut I.)

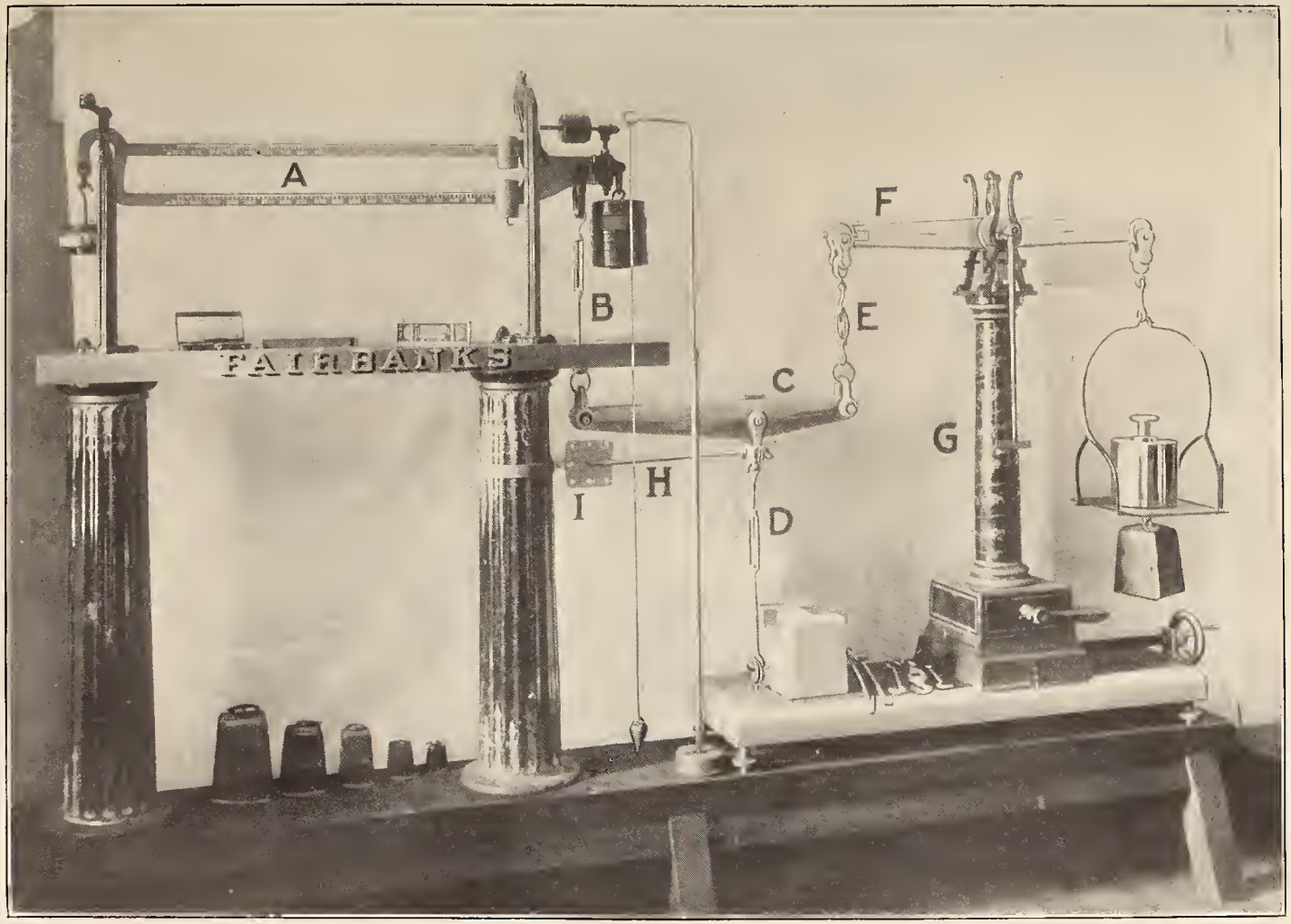
The lever F is mounted on a horizontally movable pedestal G, the mobility of said pedestal making it possible to cause a derangement of the connection E, as to plumb line. The horizontal rod H is used in connection with this movable pedestal to cause a general derangement as to plumb line of the connections B and E, one end of this rod H being formed to insert in the various holes in the plate I.

In making these experiments the beam A and the lever F are maintained in a level condition at all times, the intentional derangement for experiment being confined to the intermediate lever C and the connections B and D.

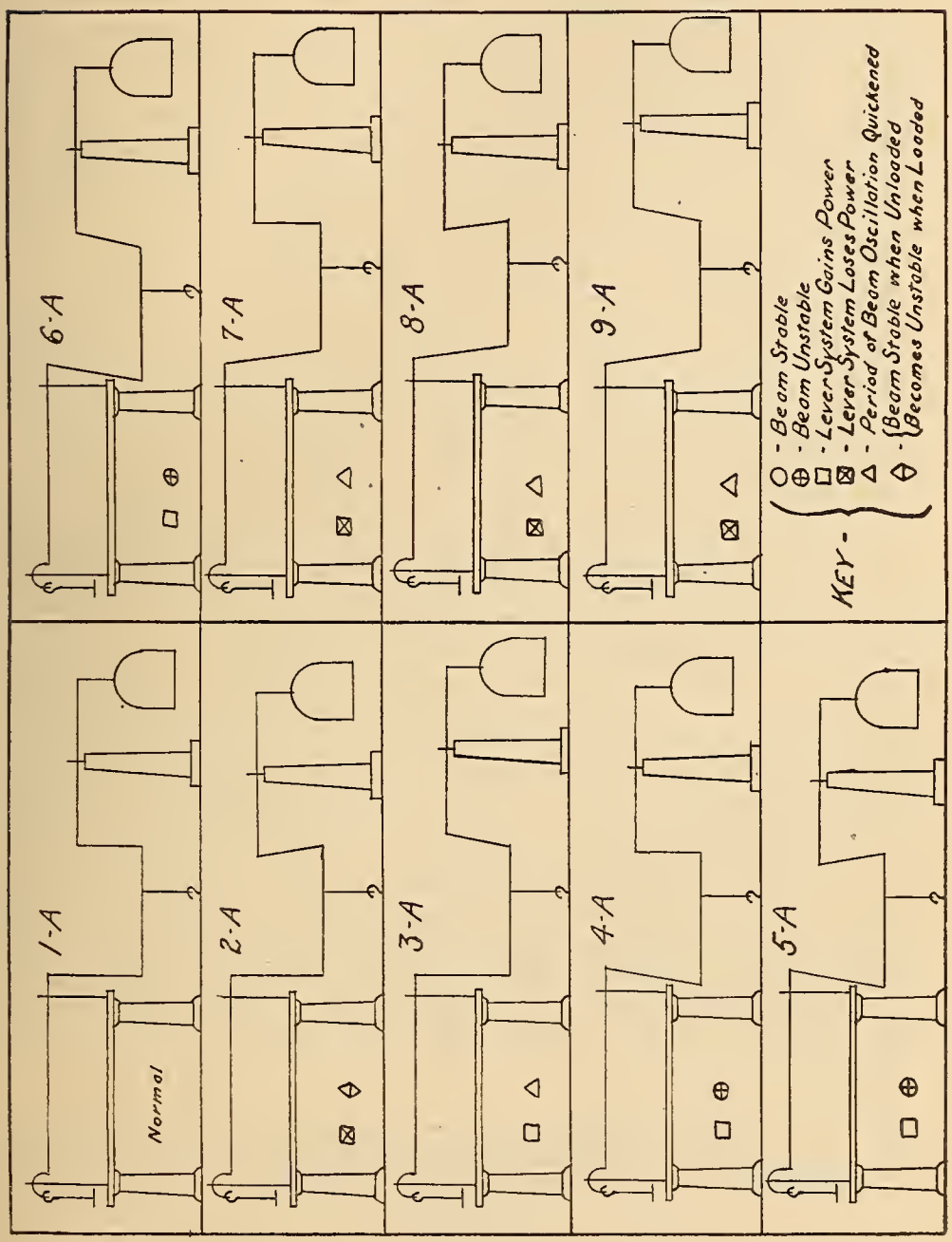
When the lever C is level it is possible to make nine different combinations, relating to plumb or out-of-plumb conditions, with the connections B and E, as shown by the diagrams in Cut II.

By deranging the level of the intermediate lever C, for instance, by raising the short-arm end or by lowering the long-arm end, as the case may be, it is possible to make nine different combinations, relating to out-of-level, plumb, or out-of-plumb conditions of the lever C, and the connections B and E, respectively, as shown by the diagrams in Cut III.

By throwing the lever C out of level in the opposite direction from the foregoing example—that this, by lowering the short-arm end or by raising the long-arm end, as the case may be—we find that it is possible to obtain nine different combinations, relating to out-of-level, plumb, or out-of-plumb conditions of the lever C and the connections B and E, respectively, as shown by the diagrams in Cut IV.



Cut I.


1-A
Normal
2-A
3-A
4-A
5-A
6-A
7-A
8-A
9-A
KEY -
○ - Beam Stable
⊕ □ - Beam Unstable
⊠ - Lever System Gains Power
△ - Lever System Loses Power
◇ - Period of Beam Oscillation Quickened
{ Beam Stable when Unloaded
{ Becomes Unstable when Loaded

CUT II.

Hence we find that with an intermediate connecting lever and its two connecting rods it is possible to make 26 combinations, varying from normal, or 27 in all, counting in the normal condition when all levers are level and all connections plumb.

However, only one degree of derangement has been considered in each case; that is, the infinite number of combinations possible to be made by varying the angle of the lever or its connections in their respective derangements has not been taken into account, only one angle or degree of derangement having been considered in each case. Further, the experiments have been only extended to those derangements of the intermediate lever and the connections thereof effected in a vertical plane with the beam A, any of the possible effects produced when lever connections are out of plumb or when the intermediate lever is out of alignment in any direction outside of said plane, not being treated in this particular experimental series.

The particular apparatus used is of a nature that somewhat approximates the stress on the intermediate lever C and the beam A that would actually exist in using a 5-ton wagon scale when loaded to about one-third capacity, and since the experiments were intended to treat of actual scale conditions as they are found in the field, it was thought best to use such an apparatus which might be called a "derangement device," rather than an arrangement of finer detail.

The results arrived at are purely qualitative and not quantitative, as it would serve no purpose to record the amount of variation from standard in this particular system of levers, since the amount of variation from standard would be variable, depending upon the construction or arrangement of various lever systems.

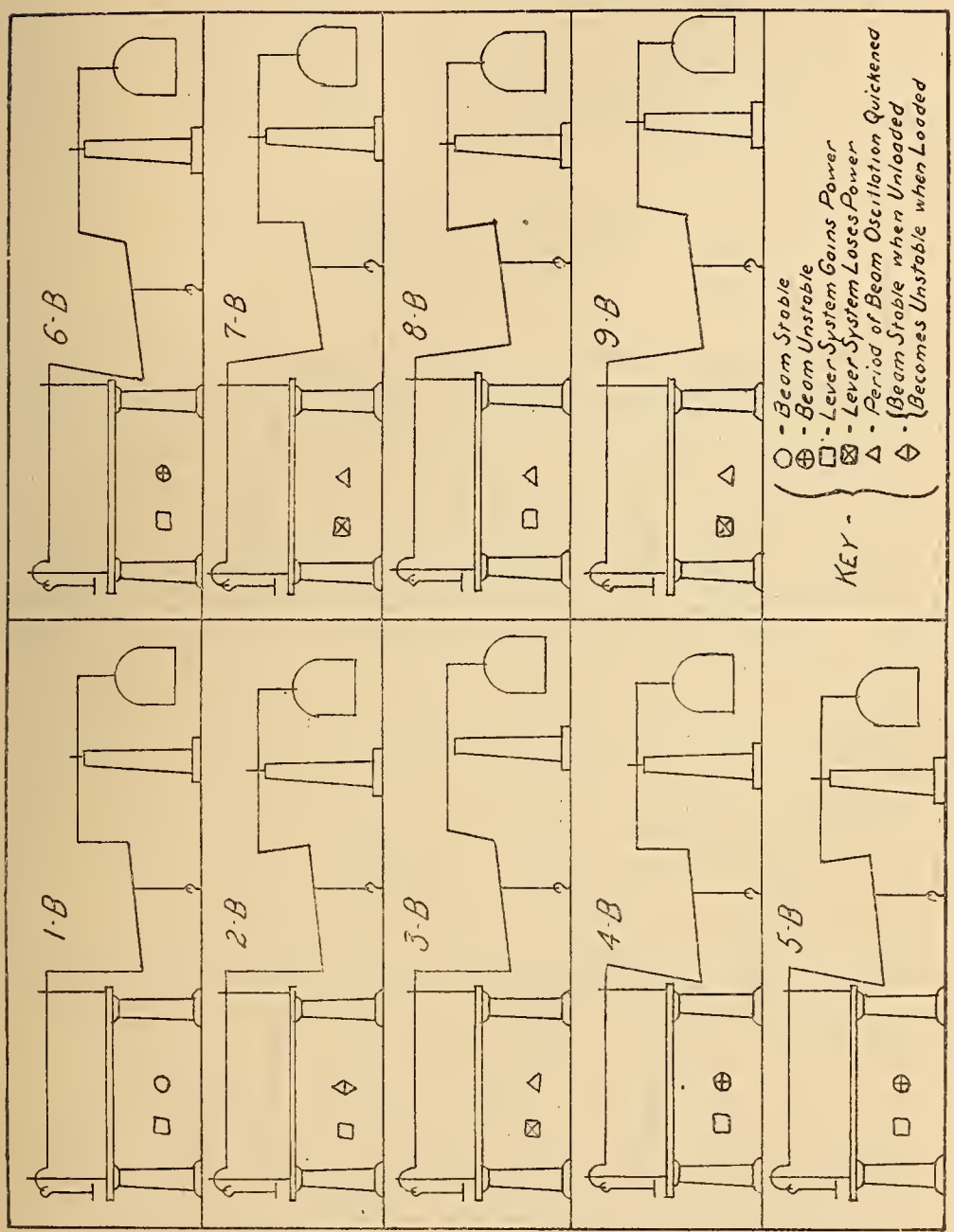
It was not the purpose on this occasion to go into a lengthy discussion as to the reasons for the effects produced by the various derangements, but I believe that the demonstration plainly shows the necessity on the part of scale inspector or scale expert of keeping all levers level and all lever connections plumb, thereby giving a weighing machine a fair chance to perform its functions under proper conditions, as was intended by the manufacturer. When derangements from normal conditions, as to levers and lever connections in a scale, admittedly cause variation from standard in weighing results, the remedy is determined, and the conscientious and diligent scale inspector or expert will aim to correct the faulty conditions treated of herein, rather than attempt to make adjustments by changing the lengths of the lever arms themselves, which in the great majority of cases simply means the application of a wrong remedy.

Gentlemen, I thank you.

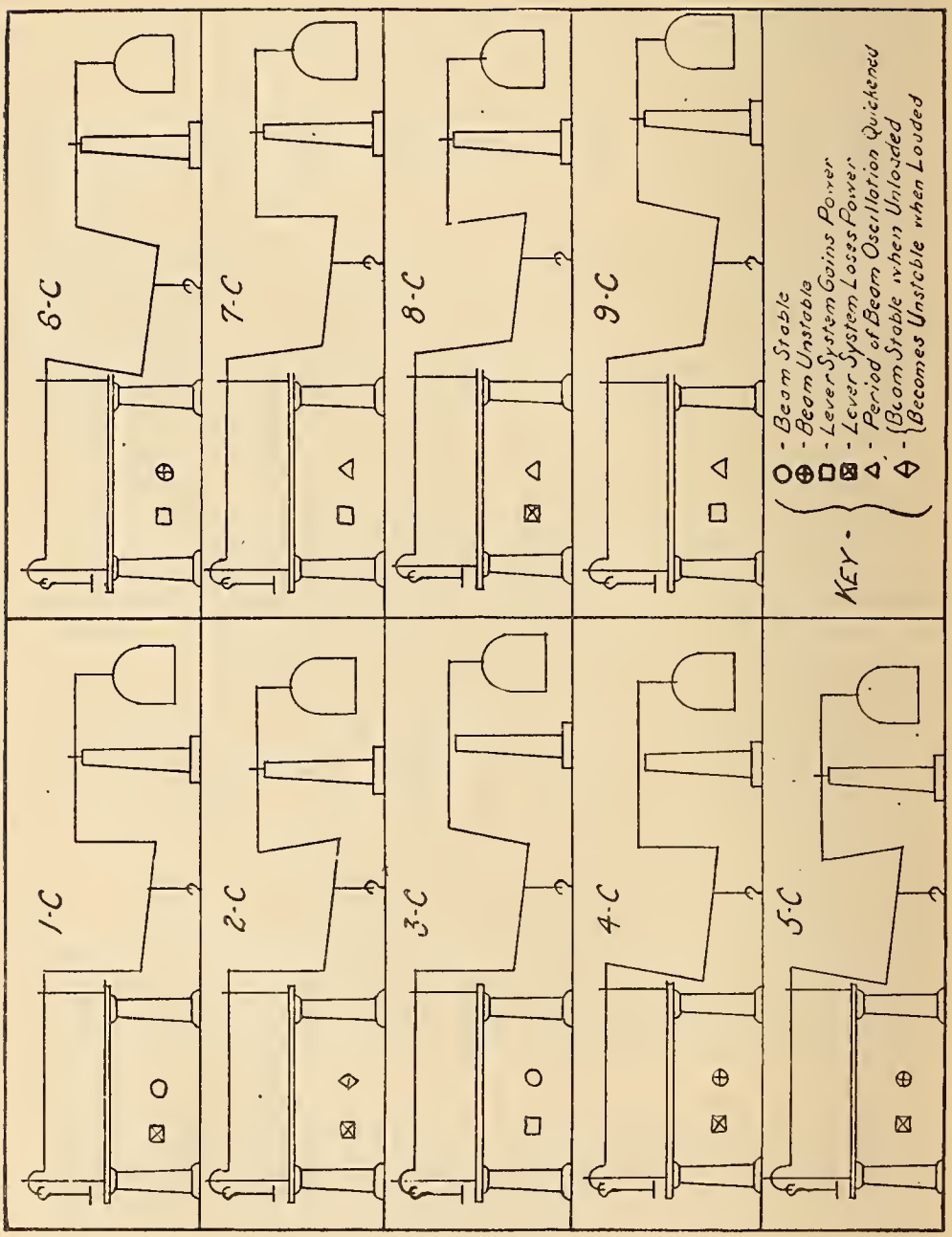
NOTE.—The effects produced by the various combinations shown on the following pages are indicated by the signs on each drawing, which signs are explained in the key shown in the lower right-hand corner of each cut.

DISCUSSION.

The PRESIDENT. You have heard this most excellent demonstration of Mr. Neale's. I have no doubt that Mr. Briggs or Mr. Ferner, of the bureau, would show you very nicely how the lever arm is changed, and so on, but I think a demonstration of this kind is much more effective and brings it home much more forcibly and quickly than could be done in the other way.


1-B
2-B
3-B
4-B
5-B
6-B
7-B
8-B
9-B
KEY -
○ - Beam Stable
⊕ - Beam Unstable
□ - Lever System Gains Power
⊠ - Lever System Loses Power
△ - Period of Beam Oscillation Quickened
◇ - Beam Stable when Unloaded
Becomes Unstable when Loaded

CUT III.


1-C
2-C
3-C
4-C
5-C
6-C
7-C
8-C
9-C
KEY -
- Beam Stable
- Beam Unstable
- Lever System Gains Power
- Lever System Loses Power
- Period of Beam Oscillation Quickened
- {Beam Stable when Unloaded
{Becomes Unstable when Loaded

CUT IV.

Are there any questions?

Mr. Briggs. Mr. Chairman, I think it is only due to Mr. Neale to testify as to the efficiency of his machine for demonstrating certain features. He has referred to it as being arranged from the standpoint of the practical man, but for a machine designed to show certain effects I can not conceive of a machine that could be designed more simply or more effectively to bring out the essential points he has in mind; and as Mr. Neale has been rather apologetic in presenting the apparatus and in speaking of it as designed only from a practical standpoint, I think it is due to him to testify as to the completeness of it from a standpoint that he would regard perhaps as an engineering standpoint or a more scientific standpoint.

CREAMERY, PRESCRIPTION, AND JEWELERS' WEIGHING AND MEASURING APPLIANCES.

By F. P. Downing, *Chief Inspector of Weights and Measures of Wisconsin.*

On first thought it appears to be a rather odd method of procedure to group together the weighing and measuring appliances used in such diversified lines of business as the testing of cream, the dispensing of prescriptions, or the weighing of gold, silver, and precious stones. In each case, however, the balances and graduated measures used are quite similar in construction and design. As a rule sealers of weights and measures have neglected to test the appliances found in these establishments. Reasons for such neglect may be due possibly to lack of time, to lack of proper understanding of the appliances found in such places, and to lack of proper equipment. There is perhaps another reason why prescription scales and graduates in drug stores have not been tested. Many sealers, as well as other people, share in the common opinion that scales and weights used in dispensing poison and expensive drugs are accurate and that there is slight need of testing the same. The druggist is assumed to have an expert knowledge of the weighing and measuring appliances he uses and to keep in his possession only standard weights and measures. A brief examination of the accompanying table will quickly dispel any such ideas and show that there is as great a need for testing the weights and measures in drug stores as there is for doing this work in groceries and meat markets. Not only is the relative proportion of inaccurate to accurate weights very high, but the percentage error on individual weights is much greater than that usually shown in reports of inaccuracies of weights and measures used by grocers and butchers. In a number of instances errors amounting to from 30 to 40 per cent have been reported.

The table alluded to shows the work done in drug stores of Milwaukee by a thoroughly competent special deputy sealer of weights and measures for a period of three months. Similar conditions to those in Milwaukee have been found throughout the State, and no doubt exist everywhere in the United States where sealers have not recently tested such weights, scales, and graduates.

Investigation of prescription balances, weights, and graduates, city of Milwaukee, months of February, March, and April, 1914.

SCALES.

Scales in use passed		123
Scales in use adjusted		2
Scales in use condemned		33
Total scales inspected		158

Percentage found in error, 22.1.

WEIGHTS.

Weights in use passed	2,041	
Weights in use adjusted	455	
Weights in use condemned	1,125	
Total weights in use inspected		3,621

Percentage of weights in use found in error, 43.6.

New weights passed	446	
New weights adjusted	165	
New weights condemned	26	
Total new weights inspected		637

Percentage of new weights found in error, 30.

Total weights inspected	4,258

Percentage of all weights found in error, 41.8.

GRADUATES.

Graduates in use passed	512	
Graduates in use condemned	419	
Total graduates in use inspected		931

Percentage of graduates in use in error, 45.

New graduates passed	320	
New graduates in error	30	
Total new graduates inspected		350

Percentage of new graduates in error, 8.5.

Total graduates inspected	1,281

Percentage of all graduates found in error, 35.

BOTTLES.

Total bottles inspected, 59.
Percentage found to be short, 23.7.
Maximum shortage, 20.8 per cent.
Percentage found to be over, 10.2.
Maximum overage, 5 per cent.

What has been said with regard to the scales and weights used by the druggists applies with no less force to the scales and weights found in creameries and in jewelry establishments. In Wisconsin the creameries of the State have been using types of cream-test scales that are not at all fitted to the weighing of 9 and 18 gram samples of cream. In many of the jewelry stores cheap, inaccurate beam balances are used in weighing gold and silver. The jeweler will invariably tell you that he only weighs gold and silver on these balances, with the emphasis placed on the "only." It is to be presumed that he implies by this that the value of gold is very small when com-

pared to the value of some of our precious stones, notably the emerald, diamond, and ruby.

About a year ago in a dental-supply house in Wisconsin an entire set of troy weights in use were found to be light. In some instances the shortage on individual weights was in excess of 2 grains. The market price of platinum being about 12 cents a grain, the loss to purchasers due to the use of this set of weights amounted to a large sum in the course of a year.

Even in weighing precious stones, jewelers are frequently grossly careless and use scales that are not accurate. A short time ago a diamond was reweighed in a jewelry store in Wisconsin that was marked 1.05 carats. This stone was valued at $300. On an accurate scale and with accurate weights the diamond was found to weigh but 1.01 carats. The difference in weight of 0.04 of a carat made a difference in value of approximately $12. The error was due to the use of a scale that was not in balance and that was not sufficiently sensitive.

The necessity for testing the above weights and measures being apparent, it remains to suggest the methods and means whereby such tests can be made. Contrary to the general impression, it is a comparatively easy matter to test both the weighing machines and graduated flasks. It must be borne in mind, however, that we are dealing with appliances used in weighing or measuring small quantities, and great care must be exercised in testing the same. In discussing the subject the question of the proper types of balances used naturally is first to suggest itself. A balance is a machine devised to record the measure of the earth's attraction for bodies on or near its surface in terms of some known standard. The mechanical principles upon which balances and other weighing machines are based are various, but in general they all have one characteristic in common, that of opposing the force of gravity which acts upon the body with some resistance, the amount of which can be determined or expressed in units of accepted standard. Roughly speaking, the different types of scales used can be divided into two classes: First, those possessing movable pivots; second, those possessing fixed pivots and commonly known as torsion balances. A very common type of the first class is the beam balance with hanging pans. Many varieties of balances are now on the market. In general they may be said to consist of the following parts: Metallic beam, knife-edges and bearings, scale pans and hangers, arrestment, pointer or index, gravity bob, pillar, and adjusting screws. The beam is ordinarily made of steel, brass, aluminum, or various alloys of aluminum, with other metals such as nickel and copper. Owing to the character of the articles to be weighed and the need of great sensitiveness it should be made as light as possible, consistent with the property of rigidity. The knife edges are almost invariably made of steel. The bearings are either steel or agate. Agate is to be preferred, owing to its superior resistance in corrosion. Scale pans are made of brass, usually coated with lacquer or nickel, of glass, horn, and other substances. The arrestment is a device for lifting the knife edges off the bearings when the scale is not in use or while weights are being placed upon the pans. The pointer enables a close weighing to be made. A gravity bob is frequently placed upon the pointer and is used to increase or decrease the sensibility of the balance. The pillar supports the beam and

other parts. The adjusting screws are used to bring the scale into balance.

The important factors to be considered in the manufacture of balances are sensitiveness, accuracy, constancy, and speed. A balance in which a perceptible or appreciable movement of the beam is noticeable when a small weight is placed on one of the loaded pans is said to be sensitive. The degree of sensitiveness that a balance should possess depends upon the use to which the same is to be put. Some of the finer analytical balances are sensitive to 1 part in 1,000,000. This, of course, is not necessary in balances used for ordinary prescription work. A range in sensitiveness of from 1 part in 5,000 to 1 part in 10,000 makes a balance that is sufficiently delicate for ordinary prescription purposes. Owing to the wide latitude followed by scale manufacturers and sealers of weights and measures in their interpretation of the term "sensitiveness," the Bureau of Standards has recommended the use of the term "sensibility reciprocal." In beam scales the sensibility reciprocal is the weight required to cause a change in the point of rest of the pointer equal to one scale division.

The sensibility of a balance is directly proportional to the length of the beam and inversely proportional to the weight of the beam and to the distance between the fulcrum of the balance and its center of gravity. The exact meaning of this statement can be readily demonstrated by means of the model balance, the essential features of which are shown in Figure V. This model consists of a wooden beam to which is securely fastened a long, slender pointer or indicator that plays over a graduated scale. A movable plumb bob or weight B is fastened to the pointer. The fulcrum pivot F is midway between the two end pivots, from which are suspended the loads P and L. Each arm of the beam is divided into six equal parts by means of pins or pegs, from which pans can be suspended.

With the scale in perfect balance—that is, with the indicator pointing at zero—a load of 5 grams is placed at L. The indicator then comes to rest eight divisions to the left of the zero point on the graduated scale. If the length of the arms of the balance is now decreased one-half by suspending the pans from the pegs indicated by 3, the scale balanced and the 5-gram weight placed in the pan to the right, the indicator will no longer come to rest at the eighth, but at the fourth division. This goes to show that the longer the beam the more sensitive the balance.

To show that the sensibility of the balance varies inversely with the weight of the beam, a metallic disk about three-fourths of an inch in diameter, with an opening or axis through the center, is made use of. We will infer that the center of gravity of the beam is at the point indicated by the figure g', through which a peg projects. If we place the metallic disk upon this peg, we have increased the weight of the beam without disturbing its center of gravity. In the previous experiment we noted that when 5 grams were placed on the pan L the pointer moved eight divisions. With the metallic disk placed on the beam at g', 5 grams will no longer move the pointer to the eighth division of the scale, but bring it to rest very close to the seventh division. Were a heavier disk to be used, the indicator would come to rest still farther to the right. This experiment shows that increasing the weight of the beam decreases the sensitiveness of the balance.

To show that the sensitiveness of the balance varies inversely with the distance of the center of gravity from the fulcrum, use is made of the movable plumb bob B. With the plumb bob at B the center of gravity of the balance lies directly below the fulcrum at the point *g*. By placing a load of 5 grams at L, the pointer moves to the left and comes to rest at the eighth graduation. If the plumb bob is now lowered from B to the dotted lines indicated by B′, the center of gravity of the balance has been correspondingly lowered. Instead of being at *g* it is now dropped to *g′*; that is, the distance between F and the center of gravity has been increased. If a load of 5 grams is now placed at L, the indicator comes to rest not at the eighth graduation as in the previous case, but at the fifth graduation. Were the plumb bob to be lowered still more, the indicator would come to rest at a point still nearer the zero of the scale, thus proving that the sensitiveness of the scale becomes less as the distance from the fulcrum to the center of gravity of the beam.

Inasmuch as there are limits to which the length of the arms of the beam can be increased we can not go on indefinitely increasing the sensitiveness of a balance by lengthening the distance between the fulcrum and the end pivots. Again, the longer the arms of a balance the slower its action becomes.

In balance construction the beam is frequently made with arms that are comparatively short, the sensitiveness being increased by introducing a long pointer or indicator. In Figure V, for example, if the pointer was twice as long and the graduated scale lowered proportionately, the balance would be more sensitive. If the pointer was shortened to one-half the length indicated in Figure V and the graduated scale raised proportionately the balance would become less sensitive.

In addition to the foregoing the sensitiveness of a balance varies when the knife-edges are not in the same plane, the sensitiveness being decreased by raising the fulcrum or central pivot above the line joining the two other pivots and increased by dropping the fulcrum below this line.

My understanding can be made clearer by referring to Figures I, II, and III. In Figure I the fulcrum F and end pivots P and L lie in the same plane, and let it be assumed that the center of gravity of the beam without the pan or load is directly below and very close to the fulcrum pivot F. If equal loads are placed on the pans the weight of the load may be considered as being centered at the knife-edges P and L. These knife-edges being in the same plane with F the center of gravity of the pans and load will be at the same point as the center of gravity of the beam. In Figure II, in which the end knife-edges are below the horizontal plane in which the fulcrum pivot lies, this is not the case. The center of gravity of the beam is at or immediately below the fulcrum F. The center of gravity of the pans and load is midway between the knife-edges P and L and directly below the fulcrum F at the point *x*. Being lower than the center of gravity of the beam alone the center of gravity of the entire system, including beam, pans, and load, will lie somewhere between the point F and *x*. In other words, the distance between the fulcrum pivot and the center of gravity of the balance has been lowered by dropping the end knife-edges. This will make the balance less sensitive. In Figure III we have the opposite effect. Here the load acts

as though it were centered at the end knife-edges P and L, which lie in a horizontal plane above the fulcrum F. The center of gravity of

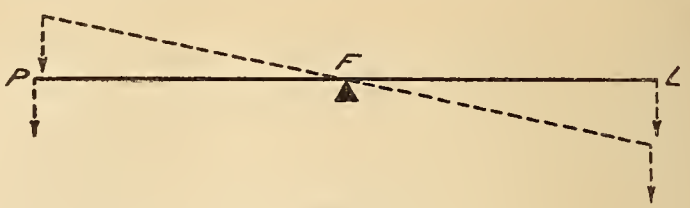


FIG. I.

the pans and equal loads contained therein lies at the point x' directly above the fulcrum. The tendency here is to raise the center of gravity of the balance to a point somewhere between the fulcrum F

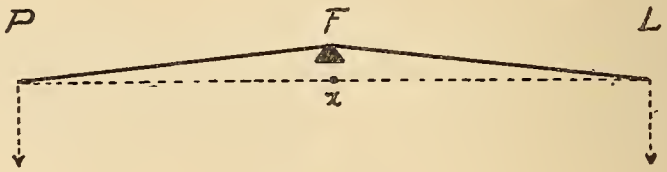


FIG. II.

and the point x'. A balance so constructed with the center of gravity above the fulcrum will be in unstable equilibrium. It is an accelerating balance and will not vibrate. The pointer of the balance will

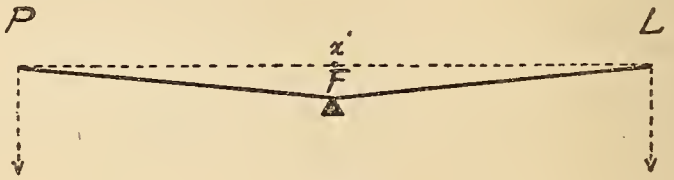


FIG. III.

move either to the right or left of the zero and remain there. Had the center of gravity of the beam itself been a considerable distance below F, we might still have a vibrating balance by raising the end

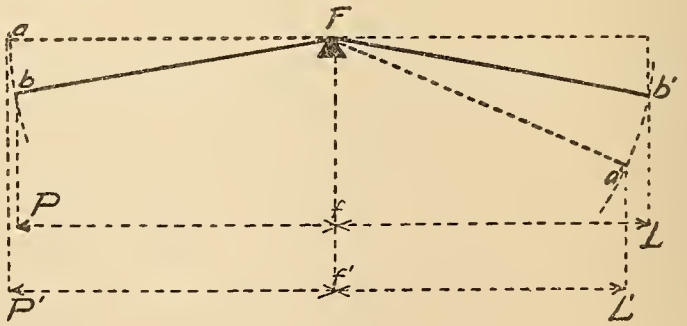


FIG. IV.

knife-edges. This would be the case if the center of gravity of the beam, load, and pans in the position shown in Figure II still fell below the fulcrum pivot.

In Figure I the sensitiveness of the balance is independent of the load in the pans. In Figures II and III the sensitiveness is not a constant factor and varies with the weight in the pans.

When the three knife-edges of the balance do not lie in the same plane the constancy of the balance is affected. This can be made clear by referring to Figure IV. The normal position of the balance at rest is shown by the position of the lever b F b'. When a load is placed on the pan L the balance is deflected to the position shown by the dotted lines a F a'. The weight distance of a balance being the perpendicular distance from the fulcrum to the line of action of the weight, the power distance being the perpendicular distance from the fulcrum to the line or action of the power, Figure IV shows that there has been a change in leverage produced by the tilting of the balance. When in the normal position at rest P f equals L f. When the balance is tilted the distance P f is increased

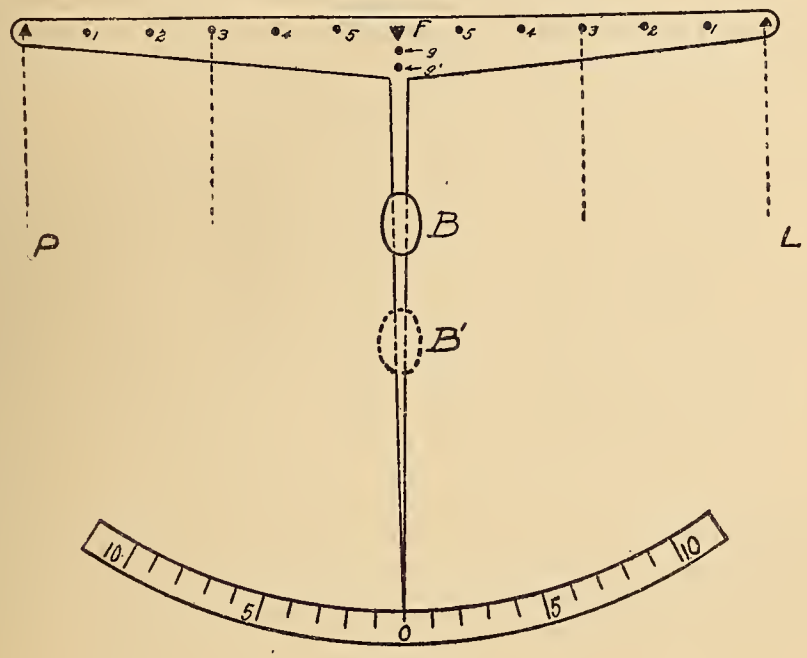


FIG. V.

as shown by the line P′ f', and the distance L f is decreased as shown by the line L′ f'. In other words, the balance in the inclined position is no longer an equal arm balance, a greater load being required to keep the scale in balance when the weight arm of the lever is moved from the point b' to the point a'. This condition of affairs may exist in a beam balance if heavier loads are placed upon the beam so as to produce a deflection or bending of the lever.

Another very common type of scale is constructed on what is known as the Roberval principle. Druggist trip scales, box prescription balances, overhead pan cream scales, and moisture scales are examples of this type. To make a scale of this sort of a sufficient degree of accuracy the pan supports must be at right angles to the beam and to the connecting rods placed beneath the base of the scale. Any deviation from the principle of the parallelogram will result in a variation of weight on different parts of the pan. Scales of this type can for many purposes be more conveniently used than

equal arm balances that have the scale pans suspended from the beam, but they have the disqualification of not being as sensitive, hence they can be used only for what is known as rougher weighing. In Wisconsin many scales of this type used in weighing cream have been condemned. In drug stores many prescription balances of this type are not sufficiently sensitive for the weighing of small loads. In general it is recommended that for prescription work druggists should be provided with two balances, one used in weighing loads up to 30 grains. This scale should respond to a change in weight amounting to 2 or 3 milligrams. The other balance should be used for weighing loads of from 30 grains to 2 or 3 ounces and should be sensitive to at least one-half grain.

A very common type of balance used both in drug stores and creameries is what is known as the torsion balance. Torsion counter scales, torsion prescription balances, torsion cream and moisture scales, and torsion chemical balances are examples of this type. Torsion balances possess no knife-edges. The action of the balance is based upon the resistance offered to the load by the torsion or twist of steel bands stretched upon frames or trusses. Early attempts in the manufacture of this type of scale were unsuccessful owing to the fact that when the bands were stretched the elasticity of the steel wires or bands destroyed the sensitiveness of the balance. This difficulty was overcome by making the balance top-heavy; that is, by raising its center of gravity above the point of support of the beam. Many forms of torsion balances are in commercial use. In its essential parts a torsion balance consists of three frames or trusses, each of which has a steel band tightly stretched about it. The three trusses are connected by means of an upper and lower beam which are fastened to the steel bands of each truss. The pan supports are fastened to the upper beam directly above the two end trusses. The lower wire of the middle truss, which is fastened to two supports, acts as a pivot for the whole balance. The sensibility of such balances is usually affected by placing a movable iron weight directly above the central pivot or by placing two movable weights, one on either side of the central pivot or the lower beam. Much care must be exercised in adjusting such weights. By raising the weight too far the balance becomes top-heavy or oversensitive and the pointer or indicator will not return to the zero mark. This is one of the defects found in what is known as the 12-bottle torsion cream balance that has been in very common use in creameries.

Weights.—It is fully as important that the weights used by druggists, jewelers, and dairymen be correct as it is that the scales be sufficiently sensitive and accurate. In drug stores both metric and apothecary weights are in use. When doctors prescribe in the metric system the druggist as a rule will use his set of metric weights. It has been found, however, in Wisconsin that by far the majority of doctors prescribe in the apothecary system, and hence metric weights are used but very little. Many apothecary weights, particularly those ranging from 10 grains down to one-half grain, have been found to be very inaccurate. These weights are frequently stamped from sheet metal and no effort made to adjust the same. Such weights are very cheap and likewise very inaccurate.

Errors in prescription weights are brought about by their constant exposure to the action of drugs and strong chemicals. Druggists

frequently polish their weights or clean the same with dilute acetic acid or ammonia. Each time this is done a portion of the metal is acted upon and the weight becomes correspondingly light. Inspectors in Wisconsin report instances of weights that have been used for periods of from 20 to 30 years in drug stores. It is not necessary to state that such weights have been found very inaccurate. In some cases the shortage is found to be as much as 40 per cent of the original value of the weight.

In the making of the Babcock test for cream, metric weights are used. If the operator is not careful, such weights frequently become covered with a mixture of dirt and butter fat and weigh heavy. The only weights used in weighing samples of cream at creameries are the 9 and 18 gram weights. In the making of the moisture test for butter a 10-gram weight is used.

In jewelry shops sets of troy and carat weights are found. Troy weights are frequently found in the form known as cup weights. This is undoubtedly done to distinguish such weights from those in the avoirdupois system. Troy weights are used in the weighing of the precious metals, such as gold and silver, whereas carat weights are used only in determining the size of precious stones. The latter system of weights should be very accurate, in other words; but small tolerances or variations should be permitted. In this connection attention must be called to the difference between what is known as the metric carat of 200 milligrams and the old United States carat which varied in weight from 205.3 to 205.5 milligrams. The new metric carat has been recognized by the Bureau of Standards since July 1, 1913. It is rapidly being adopted all over the country by jewelers. In making the change from the old carat to the metric many of the jewelers have only sent in the weights from 2 carats down to one sixty-fourth of a carat to be replaced by the new system. The larger weights, which are very seldom used, are still the old variety.

Various methods are in use for indicating the value of weights. Apothecary weights are designated by means of the symbols representing the ounce, dram, scruple, etc. Frequently the weights are designated by stamping the entire word on the side of the weight. The smaller weights are often designated by means of dots or numerals. In the case of what are known as rod weights the value is expressed or designated by the number of sides the weights possess.

Weights found in the above-mentioned places of business are made of brass, aluminum, platinum, and various alloys. Weights made of brass should be lacquered or plated with some material, like nickel, that resists corrosion. Aluminum is less subject to corrosion than brass, but being a very soft material it wears rapidly. Owing to its lightness it is especially adapted to the manufacture of small weights. Platinum makes an ideal material for weights. Its excessive cost, however, is prohibitive.

Specifications for Babcock glassware have been adopted in a number of States. On March 28, 1911, specifications for standard Babcock glassware were proposed and adopted at a meeting held in Washington, D. C. These specifications can be found in circular No. 9 of the Bureau of Standards. The specifications prescribed by the Wisconsin department of weights and measures follow very closely the specifications formulated by the bureau. The Wisconsin

law, however, does not permit the use of the 8 per cent milk test bottle or the 9-gram cream test bottle. These two types advocated at the conference in 1911 can not therefore be legally sealed in Wisconsin. One of the most important differences between the Wisconsin and the national specifications is the dimensions specified in the length of the graduated scale. The graduations should be approximately 1 millimeter apart. This necessitates the specifying of a definite length for the graduated neck and permitting certain tolerances both above and below to allow for reasonable variations in the diameter of the tubing. In reading the percentage of fat in milk the reading is made to the top of the meniscus. As the shape of the meniscus varies with the diameter of the tubing, errors result if the tubing is not uniform. The standard length for the graduated scale of milk-test bottles should be 75 millimeters. The bureau has specified a minimum length of graduated scale, but has failed to specify a maximum.

Graduated glassware.—We now come to a consideration of the various types of graduated bottles and containers used in creameries and drug stores. Considering first of all the glassware used in creameries it will be necessary to make a slight explanation of what is known as the Babcock method of testing milk and cream. In obtaining the percentage of milk fat the operator starts with a known volume or weight of the sample, places it in a graduated milk or cream bottle, treats it with sulphuric acid, and then, after centrifuging or whirling the bottle a definite period of time in a centrifuge, reads the percentage of fat directly from the graduated neck of the bottle. In the measuring of milk an 18-gram sample is taken. This can be arrived at with a sufficient degree of accuracy by taking a pipette of such a capacity that the same will deliver 17.5 cubic centimeters of milk. It has been found that a pipette which delivers 17.6 cubic centimeters of water will deliver 17.5 cubic centimeters of milk. Therefore in the testing of such pipettes the amount of water delivered should be taken into consideration. The graduated neck of both milk and cream bottles, when an 18-gram charge is taken, is made on the basis of 1 cubic centimeter for each 5 per cent marked on the neck. In the case of the 9-gram bottle, which, by the way, is not permitted under the laws of Wisconsin, each 10 per cent on the scale is represented by 1 cubic centimeter. The inventor of this test, Dr. Babcock, is opposed to the use of a 9-gram bottle, his contention being that there should be but one standard as the basis for the calibrating of the necks of the bottles. Babcock bottles can be readily tested by two accurate volumetric methods. The test can be made either with an accurate burette, preferably one of the capacity of 10 cubic centimeters graduated to one-twentieth cubic centimeter divisions, or by means of brass plummets. These brass plummets are so devised that the bottle can be tested at one-half and at full capacity. This method of testing is now followed almost entirely in the laboratory of the weights and measures department of Wisconsin. When many bottles are to be tested the use of plummets is a time saver. In testing Babcock bottles it is necessary to exercise great care. Allowance must be made for drainage. When plummets are used they must be carefully wiped after each test. The eye must be placed on a level with the meniscus. The bottom of the meniscus should be read. It is

best to use alcohol as the fluid for testing, inasmuch as it drains a great deal faster than water. Owing to the high coefficiency of expansion of alcohol it should not be allowed to come in contact with the heat of the hand during the testing; that is, the bottle should never be taken hold of at the base, but always at the top of the neck.

For further information concerning specifications for Babcock glassware reference can be made to a pamphlet issued by the Wisconsin department of weights and measures on March 3, 1914, pertaining to regulations relating to cream test scales and Babcock milk and cream test bottles and to circular No. 9 of the Bureau of Standards, relating to the testing of glass volumetric apparatus.

Graduated glassware can be tested either volumetrically or gravimetrically. For the calibration of standards used by sealers it is best to use the gravimetric method. For testing glassware in the field, however, this method is impossible, and volumetric methods should be followed. Glassware as calibrated by manufacturers is made either to contain a definite amount or to deliver the same. There will be a slight difference between the amount a graduate contains and the amount it delivers, owing to a slight film of the liquid adhering to the side of the vessel after the same has been poured. Reliable manufacturers of prescription graduates make graduates to deliver the specified quantity at a temperature of 15° C., which is the temperature prescribed by the United States Pharmacopœia. It has been found that there is not much uniformity among druggists or even among instructors in pharmaceutical schools with regard to the method of filling prescription graduates. Some pharmacists read to the bottom of the meniscus, some to the top, and some one-third of the distance between the top and bottom. It is becoming more and more common, however, to read the bottom of the meniscus.

In testing graduates the reading should always be the bottom of the meniscus. Numerous forms of glass graduates are on the market, practically all of which are provided with a pouring lip. Some of the graduates are cylindrical in form, others conical, and still others tumbler-shaped. In the more accurate varieties of graduates the graduations are etched in the glass. In the less accurate they are simply blown in the glass. The latter class of graduates should not be used for prescription work, it being practically impossible to make graduates of this type with a sufficient degree of accuracy. The most accurate type of graduates are cylindrical in form. These, however, are not used to any great extent, no doubt because of the difficulty in cleaning. In examining graduates a number of intermediate graduations, as well as the full capacity, should be tested. In making the test it is advisable to place the graduate on a level surface. The eye should always be placed in a line with the meniscus and attention must be given to the nature of the background used, a different reading being obtained when the graduate is placed before a white or a dark background. A clearer-cut reading can be obtained on a white background. The most reliable practice recommended by various volumetric works calls for the use of a rectangular slip of paper, half black and half white. This is placed directly back of the graduate to be tested, with the black surface at the bottom. The slip should be placed in such a position that the dividing line between the black and white will be from 2 to 3 millimeters below the menis-

cus. A very distinct and clear-cut reading can then be obtained. The specifications and tolerances advocated by the Wisconsin department of weights and measures in the testing of glass prescription graduates are given below. In drawing up these tolerances consideration was taken of the fact that such graduates were to be tested by volumetric methods. The tolerances are fairly liberal, so large, in fact, that no attention needs to be paid to the matter of temperature.

Commercial glass graduates and apothecary fluid measures—Specifications.—Glass graduates must be free from flaws or cracks.

The divisions shall not extend to the top and must be etched into the portion of the glass not otherwise marked.

The graduation markings shall be at right angles to the longitudinal axis and shall not exceed one sixty-fourth of an inch in width.

Glass graduates shall have a lip or be flared to facilitate pouring.

Glass graduates are tested as pouring measures.

The following errors are allowable (readings made to the bottom of the meniscus):

Measures.	Tolerances.
1 quart	1½ drams or 90 minims.
1 pint	1 dram or 60 minims.
½ pint	½ dram or 30 minims.
1 gill	¼ dram or 15 minims.
2 fluid ounces	9 minims.
1 fluid ounce	6 minims.
½ fluid ounce or 4 drams	3 minims.
1 dram	1 minim.
1 liter	100 minims.
½ liter	60 minims.
¼ liter	30 minims.
100 cubic centimeters	12 minims.
50 cubic centimeters	6 minims.
25 cubic centimeters	4 minims.
10 cubic centimeters	2 minims.
5 cubic centimeters	1 minim.

In addition to the specifications above the following regulations are being investigated and, if found practicable, will be adopted:

The material shall be of good quality glass, clear, transparent, of uniform but not excessive thickness, and free from striæ.

The greatest inside diameter of conical commercial graduates must not be more than one-half the graduated length.

The greatest inside diameter of cylindrical commercial graduates must not be more than one-third the graduated length.

Sealer's equipment.—In testing the weighing and measuring appliances in the various establishments enumerated above, the sealer of weights and measures should be provided with the following special equipment:

1 small pocket balance sensitive to 1 milligram.
1 set metric weights, 50 grams to 1 milligram.
1 set apothecary weights, 2 drams to one-tenth grain.
1 sixty-minim cylindrical graduate.
1 one-hundred-and-twentieth minim cylindrical graduate.
1 one-fluid ounce cylindrical graduate.
1 two-fluid ounce cylindrical graduate.
1 fifty cubic centimeter burette.
1 one-hundred cubic centimeter cylindrical graduate.
1 one-minim dropper for determining tolerances.
1 one-sixteenth-inch steel die.
1 one-thirty-second-inch steel die.
1 bottle glass ink, with marking pen and pad.

This is the minimum equipment necessary for the performance of accurate work. For testing apothecary or metric weights of greater value than those indicated in the list, the sealer's set of avoirdupois weights can be used by resorting to tables of equivalents. In testing graduates of greater capacity than 2 fluid ounces the sealer can likewise resort to his set of standard liquid measures, provided the same are used with a slicker plate. The small one-sixteenth-inch die is used for sealing the smaller weights. The small rod weights used by druggists can be sealed with this die. For sealing carat weights it will be necessary to use the one-thirty-second-inch steel die. The glass graduates can be readily sealed by writing on the side of the graduate with glass ink or hydrofluoric acid. In order to prevent the ink from running over the surface of the glass the same should be mixed with a small quantity of some inert powder like barium sulphate.

DISCUSSION.

The PRESIDENT. I think we are exceedingly fortunate in having the last two papers, because it indicates that the trend of thought of the delegates is along the line of understanding what you are dealing with. In the past you have been largely at the mercy of the manufacturers of scales, who unfortunately have not been following the scientific and engineering principles as closely as they should; but the day is not far distant when you will lead rather than be led by them, and this is an indication of it.

I am exceedingly pleased to know that you are looking forward to this class of papers. Several years ago I predicted that the field of the city sealer would be greatly broadened in the future. I expect that within a year or two you will be presenting papers on the testing of physicians' thermometers. They are just as important as what we have here. The Bureau of Standards can not handle this for all of the country, and the time will come when you will handle them, either direct or in cooperation with the Bureau of Standards. But some means must be brought about whereby your functions will cover a much wider field than they do at present.

And again, I am glad to see that you are beginning to look upon your duties from the other and broader standpoint, namely, that of enabling the honest man, the man who wants to be honest, to do what is right. There has been too much of the police aspect in the past—of preventing the dishonest man from doing a dishonest thing. That is all right, and that is very valuable; but the other side is at least equally, and, I think, far more important. That is to enable the man who wants to do the right thing to do it; and he can not do it unless you are prepared at all times to test just such apparatus as these, and the other apparatus that they have to do with.

Mr. HANSON. Mr. Chairman, possibly those who are here will be interested to know what the State of Massachusetts has done regarding apothecary weights and measures. When I was appointed to office I sent a notice to all the local sealers to test the apothecaries weights and measures, which I thought was one of the most important things we had there. Some two months ago I put five State inspectors to testing the weights and measures of apothecary stores. I just want to submit the following table showing what one inspector found.

Summary of tests of apothecaries' weights by an inspector from Massachusetts State department of weights and measures, 1914.

Store No.	Total number tested.	Correct within tolerance.	Incorrect.		Adjusted.	Condemned and seized.	Correct.	Incorrect.	Greatest per cent of error in any weight.		Denomination of weight in which greatest error is found.
			Heavy.	Light.					Heavy.	Light.	
							P. ct.	*P. ct.*	*Per ct.*	*Per ct.*	*Grains.*
1	14	10	2	2	2	2	71.4	28.6	20	.....	½
2	46	27	15	4	15	4	58.7	41.3	18	.....	1
3	19	19	.....	.....	.....	.....	100	.....	.....	1.4	5
4	8	8	.....	.....	.....	.....	100	.....	.....	.56	3
5	29	15	13	1	3	11	51.7	48.3	22	.....	1
6	22	11	4	7	2	9	50	50	12	.....	½
7	20	11	7	2	6	3	55	45	20	.....	½
8	19	9	6	4	6	4	47.4	52.6	6	.....	4
9	30	21	5	4	4	5	70	30	.....	6	½
10	38	10	8	20	4	24	26.3	73.7	14.7	.....	3
11	34	14	1	19	1	19	41.2	58.8	4	.....	2
12	21	13	6	2	6	2	61.9	38.1	6	.....	4
13	31	15	5	11	4	12	48.4	51.6	40	.....	½
Total.	331	183	72	76	53	95	55.3	44.7	.....	.....	.....

You, gentlemen, can see the importance of this work from the figures I have given.

In Massachusetts practically all the local sealers now have their equipment and are going ahead testing the apothecaries' weights. What we advocate there is that the sealer should have at least two sets of weights and that all the testing should be done in the office of the sealer. For instance, he leaves one set with the apothecary shop and he brings the apothecary's weights into his office to be tested.

Regarding the graduates, we have not reached that just yet, but we are advocating the use of burettes; that is to say, the sealers will use burettes instead of graduates in pouring from one to the other.

The SECRETARY. Mr. Chairman, I am also very glad, indeed, that Mr. Downing presented a paper of this sort. I think that perhaps two reasons have contributed to the neglect of this subject, the first of which, of course, is that the whole subject of weights and measures is new—that is, the inspection is comparatively new in this country—and it was perfectly natural to look out for those weights and measures with which the average individual would come in contact.

That, I think, is perhaps the main reason why this particular subject has been neglected. The other one, of course, is the one that Mr. Downing pointed out, namely, that the sealer had an idea that this was very delicate apparatus. As a matter of fact, it is almost the worst kind of apparatus that there is in use. It is the cheapest kind of apparatus that is made, and we were very much surprised, as everyone else has been, a few years ago, when making tests, to find the bad condition of these weights. Of course, if you talk to a druggist about it, he will tell you that human beings differ very widely, anyhow, and that a physician never gives a dose that is likely to kill; he merely guesses about what a man can stand and makes a liberal tolerance himself, so that if you happen to get twice as much in as is called for, it makes very little difference. There is something in that; but, at the same time, if they do not take care of their weights, it seems to me that they are not going to do very accurate work anywhere.

DISCUSSION ON TUTTLE-WEEKS STANDARD BARREL BILL.

The SECRETARY. I was informed a short while ago that the hearing on the Tuttle bill, which was held this morning, has been extended; that is, there will be another hearing to-morrow at 10 o'clock; and Mr. Hardwick, the chairman, would like to have this association or conference represented at that hearing. I think perhaps Mr. French or Mr. Wagner might want to make a little announcement in regard to that. They have just come from the hearing and perhaps can tell us the status.

Mr. FRENCH. Mr. Chairman, at the hearing accorded us this morning there was representation from all over the country. The report on the Tuttle-Weeks bill was adjourned until to-morrow morning by reason of the great number of witnesses. We had a very courteous and very full hearing this morning.

This bill was introduced for the creation of a standard barrel for all fruits and vegetables and other dry commodities, and it progressed along the usual course, through the Committee on Coinage, Weights, and Measures, and reached the point where the cranberry interests injected into that bill a special provision for the cranberry barrel. The cranberry barrel, as you all know, is practically a universal standard, controlled by custom over a number of years, and in latter years adopted by the cranberry-producing States. From that bill a bill was put in the Senate known as the Weeks bill, with the cranberry specification shown as a separate standard, and this passed the Senate unanimously in January. The bill then was referred to the Committee on Coinage, Weights, and Measures of the House, and after several hearings, which we thought were favorable, was so amended by that committee as practically to destroy its usefulness. They eliminated the cranberry barrel; they changed the penalty provision from a dollar a barrel to $500 and six months' imprisonment, and made no provision for enforcing the act, and made one or two other amendments which were not at all acceptable. But we were successful in having the committee withhold that bill and not report it, and to give us another hearing, which they have done to-day. The special feature that has been argued to-day was the cranberry proposition. The cranberry interests came down here very strong, and I am quite convinced that there are only a few of the committee that are not favorable. But I do realize the importance of having the further indorsement from this department, and especially a representation from this convention to appear before this meeting. I think the committee is fully aware of the fact that the conference has already given indorsement to the bill as passed by the Senate, and if they wish to give further indorsement there will be an opportunity at this time.

Mr. CUMMINGS. Mr. Chairman, I would like to ask Mr. French, if I may be permitted, if the standard cranberry barrel does not contain 100 quarts?

Mr. FRENCH. My understanding is that this is not a capacity measure, but simply a standard barrel of 7,056 cubic inches.

Mr. WAGNER. Mr. Chairman, if I may answer that, the cranberry barrel will measure out 100 quarts. The cranberries are put in under pressure, and the fruit or vegetable, whichever it may be called, expands, and when the barrel is opened it will rise, so that it will

measure, in the disposing of it, more than it measures in its compressed form. I think there is no question but that the standard cranberry barrel in use will measure a full 100 quarts.

Mr. CUMMINGS. I made a test on that standard barrel, which failed to show that.

Mr. WAGNER. Might I ask the nature of the test?

Mr. CUMMINGS. I made a test with split peas.

Mr. WAGNER. In the cranberry you have a commodity that is entirely different. In the cranberry you have a commodity which is similar to the sponge. They are put in under pressure and compressed. Your split peas can not do that. If you are filling with a commodity, you might as well use wheat; but with the cranberries under pressure, with the opening of the barrel they spring.

The SECRETARY. Mr. Chairman, I would like to say in regard to this provision for the cranberry barrel in this bill that the cranberry people are very well organized indeed, and they have been unanimous in contending that this barrel was the result of a good many years' experience in shipping cranberries, and that the larger size standard would not do. That statement has been made over and over again, positively, by these gentlemen who are engaged in that business. In addition to that, this particular barrel has been adopted, I think, in all three of the cranberry States; and I will say further that if the exception is not made of the cranberry barrel there will not be any national standard barrel in the United States for a good many years. That is my opinion, after three years' experience with this measure.

Mr. HANNAFORD. Mr. Chairman, I am somewhat interested in this bill that is before the House at present, because I am right in the district where they pick thousands and thousands of bushels of cranberries; and if this bill goes through I will be very much pleased. I am in hearty accord with everybody on the standard barrel; but if you will go down on Cape Cod in Massachusetts, you will see buildings there twice as large as this, filled from cellar to roof with staves and heads and hoops for the manufacture and putting together of barrels for cranberries. Now, this season cranberries are pretty well advanced; there is no question about that. Cranberries are the first commodity that is picked in Massachusetts, or practically the first, although you may not get them until just before Christmas; and I really and honestly think, gentlemen, that it is no more than right that if you can get this bill through and leave the cranberry barrel out, you are justified in doing so.

Mr. BROWN. Mr. Chairman, I do not know the first thing about any of these propositions. There has been a good deal said about cranberry barrels, standard barrels, and so on, and I notice you asked Mr. French for some statement about the provisions of these bills. We have failed to get them, so far as I have heard.

The PRESIDENT. I think Mr. French assumed that you were familiar with the barrel bill that has been discussed heretofore. It provides for a standard barrel with a certain capacity, with the exception of the cranberry barrel. My own feeling about that matter is that we should allow that to continue, as long as they have adopted a standard package. Cranberries are raised in but four or five States, and they have a uniform package. Let them continue to use a uniform package; but there is one thing that we should be very careful

about, and that is not to have two standard barrels. Change the name of it, or put it in such form that there is but one standard barrel, and that is the one you legislate for, but make the exception in the use of cranberry barrels. Allow the cranberry people to use another barrel and call it, if you like, a cranberry barrel, but not a standard barrel. There should be only one United States standard barrel.

Mr. Fischer, will you please answer the question of the last gentleman who spoke?

The SECRETARY. The standard barrel provided for in this bill is the same barrel which was established for the apple industry last year, in the bill known as the Sulzer bill. That bill was passed, providing for the same size barrel that is standardized in practically all the States where they have a standard. They have that barrel in New York and quite a number of other States, and that is supposed to be the standard flour barrel. That was the great argument used in getting the bill through—that it was the barrel in common use. We looked it up at the time in a great many coopers' catalogues in order to find out what sizes they used, and each one of them had that particular standard in it; so that I do not think there was any doubt but what the standard created by that law established the standard which was already in use throughout the United States.

Now, that was only for apples. This particular bill provides the same standard for all dry commodities except those that are sold by weight, like cement, lime, and so on, and in that case it is required that the net weight shall be stamped on the outside; the single exception being the cranberry barrel, for the reasons which have already been stated.

Mr. ROYLANCE. Mr. Chairman, I am a delegate here in the interest of the Western Fruit Jobbers' Association, and would like to say a word along the line of explanation as to why we want this bill adopted. The Western Fruit Jobbers' Association—which is composed of about 380 members in all the States west of Ohio and about 138 cities, doing an annual business of about $250,000,000 and paying a railroad freight bill of about $82,000,000 per annum—in convention assembled at Kansas City last January, went over the merits of this bill as proposed by the cranberry growers of Massachusetts, and unanimously indorsed the bill. For the reasons stated by the growers themselves, an apple barrel should not be used for cranberries because of its enlarged capacity; but they do want the cranberry barrel standardized, not only for the growers themselves, but in order to make the manufacturers responsible for the size of the barrel, so that it will come entirely under the head of the department of weights and measures. So that I am here as the representative of that organization for the purpose of standardizing weights and measures, and among other things is this barrel bill; and our committee that was at the hearing this morning was instrumental in getting the further consideration of the bill postponed until tomorrow morning in order to give this convention a chance to have a representative there.

The PRESIDENT. Gentlemen, we would like to continue this discussion, and perhaps we may find time for it at some future meeting; but we have on the program the inspection of manufacturers' exhibits and the laboratories of the Bureau of Standards, and one of the things we had planned for you to see was the operation of the

large Emery testing machine in the north end of the basement of the building in which you took luncheon. They are testing large steel columns, for the purpose of getting the law of columns. We have had them hold back that test in order that you might see it. It is rather an unusual sight. The large testing machine has a capacity of two and a half million pounds, and when it is being operated at its total load you can push it down with the end of your finger and the increased weight will be indicated by the machine.

APPOINTMENT OF LEGISLATIVE COMMITTEE.

Mr. BUCHTEL. I move at this time that the chair appoint a committee to appear before the Committee on Coinage, Weights, and Measures of the House to discuss the Tuttle bill. (The motion was seconded and agreed to.)

The PRESIDENT. The committee will consist of Messrs. Neale, of Minnesota; Henry, of Vermont; Van Duyn, of Iowa; Waldron, of New Jersey; and Brown, of Tennessee; and we hope that this committee will feel at liberty to arrange for as many others as they see fit.

(Thereupon, at 3.50 p. m. the meeting adjourned to meet the morning of May 28, 1914.)

WEDNESDAY, MAY 27, 1914.

The forenoon of Wednesday was set aside for a hearing before the House Committee on Coinage, Weights, and Measures at the Capitol on certain weights-and-measures-legislation pending before Congress. The committee appointed by the conference the previous day to represent it at the hearing consisted of Messrs. Neale, of Minnesota; Henry, of Vermont; Van Duyn, of Iowa; Waldron, of New Jersey; and Brown, of Tennessee, the committee being authorized to arrange for the assistance of other members as they saw fit.

The committee accorded the conference committee a hearing on H. R. 4899, "To fix the standard barrel for fruits, vegetables, and other dry commodities"; and in the course of their remarks the conference committee pointed out the necessity of having a national standard barrel and the advisability of making the law mandatory. Messrs. L. A. Fischer, F. Reichmann, Joseph Hartigan, and Charles Hannaford also addressed the committee in favor of the bill.

The afternoon of Wednesday was devoted to an inspection and demonstration of the railroad track scale-testing equipment of the Bureau of Standards, at the Naval Gun Factory, Washington, D. C., the members of the conference being afforded an opportunity to closely inspect the mechanism of the car and its equipment, after which they watched the various operations in an actual test of a railroad-track scale belonging to the Gun Factory.

After the completion of the test the members of the conference were escorted through the Naval Gun Factory by Commander Chester Wells.

THIRD SESSION (MORNING OF THURSDAY, MAY 28, 1914).

The conference reassembled at 10.15 a. m.

REPORT OF COMMITTEE ON TOLERANCES AND SPECIFICATIONS.

Presented by Mr. JOHN C. CONNORS.

Your committee on tolerances and specifications respectfully submit the following report:

The committee, realizing that the report as submitted to and adopted by the last conference was necessarily not final or complete, have attempted to obtain further information from the manufacturers, the weights and measures officials, and other persons interested. In furtherance of this purpose requests for criticisms and suggestions were addressed to the various interests affected, and all replies have been given very careful consideration. Also meetings were held in various cities at which the various specifications and tolerances were thoroughly discussed.

The adoption and enforcement of these tolerances and specifications in Porto Rico and in the States of Indiana, Wisconsin, Washington, Ohio, Massachusetts, and the city of Chicago, and the adoption and enforcement of the major part in the States of Michigan and Kansas has proved that while the tolerances and specifications are just, equitable, and enforceable on the whole, nevertheless some changes are advisable.

The following suggestions for revision or addition are the result, and the committee accordingly recommends their adoption by the conference.

The committee extends its thanks to Mr. F. S. Holbrook and Mr. C. A. Briggs, of the Bureau of Standards, for the valuable advice and assistance which they have freely given. The committee also extends its thanks to the weights and measures officials and the manufacturers of weighing and measuring devices for the valuable suggestions and criticisms offered.

Respectfully submitted.

LOUIS A. FISCHER,
J. C. CONNORS,
Committee.

LINEAR MEASURES.

Amend the specification reading—

Measures of length may be made of any material whose form or dimensions remain reasonably permanent under normal conditions; for example, steel, brass, hardwood, etc.: *Provided, however*, That tapes for commercial purposes may be made of wire-woven cloth—

by adding the words:

When an actual and sufficient reenforcement and permanency is thereby obtained.

Add a new specification, reading as follows:

Folding measures of length shall be so constructed that each section will come to a definite stop when straightened out to its proper position.

LIQUID CAPACITY MEASURES.

Amend the specification reading—

The capacity shall be legibly and permanently indicated on the side of the measure. On enamel and composition measures this marking shall be of a different color than that of the measure—

by adding, after the word "capacity" in the first line, the words:

of the measure and the word "Liquid."

Add a new specification, reading as follows:

Liquid measures of the customary system shall be of one of the following capacities only: One gallon, a multiple of the gallon, or a binary submultiple of the gallon; i. e., a measure obtained by successively dividing the gallon by two: *Provided, however,* That nothing in this specification shall be construed to prevent the use of forms for ice cream exclusively in 5-pint and 3-pint sizes, or bottles for milk or cream in the 3-pint size.

Amend the specification reading—

The following errors are allowable—

to read:

The following errors shall be allowed in deficiency and double these errors in excess on liquid capacity measures:

Add the following new specifications:

MILK BOTTLES.

Bottles used for the sale of milk or cream shall be made only in the sizes heretofore specified under the heading, "Liquid Capacity Measures."

Each bottle shall have its capacity clearly blown or otherwise clearly and permanently marked in the side of the bottle, and in the side or bottom the name, initials, or trade-mark of the manufacturer thereof.

Bottles with an inside diameter immediately below the cap seat or stopple of not over 2 inches shall hold the correct capacity when filled within one-fourth inch of this cap seat or stopple; bottles with an inside diameter of over this amount immediately below the cap seat or stopple shall hold the correct capacity when filled within one-eighth inch of the cap seat or stopple.

The following errors in excess and deficiency may be allowed on individual bottles, and on the average content of bottles, as noted in the column headings. The latter figures shall be determined by finding the error on each of not less than 25 bottles selected at random from at least four times the number tested and taking the average of these errors.

Capacity.	Tolerance on individual bottles.		Tolerance on average content.	
	Drams.	Cubic inches.	Drams.	Cubic inches.
½ gallon	6	1.4	1.5	0.35
3-pint	5	1.2	1.25	.29
1-quart	4	.9	1.0	.23
1-pint	3	.7	.75	.17
½-pint	2	.5	.5	.12
1-gill	2	.5	.5	.12

DRY MEASURES.

Add a new specification reading as follows:

Dry measures with adjustable bottoms shall not be used.

Amend the specification reading—

The following errors are allowable—

to read:

The following errors shall be allowed in deficiency and double these errors in excess on dry capacity measures:

Add a new specification reading as follows:

BERRY BASKETS OR BOXES.

Baskets for berries or small fruits of a capacity of 1 dry quart or less shall be of one of the following sizes: 1 quart, 1 pint, or one-half pint, dry measure.

The following errors are allowable in deficiency and double these errors in excess on berry baskets or boxes:

Capacity.	Tolerances.
	Cubic inches.
1 quart	3
1 pint	2
½ pint	1

SCALES.

General specifications.—Add a new specification reading as follows:

When the scale is equipped with a device attached to the scale intended to counterbalance the weight of the scoop, this shall clearly indicate on the customer's side whether the scoop should be on or off the scale platform.

Amend the specification reading—

The normal position of the beam shall be horizontal—

to read as follows:

When scales are equipped with a beam or beams, the position or oscillation of which is used to indicate the balance of the scale, the normal position of this beam or beams must be horizontal.

Add a new specification, reading as follows:

All scales shall be of such construction that they are permanent in their adjustment and will repeat their weight indications correctly, and are not designed to or may not be used to facilitate the perpetration of fraud.

Add the following to the definition of "sensibility reciprocal:"

In the case of scales provided with a reading face or dial, the sensibility reciprocal does not apply to the face or dial.

PLATFORM SCALES.

The specification reading—

The beam shall have equal play above and below its normal horizontal position,

should be amended to read—

On scales which are required to have the normal position of the beam horizontal, the beam shall have equal play above and below this normal horizontal position.

Amend the following specification by adding italic portion as follows:

The sensibility reciprocal of platform scales, *except counter platform scales,* shall not exceed the value of two of the minimum graduations on the beam at the capacity or at any lesser load. *Counter platform scales shall be governed by the sensibility reciprocals given hereafter for counter balances and scales.*

Amend the following specification by adding italic portion as follows:

The tolerances to be allowed on platform scales, *except counter platform scales,* at the loads indicated, shall not exceed the values given in the table following. *Counter platform scales shall be governed by the tolerances given hereafter for counter balances and scales.*

COUNTER BALANCES AND SCALES.

Amend the specification reading—

Pendulum scales must be equipped with a device for indicating when the scale is level—

to read as follows:

Counter scales whose weight indications are changed by an amount greater than one-half the tolerance allowed when set in any position on a surface making an angle of 3°, or approximately 5 per cent with the horizontal, shall be equipped with a device which will indicate when the scale is level. *Provided, however,* that the scale shall be rebalanced each time its position is altered during this test.

Amend the specification reading—

Pendulum scales must be equipped with leveling devices which require the use of an outside mechanical device for their operation—

to read as follows:

When any scale is equipped with a leveling device, this shall be of such construction that it is operative or accessible only by the use of some tool or device which is outside of and entirely separate from the scale itself.

Strike out the specifications reading as follows:

When a weight equal to one-half the capacity of the scale is placed upon the weight plate in such a position that the edge of the weight coincides with the edge of the plate, the allowable error in the scale should not exceed the allowable error for the scale at its full capacity.

When a weight equal to one-half the capacity of the scale is shifted on the commodity plate or scoop to a point one-half the distance between the center and edge of the plate or scoop, the error should not exceed the allowable error for the scale at its full capacity—

and insert in place thereof the following:

When a weight whose body has approximately equal diameter and height and which represents one-half of the capacity of the scale is shifted on the weight plate, or the commodity plate or scoop to a point one-half the distance between the center and the edge of the weight plate, or the commodity plate or scoop, the resulting error in the weight indication shall not exceed the allowable error for the scale at its full capacity. *Provided, however,* that in this test the weight shall not project over the edge of the weight plate or the commodity plate or scoop.

SPRING SCALES.

Amend the specification reading—

Where a dish-shaped pan is provided there shall be an opening in said pan to allow for drainage—

to read as follows:

Scale pans in which fish or other wet commodities are placed when weighed shall be so constructed as to provide for drainage.

and transfer this specification to heading—

"Scales. General Specifications."

Add a new specification reading as follows:

Spring scales whose weight indications are changed by an amount greater than one-half the tolerance allowed, when set in any position on a surface making an angle of 3° or approximately 5 per cent with the horizontal, shall be equipped with a device which will indicate when the scale is level: *Provided, however*, that the scale shall be rebalanced at zero each time its position is altered during this test.

Add a new specification reading as follows:

When spring scales are equipped with devices intended to compensate for changes in elasticity of the springs due to temperature effects, these devices shall be automatic in their operation and shall be so constructed or covered that they can not be readily manipulated.

Add a new specification reading as follows:

Spring scales equipped with a device intended to compensate for changes in elasticity of the springs due to temperature effects, shall be governed by the same allowable errors as heretofore given in the tolerance table under the heading "Counter Balances and Scales."

COMPUTING SCALES.

Amend the specification reading—

The maximum value graduations on the chart must not exceed 2 cents—

to read as follows:

The value graduations on all computing charts shall not exceed 1 cent on all prices per pound up to and including 30 cents. At any higher price per pound the value graduation shall not exceed 2 cents: *Provided, however*, that nothing in the above shall be construed to prevent the placing of a special value graduation to represent each 5-cent interval. These special graduations may take the form of dots, staggered graduations, or similar forms; they shall be so placed that their meaning and value may be clearly understood, but they shall not be placed in the space between the regular graduations.

Strike out the specification reading—

The distance between the chart and the reference mark must not exceed 0.06 inch. Reference marks must be present on both the dealer's and customer's sides, and their width must not exceed the width of the finest graduation on the chart. Both reference marks must indicate clearly and correctly—

and add in place the following new specifications:

The distance between the chart and the weight indicators and the distance between the chart and the value indicator or indicators shall in no case exceed 0.06 inch.

Weight indicators shall be present on both the dealer's and the customer's sides, aud their width shall not exceed 0.015 inch. Both indicators shall reach to the graduated divisions and shall indicate clearly and correctly.

Amend the specification reading—

The maximum value of the weight indications shall be 1 ounce—

to read as follows:

The maximum value of the weight graduations on computing scales used in the sale of foodstuffs at retail shall be 1 ounce.

Amend the specification reading:

The width of the value indicator must not exceed the width of the value graduations.

to read as follows:

A value indicator shall be present on the dealer's side, and its width shall not exceed 0.015 inch. This indicator shall reach to each value graduation and shall indicate clearly and correctly.

Add a new specification, reading:

The weight graduations and the value graduations shall be clear and distinct, but in no case shall their width be less than 0.008 inch.

Amend the specification reading—

On scales equipped with a magnifying device the clear interval between the weight and value graduations shall not be less than 0.02 inch. On scales not equipped with a magnifying device the clear interval between the weight and value indications shall not be less than 0.04 inch—

to read as follows:

The clear interval between the weight-graduation marks on all computing scales shall not be less than 0.04 inch. The clear interval between the value-graduation marks on all computing scales shall not be less than 0.02 inch: *Provided, however,* that the latter requirement shall not be construed to apply to the special value graduation denoting the 5-cent interval mentioned heretofore.

Add a new specification, reading as follows:

Computing scales, whose weight indications are changed by an amount greater than one-half the tolerance allowed when set in any position on a surface making an angle of 3° or approximately 5 per cent with the horizontal, shall be equipped with a device which will indicate when the scale is level: *Provided,* however, that the scale shall be rebalanced at zero each time its position is altered during this test.

Add five new specifications, reading as follows:

Computing scales must give correct results, whether the load is being increased or decreased.

All devices intended to increase the capacity of computing scales by the addition of an added weight or weights shall operate properly irrespective of the speed with which they are manipulated.

Spring computing scales not equipped with a device intended to compensate for changes in elasticity of the springs, due to temperature effects, shall be governed by the same allowable errors as heretofore given in the tolerance table under the heading "Spring Balances."

Spring computing scales equipped with the above-mentioned device and also all those not operated by springs shall be governed by the same allowable errors as heretofore given in the tolerance table under the heading "Counter Balances and Scales."

When spring computing scales are equipped with devices intended to compensate for changes in elasticity of the springs, due to temperature effects, these devices shall be automatic in their operation and shall be so constructed or covered that they can not be readily manipulated.

CREAM TEST AND BUTTER-FAT TEST SCALES.

The specification reading—

The scale shall be provided with leveling screws and an attached level—

should be amended to read as follows:

All scales whose weight indications are changed by an amount greater than one-half of the tolerance allowed, when set in any position on a surface making an angle of 3° or approximately 5 per cent with the horizontal, shall be equipped with leveling screws and with a device which will indicate when the scale is level: *Provided, however,* That the scale shall be rebalanced at zero each time its position is altered during this test.

WEIGHTS.

Amend the specification reading—

All holes in which foreign material is placed for adjusting purposes must be so made that the bottom diameter is larger than the top diameter. The

adjusting material must not project beyond the surface of the weight and must be securely held in place—

to read as follows:

All holes in which foreign material is to be placed for adjusting purposes must be of such form that this material will be permanently and securely held in place. In no case shall this adjusting material project beyond the surface of the weight.

Add a new specification, to be included under the proper headings, reading as follows:

The manufacturers' tolerances and sensibility reciprocals or the tolerance and sensibility reciprocals on all new weights and measures and weighing and measuring devices shall be one-half of the values given heretofore in the tolerance tables.

Add a new heading and specification reading as follows:

METRIC SYSTEM.

Nothing given in the specifications heretofore shall be understood or construed to prohibit the sale or use of weights and measures or weighing and measuring devices constructed or graduated in units of the metric system.

RESOLUTION.

The following resolution in relation to certain amendments is recommended:

That the committee be empowered and instructed to revise the wording of the specifications and tolerances without changing their meaning and effect, in order to clarify them.

DISCUSSION.

The PRESIDENT. Gentlemen, you have heard the report. What shall we do with it?

Mr. VAN DUYN. Mr. Chairman, I move the adoption of this report.

(The motion was seconded.)

The PRESIDENT. Are there any remarks?

(The question was taken, and the report was adopted.)

The SECRETARY. Mr. Chairman, I think the best way to handle this proposition would be for Mr. Connors, on behalf of the committee, to read these proposed amendments over one by one, and, if necessary or desirable, make an explanation as to why the previous specifications and tolerances have been amended, and then have a vote on each proposed amendment. That, I think, would be the most satisfactory way of handling this proposition. It looked at one time as though the adoption of the report of the committee meant the adoption of the amendments. The committee does not care to have that done, even if you were willing to do it. We want to have discussion of these amendments.

Mr. SWEENEY. Mr. President, this being a new proposition, and a very important one, it strikes me it would be better to let this matter lay over until the next conference, and let each State representative take the matter home with him and give it thorough thought, and not pass upon it so quickly here. I represent a State that has several millions of people, and they do not know anything at all about this question. It has never been submitted to them, and I think it would be a very arbitrary position for me to vote here on a proposition that

would place me in the light of compelling them to accept something of which they have no knowledge at all. I think this matter should properly be submitted to the different legislatures when they are in session, and if the legislators of our State decide that this proposition should come from the National Bureau of Standards and be adopted by the various States, we can come here and vote and discuss this question intelligently. As I said in the beginning, it is a very important proposition, and the people ought to be given more time on it. Why not let the matter lay over for one year, and let the delegates take these amendments home with them and study them, and they will be better prepared to vote on them when they come here one year from now. I think questions of such importance should not be submitted so quickly for action, before the people have an opportunity to study them. I am free to admit, regardless of the merits or demerits of the whole proposition, that I would not like to vote for any of it unless I consulted our State on this matter. I know that there is no legal enforcement of this, but still it goes back to the people. It has been passed by the National Bureau of Standards, or at their conference, and the influence that the proposition would carry with it, from the fact that it has been passed here, will be equal in many cases to a legal enforcement, and it will be adopted by many States, whereas if we take these amendments home with us our State can settle the matter for themselves. That is my own opinion on the proposition.

The PRESIDENT. Are there any further remarks?

Mr. SCHWARTZ. Mr. President, this proposition, as Mr. Sweeney has stated, is a very important one; but, then, if we do not decide on tolerances and specifications here, where is our uniformity coming from? We go back to each State and they discuss this proposition, and one State says, "We don't like the measure of length amendment here," and we change it. I think the idea of this conference is to have uniform tolerances and specifications, so that all of the States will have the same thing to work on. Now, if each legislature is going to take this matter up and make changes in it when it comes before them for consideration and promulgation in that particular State, we are just in the same position that we are to-day on weights and measures. I think we ought to pass on this entire matter here and settle it—have something go out from the bureau that we can follow specifically in our respective States.

Mr. SWEENEY. Mr. Chairman, we will suppose that what this gentleman says is true, and I have no doubt it is true. But I believe that if we are to have a uniform tolerance the States themselves can elect delegates to meet at some central place in annual conferences and draft uniform tolerances. It is a question in my mind whether this proposition ought to come before the United States or not, and to be frank and honest about it I am opposed to the United States regulating this question for the country. I believe each State ought to regulate this matter for itself. As far as tolerances are concerned, they ought to be uniform; but this is only an entering wedge, and if the Bureau of Standards can say to us that we shall adopt certain tolerances they can also say to us what type of scale we shall use, and place a whole lot of restrictions upon us in time, and perhaps our presence here as representatives of various States may be used

to influence the congressional committee whether we know anything about it or not, and I am not willing to put myself in that position.

The SECRETARY. Mr. Chairman, I might state for the benefit of the delegates here who might be influenced by what Mr. Sweeney has to say about this matter that this is not being done by the Bureau of Standards at all. The Bureau of Standards has never adopted any specifications or tolerances. The present tolerances and specifications represent the work of this conference. I am a member of the committee appointed by this conference, and these modifications that we propose now we think are improvements. These old tolerances will still stand, if we do not adopt the amendments. Now, it is a question whether we can not improve them. That is the question that we would like to put up to this conference, and it seem to me that we ought to get the benefit of the advice and judgment of these men here when they are all together. You are certainly the most competent people in the United States to discuss this matter. We are perfectly willing to defend these particular amendments proposed, and if anybody has any questions to ask about them we stand here ready to answer them. I certainly hope that they will be considered.

Mr. BARNARD, of Michigan. Mr. Chairman, I wish to concur in the opinion of our friend from New Jersey. I think now is the proper time to go into this matter. If you put it off for another year, by the time the next conference comes around there will be differences of opinion again and a desire to put it off for another year. It seems to me now is the time to go into it, and I think, out of courtesy to our committee, which has undoubtedly spent a great deal of time in going over the matter, we should go into it right away and get the opinion of the different members regarding its feasibility.

The PRESIDENT. I also want to say a word, Mr. Sweeney, from the standpoint of the Bureau of Standards. I am very sorry to hear you take the position that you do regarding the relation between the Federal Government and the States. The position of the bureau is pretty clearly defined. We believe that we are here for the assistance of the States, to give advice and assistance, and the bureau will continue to do it. Not a day goes by in which we are not called upon to assist some State or city official of weights and measures, and we consider it not only our duty but a great pleasure to do so, and we are going to do so to the best of our ability; but it is only in the nature of advice, Mr. Sweeney. We feel that it is a very great privilege to have the benefit of your discussion and your advice—you gentlemen who are on the field, who are coming in touch with these things every day—and it would be a mistake for the bureau to give advice without taking your experience into account. We want that experience, and we want this thing discussed. It does not interfere with State rights, nor has the Federal Government any idea whatever of doing so.

Mr. STIMPSON. Mr. Chairman, I simply want to remark that this is about the third year that these things have been up, and so far as our country is concerned, we would like to see something definite finally thrashed out. I therefore second the motion that we go on with the discussion of these tolerances.

Mr. ALBRECHT. I believe, Mr. Chairman and gentlemen, that this is a matter that ought to be settled once and for all, and be settled

now. Last year, in Ohio, we were about to adopt the specifications that were drafted here. We were told by one of the manufacturers in Ohio, just about the time that we had the specifications ready to go to the press, that they were going to be modified. We stopped right there, and said we would wait for this conference. Now, I believe that the gentlemen who have drafted these tolerances and specifications are more able to say what we ought to have and what we ought not to have than the legislatures of the different States. I do not think there is a member of the legislature who would know what we were talking about if we did submit a list of tolerances to him. I think that we ought to have uniformity, and adopt whatever the committee of this organization presents to us.

Mr. SWEENEY. Mr. Chairman, so far as tolerances are concerned, my position seems to be misunderstood. I am not opposed to a vote on this or to the discussion of this subject, but I think the delegates here ought to have more of an opportunity to study it; and it is a great reflection upon the members of the legislature of any State of this Union if they have no knowledge of a subject that is of so much importance to the people of this country as this subject is. I do not mean to say that we should take this subject of tolerances to a legislature; I was speaking of the question in a general way; but I believe that the members here ought to be permitted to study those questions, because they are of importance. Now, the gentlemen who have spoken since I first spoke—every one of them—speak in a tone that if this was adopted here to-day it would become a tolerance for their States or cities or towns. Now, while, as I said before, there is no legal way of enforcing that or compelling any State to accept it, yet the influence of this conference is of such a nature that it would be just as binding, almost, as if there was a legal enactment; and I still maintain that these men ought to have an opportunity to study this question.

Mr. SHERMAN. Mr. Chairman, there are a good many new members here, like myself—new since the last meeting. In a great many of the States and also here in the District the question of tolerance is left almost entirely up to the local officer in charge. Now, when a new member comes into this work he needs education. His position is very much like that of a young fellow who goes into college. He needs to be taught first by somebody else with better experience and better training, and after that he is capable of studying; and the proposition to send a young fellow like me back to his office to study this proposition as a new one, without the aid of discussion and guidance from this body, is a cruel proposition. I do not care to tackle it. I think that we young men (and by that I mean we men that are young in the positions we hold) need the guidance of this body. I feel strongly against any proposition to limit or postpone discussion for that reason. Such measures as are recommended here are, as Mr. Sweeney says, liable to become the standards used in the various States that these delegates come from; and I can say now that they will become the tolerances used in the District of Columbia; and it is because of that that I want to get them thrashed out here and have something said that I can go by.

Mr. O'ROURKE. Mr. Chairman, in my locality I am confronted with a most peculiar situation, being located on the State line between Indiana and Illinois, and we frequently come in conflict with one

another. I want to say to this conference that if any action you could take to-day would bring about a uniformity of specifications I would be more than pleased to go back to the people of my community and say that we are handling all our commodities in Indiana on exactly the same basis as they are in Illinois; and I dare say that the delegates here from Illinois will agree with me on that.

We are coming in conflict daily. There is no doubt that there are other sections of this country that are confronted with the same problems that we are, and if the action of this conference will in any way influence the legislatures of the various States, I say, let us take some definite action to-day and see that that influence counts for something and is created in as short a time as possible. I believe that the men represented in this conference have studied this question long enough. The committee has devoted ample time to it, and I believe that their recommendations are made after due thought and consideration given to this subject from every point of view.

What we want is uniformity. We do not want one law in Indiana and another one in Illinois and another one in Ohio and another one in New York. We do not want the imaginary State lines dividing the people of this country on this all-important question of buying and selling commodities on an equitable basis throughout this country. I believe that uniformity is what we are after, and it is for this conference to take the initiative in that. As Mr. Albrecht, of Ohio, well said, I do not believe that there is a legislature in the country that would know what we are talking about if we brought up the question of tolerances for discussion before one of the legislative committees. I am satisfied, after a trial of that with our own legislature in Indiana a couple of years ago, that the same condition would prevail in other States that prevailed there. Many members of the legislature knew absolutely nothing about what we were discussing, and it would be up to the gentlemen of this conference to so place this matter before their various legislatures as to bring about the uniformity that this conference is after.

Now, I believe that the committee has studied this thing for a long time, and the recommendations that they are making now are worthy of our consideration. I think that we ought to go on with this discussion and adopt some uniform system so that we can go back to our various States and say, "This is what the gentlemen assembled in conference at Washington recommend for this country," and adopt a uniform law; and I hope that we will have a free and open discussion on this whole proposition.

Mr. Richardson, of Virginia. Mr. Chairman, representing Virginia, I would like to say that we are here as legal representatives from our State to get any information we can relative to the uniformity of weights and measures, and with the combined wisdom of the States that are represented we certainly ought to be able to get something tangible to take back to our people on that subject, and if we do not they will not be satisfied with our attendance here. So I am in favor of taking these up and discussing them seriatim, so that we may get something tangible to take back to our people and show them what the conference is doing.

(Cries of "Question!")

The President. Question has been called for.

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

Mr. CONNORS. The first amendment is in relation to tapes. We found that there were so-called wire-woven tapes on the market which would stretch and which were, as a matter of fact, not wire woven at all. What the committee had in mind was a tape with continuous wires passing through it. So we suggested the addition of the following words after the specification in relation to materials of which length measures shall be made: "When an actual and sufficient reinforcement and permanency is thereby attained." This will prohibit a tape that will stretch and thus will not hold its accuracy.

The SECRETARY. Mr. Chairman, I would like to say to the members that I hope there will not be any discussion of those things that are obvious, and this, it seems to me, is one of the cases. I do not want to give the impression that the committee does not want to hear discussion, but this is a perfectly obvious thing. Some of these tapes have tinsel woven through them, which adds to them absolutely no strength whatever, and what we want to require is that if there is a reinforcement it be a continuous wire that has some effect on the length. I think, perhaps, if explanations of that sort are made they will do away with some discussion, and I am sure that we will want all the time we can get to discuss some of these other things that are not so obvious.

Mr. STIMPSON. Mr. Chairman, I move the adoption of this amendment.

(The motion was seconded.)

The PRESIDENT. Are there any remarks?

(The question was taken, and the amendment was adopted.)

Mr. BUCHTEL. Mr. President, in order to facilitate the handling of this matter I would move that unless there is objection to these amendments as read they be considered adopted by the conference.

(The motion was seconded and agreed to.)

Mr. CONNORS. The next specification is a new one. At various times folding rules are presented for test, and as there is nothing in the present specifications that covers that matter, we suggest a specification reading: "Folding measures of length shall be so constructed that each section will come to a definite stop when straightened out to its proper position."

We found folding rules that, when they were unfolded, were not accurate because they were not straight.

The PRESIDENT. If there is no objection that will be considered adopted.

Mr. CONNORS. The next specification relates to liquid capacity measures. In our specification we require that all dry measures shall be marked "dry" where they contain the words "quart," "pint," etc.; that is, "1 quart dry," "1 pint dry," and so on. The question came up that in the liquid capacity measures we did not require the word "liquid," so that if a liquid measure was used for beans it would be marked "1 quart," and the customer would never know whether it was dry or liquid. Therefore we amend this specification by adding the word "liquid," so that it will read:

"The capacity of the measure and the word 'liquid' shall be legibly and permanently indicated on the side of the measure. On enamel and composition measures this marking shall be of a different color from that of the measure."

The PRESIDENT. You have heard this amendment. Is there any objection? [After a pause.] If not, it will stand adopted.

Mr. CONNORS. The next is a new specification. We defined the sizes of dry measures, but omitted to do so in the case of liquid measures, and thus there is nothing in the specification that prevents the use of a 6-quart or a 3-pint measure in the trade. But we had to take into consideration the fact that 3-pint measures are used for milk, and also that 5-pint and 3-pint are used for ice-cream molds. So the specification suggested is as follows:

"Liquid measures of the customary system shall be of one of the following capacities only: One gallon, a multiple of the gallon, or a binary submultiple of the gallon, i. e., a measure obtained by successively dividing the gallon by two. Provided, however, that nothing in this specification shall be construed to prevent the use of forms for ice cream exclusively in 5-pint and 3-pint sizes, or bottles for milk or cream in the 3-pint size."

I would say that all through the country the customary measures for bricks of ice cream include the 5-pint and the 3-pint. It is an established custom in the ice-cream trade, and it is also an established custom in the milk trade, to have a 3-pint jar.

Mr. UMSTEAD. Mr. Chairman, I would like to ask Mr. Connors if the 3-pint bottle is a standard measure.

Mr. CONNORS. The 3-pint bottle is made a standard in the States of Massachusetts, New York, New Jersey, Ohio, and Wisconsin.

Mr. HANSON. Did I understand you to say that Massachusetts legalizes the sale of a 3-pint bottle of milk?

Mr. CONNORS. I am very sure it does, Mr. Hanson.

Mr. HANSON. No, sir; I think you are mistaken there. The only ones that we legalize are the 2-quart, quart, pint, and half-pint bottles. We have our law books right here.

Mr. UMSTEAD. Another question: Is there a real necessity for the 3-pint bottle?

Mr. CONNORS. I think there is a real necessity. A great many people take 3 pints of milk in the morning and the milkman has to deliver two bottles, unless he has a 3-pint size.

Mr. UMSTEAD. I do not see the necessity of approving a 3-pint bottle. If we have standard measures, we must adhere to the standard measures. We desire uniformity, and we are deviating from it in this. I want to make a motion that this size be stricken out.

Mr. CONNORS. Just a moment, if you will. In the Massachusetts law you will find that the 3-pint bottle is legalized.

(The motion was seconded.)

The PRESIDENT. It is moved and seconded that this 3-pint bottle be stricken out. Are there any remarks?

Mr. BUCHTEL. Mr. Chairman, in Oregon I have no recollection of ever seeing a 3-pint bottle in use, but I can see no good reason why it should not be legalized. There certainly would be no question of a person mistaking a 3-pint for a quart or for 2 quarts, and the only object I can see in not adopting this size would be through the fear that a dealer who wishes to be unfair might try to put out a 3-pint bottle in place of a 2-quart. Now, owing to the large difference, there would be no particular opportunity of getting away with a thing of that kind, and for that reason I shall vote against the motion.

Mr. CONNORS. I would say to the members that we have checked the probability of fraud, inasmuch as we require the capacity to be marked on the outside; the 3-pint-size milk bottle, especially in the East here, has been established both by custom and by law.

Mr. VIRDIN. Mr. Chairman, I do not think that Philadelphia has any 3-pint bottles, nor do I think we need any, since the quart, the pint, and the half pint are sufficient.

Mr. AUSTIN. Mr. Chairman, in Detroit there is quite a demand for a 10-ounce bottle. For the last two years I have permitted the bottle manufacturers to place a bottle in use for cream and milk, or for milk at least, for restaurant trade, if the bottle was marked 10 ounces. Their desire was to place a third-of-a-quart bottle upon the market, and I objected to that, but I did consent to their using a 10-ounce bottle if it was clearly marked 10 ounces. This, however, I think, is confusing and conducive to much trouble to the weight and measure inspections, and I, for my part, would be very glad to see this conference oppose any departure from the usual size and capacity or the usual subdivisions of the standard quart.

The SECRETARY. Mr. Chairman, I would like to state that this is one of the very questions on which the committee would like to get the opinions of the various delegates. This was supposed to provide for a custom which is now prevalent throughout the United States. I know I had to be convinced myself that there was a need for a 3-pint bottle before I agreed to this amendment. I was informed that that was the case—that this bottle had been legalized in a number of the States throughout the country and was in common use, and that there was a real demand for it. I saw no objection to providing for it in these specifications, and so I agreed to the amendment with that understanding. I would not have the slightest objection if the majority of this conference thought that was unnecessary or undesirable. I would like to say that as a member of the committee.

Mr. VIRDIN. Mr. Chairman, I would state that in Philadelphia we have never heard of such a thing as a 3-pint measure, and I fail to find it in any of the books that we have received from the different States, so if it is adopted by any State I fail to read it in any of their pamphlets.

Mr. HANNAFORD. Mr. Chairman, I understand the amendment is to exclude the 3-pint milk bottle, and I sincerely hope that it will pass. I have in my district 38,000 milk bottles, just in one small district; and it was drawn to my attention within six weeks that one of these milk dealers bought 3 gross of 3-pint milk bottles, and he uses them in charging 12 cents for that bottle of milk. It is ridiculous. The quart, pint, and half-pint are sufficient, and if we get what the bottle contains we will be mighty fortunate.

Mr. SHERMAN. Mr. Chairman, I want to ask another question. Is it our business—I am asking for information—is it our business to guarantee to the buyer that he gets good value for his money; or is it only our business to guarantee to the buyer that he gets what he buys? Is it our business whether he drives a good bargain with the seller or not? If he pays more for 3 pints than 3 pints are worth, is it any of our business, so long as he gets the 3 pints he asks for? I want to know where our limits are.

Now, if it is only our business to guarantee that he gets 3 pints, it seems to me that the question is simply this: Is the 3-pint bottle well enough known so that it can be safely left on the market? The fact that it is more difficult, as a matter of administration, to take care of it, due to the greater variety of bottles to keep an eye on, is not a thing, it seems to me, that ought to affect us in this discussion. My own department has no right at present to limit the bottles or the types of scales, or anything else in the market, for its own convenience, but only for the protection of the public. Now, if that is the case, and if that is the sentiment of this meeting, it seems to me the discussion ought to hinge entirely on whether the 3-pint bottle is well enough known to be safely trusted on the market.

Mr. O'Rourke. Mr. Chairman, there seems to be a misunderstanding on this. In our locality we have a standard pint and quart. Various States, and the Federal Government as well, have gone on record as adopting the pint as a standard unit of measure. It is a question in my mind whether we could legally eliminate a measure of any number of pints or quarts, provided they conformed with the standard unit adopted by the Government. If the manufacturers wished to make a measure that contained 6 pints or 7 pints or 9 pints, there is absolutely no law that would prevent them from making that and using it, provided it was fully 6, 7, or 9 pints, whatever the capacity stamp on the measure or bottle indicated; and I believe the committee in recommending the passage of this addition to the specifications took that feature into consideration. I can not see where there is any objection to the various States using the milk bottles of the different capacities providing they contain what they are supposed to in recognized units. I am in favor of the adoption of this amendment just as presented by the committee.

Mr. Steinel. Mr. Chairman, about four years ago this conference adopted the so-called model law. In the model law we incorporated a section on milk bottles. The 3-pint bottle was standardized at the time, and we incorporated it in our Wisconsin State law, and it is now in use in our city in large quantities. The manufacturer has put in these bottles. Now, would it be fair to these manufacturers to throw out these bottles? There is no chance to mistake them for pints or quarts; they are marked "3 pints" in large figures blown into the bottle, the same as the pints and quarts. Would it be fair to the dealers in our State and city to throw out these 3-pint bottles? We told them these were adopted in the model weights and measures law approved by this conference.

Mr. Maroney. Mr. Chairman, I was a member of the committee that drafted that law several years ago, and had that matter under consideration; and in answer to the gentleman's question, if you will stop and think, they are putting up liquor in fourths and fifths, and sometimes sixths and sevenths, and how are you going to stop them if they get to using them? Ninety per cent of liquors are put up in fifths or sometimes in sixths of a gallon.

Mr. Richardson, of Virginia. Mr. Chairman, people are using these bottles in our State now, and they have them all stamped on the outside.

The President. If there is no objection, we will vote on the motion to drop out the 3-pint size. [Putting the question.] There is a division.

Remember that those entitled to vote are State, county, and city sealers only. There are certain guests here, who are always welcome and whose opinions are of value, but they are not entitled to a vote.

(A count was taken, resulting in 17 for and 35 against; so the motion was lost.)

The PRESIDENT. The question is now on the original amendment to the specifications.

(The question was taken, and the amendment as first read was adopted.)

Mr. VAN DUYN. Mr. Chairman, I would like to bring this one question to the attention of the gentlemen assembled here to-day, and that is with regard to the 10-ounce milk bottle that is universally used in cafés and restaurants all over this country. Now, the sanitary law in a number of States, of which Ohio is one, requires that milk served at cafés and restaurants must be served in sealed bottles at your plate, if you please, and opened there. Now, this 10-ounce bottle just fills the glass at your plate. I was wondering whether, while we are considering this proposition, it would be in order to take up this matter or whether it was of importance enough to consider it?

Mr. DOWNING. Mr. Chairman, the question of the 10-ounce bottle that Mr. Van Duyn speaks of came up in our State in connection with our milk-bottle law, and the people in charge of restaurants had brought this same question up to us. Now, I see absolutely no reason why this bottle should be tolerated at all. They came to us on the plea that 10 ounces was just the amount the people desired to drink. Now, how in the world they arrived at such a conclusion I do not know. It is the same proposition that was put up to us by the bottlers in the dispensing of liquor, saying that a 12-ounce bottle was just the proper amount to drink. I have found the ordinary tumbler holds 8 ounces—a half pint. So, I see no reason why we should change from the half-pint to the 10-ounce size, just a trifle larger. I think we ought not to consider this proposition at all.

Mr. BUCHTEL. Mr. Chairman, as I understand it, this amendment disallows the recommendation, as it stands now.

The PRESIDENT. There is no motion or recommendation, but remarks have been permitted regarding the 10-ounce bottle for the sake of discussion.

Mr. BUCHTEL. I think it would be wise to proceed with the next section.

The PRESIDENT. It is not the purpose of the Chair to cut off discussion. In my own mind I think that is a very important question—this 10-ounce bottle. I do not believe in the 10-ounce bottle, because I happen to know that the average tumbler is 8 ounces. In fact, I often use for coarse work an ordinary tumbler for an 8-ounce measure. But it is along the line upon which we wish information, and therefore I permitted discussion which you might say was a little out of order at the time.

We will proceed to the next section.

Mr. CONNORS. The next amendment is to the specification reading "The following errors are allowable." The present specifications allow the same errros on liquid capacity measures in excess and deficiency, but we find it more equitable to allow double the errors in excess, because even if you completely fill a correct measure it is very seldom that you can deliver the full quantity from it. There-

fore the committee was of the opinion that those errors should be allowed in deficiency and double those errors in excess.

The SECRETARY. Mr. Chairman, I might state that that is the practice in England at the present time. There are a good many things that contribute to make a measure (especially a metal measure) short after it has been in use. Any dent will have that effect; any distortion of its shape has the effect of making it small, except punching out the bottom. So it seemed to the committee as though that was a good recommendation to make—to allow larger tolerances in excess than in deficiency.

The PRESIDENT. Are there any further remarks? [After a pause.] If not, this stands adopted.

Mr. SHARP. Mr. Chairman, I suggest, in this milk-bottle proposition which comes next, that the paragraphs be taken up separately, so that we can discuss them intelligently.

Mr. CONNORS. The next section is a new section relating to milk bottles. Now we come again to the size proposition, and we recommend that:

"Bottles used for the sale of milk or cream shall be made only in the sizes heretofore specified under the heading 'Liquid Capacity Measures.'"

That is, it provides for the gallon, half-gallon, 3-pint, quart, and so on down, but does not allow for the 10-ounce bottle.

The PRESIDENT. If there is no objection, this will stand approved.

(There was no objection.)

Mr. CONNORS. The next paragraph is—

"Each bottle shall have its capacity clearly blown or otherwise clearly and permanently marked in the side of the bottle, and in the side or bottom the name, initials, or trade-mark of the manufacturer thereof."

The PRESIDENT. If there is no objection, that paragraph will stand approved.

(There was no objection.)

Mr. CONNORS. The next paragraph relates to the correct filling point. Where shall the bottle be measured to? In some States it is measured to the bottom of the cap or stopple. Now, I think most of the sealers know that in ordinary practice bottles are not filled to the bottom of the cap or stopple; so the committee was of the opinion that they should be correct when filled to some point below the bottom of the cap or stopple. But when we considered that, we found that the bottles had varying diameters. For instance, the ordinary jar is not over 2 inches in diameter, but there are on the market cylindrical, screw-top jars, for the sale of cream, which have a diameter of about 3 inches. Now, it would be unfair to put them in the same class with an ordinary milk jar, as we understand it; so you notice that we have prescribed a different point to which the bottle should be filled. We recommend "Bottles with an inside diameter immediately below the cap seat or stopple of not over 2 inches shall hold the correct capacity when filled within one-quarter inch of this cap seat or stopple." That is, on the quart bottle of this kind the point to measure to would be one-quarter of an inch below the cap seat of the bottle. In that case the committee is of the opinion that when the bottle was filled to this point it would deliver a full quart, also taking into consideration the tolerance. "Bottles with an inside

diameter of over this amount immediately below the cap seat or stopple shall hold the correct capacity when filled within one-eighth inch of the cap seat or stopple." That is, if the bottle has an inside diameter of more than 2 inches, the point to be measured to is one-eighth of an inch below the cap seat, and if the bottle has a diameter of 2 inches or less the point to be measured to is a quarter of an inch below the cap seat.

Mr. VIRDIN. Mr. Chairman, I would like to ask what the meaning of the tolerances is in regard to milk bottles—whether the meaning is to go below or above?

The PRESIDENT. Tolerance always means allowable errors in either excess or deficiency.

Mr. VIRDIN. Well, if I am rightly informed by people who are interested in their own welfare, the great trouble has been that people have suffered too much with what they term "tolerance." The people to-day are spending about a million dollars or more for the purpose of having inspectors, like ourselves, who will protect them. Now, when a jar is marked a quart and it is below a quart I would feel myself, if I put the stamp of approval on that bottle, that I was practicing deception, because the people rely on me to know that that is a quart and that when they purchase it they are going to get a full quart. Now, if it is below, as I understand the standard, it should be marked a quart, less so many drams or whatever it may be. If it is not so, then there is no use of having a standard. First, the manufacturer himself wants a tolerance on his goods. Then the party who fills the container with the commodity wants a tolerance, and at the same time it is marked a quart or a pint or whatever it may be, and we seal it, and we are putting our stamp of approval on it as being something which it is not. Now, I tell you it is a wrong thing for any of us here to allow a tolerance to be under the measure, because we very seldom get it filled anyhow. We put out about 3,000,000 bottles in the city of Philadelphia every morning. Prior to the organization of our bureau we were getting a bottle sometimes about three-quarters filled up, and some of them were so bold that they would fill it two-thirds full, and now they are filling them up to the cap in some cases, and the bottle will not hold a quart at that.

Now, I think it is the duty of every sealer here to protect every man, woman, and child in this country in regard to the milk, because I think there is more milk used by the people—that is, by the poor people—than any other commodity, and they are entitled to get the full amount. I have heard it said that the glass blower can not make a bottle to hold a quart. That is ridiculous. Then I have heard it also said that there is a certain company which can make an exact bottle, and that would, of course, create a monopoly. Now, if that is the case and a man can not come up to that, they will have to regulate themselves so that they can compete with the other class; but I am telling you that when a man says he can not do it it is not true, and there are a lot of mechanics in this room here to-day who know it is not true. They are making bottles to-day of 3 drams under. Now, if they make them 3 drams over, we will then get a full quart. It is just as easy to make them three over as it is three under. The bottles in Philadelphia, I think, are 85 per cent short. I had a consultation with glass men, and they say that they can all

be made to hold a quart, and inasmuch as we are appointed for the purpose of protecting the public I think that we ought to do it, and we ought to exact a bottle that will hold a quart.

The PRESIDENT. Would you not make the same statement in regard to our money? I presume that every time you get a $5 gold piece or a silver half dollar, or any coin whatever, you imagine you are getting full weight and full measure?

Mr. VIRDIN. I am entitled to think that if I do not get it they are cheating me; that is all.

The PRESIDENT. But the authorities, recognizing that no mechanical action is perfect, allow a tolerance. Hence, every year, when the assay commission goes to Philadelphia and tests up the coins from all over the United States, they take this little table, and all of the coins which fall within certain limits they say are right. Now, why? Some of them are under and some are over. Why should the Government pass coins which are light? Solely for the reason that it is impossible in mechanical operations to reach exactness. You in your standardization have a tolerance. You have to allow it. You would be in an awful fix if you had to say every time, "That is exactly a quart." You could not do it. There never was an exact quart made, and there never was an exact pound made.

Mr. VIRDIN. I agree with you, Mr. Chairman.

The PRESIDENT. Now, it would not be fair to allow the supplier to always give over. You would not suggest that, would you?

Mr. VIRDIN. We are not afraid of getting anything over. We very seldom get that. On our inspections we find that we have a great deal under and very little over.

The PRESIDENT. I think you have the wrong idea of tolerances.

Mr. VIRDIN. I do not think so, Mr. Chairman. When I am paid to protect the public in that line, I think that when a bottle says a quart it should be a quart, and that if there is any shortage it should be marked short.

The PRESIDENT. But you can not measure a quart.

Mr. VIRDIN. But we can have a bottle to hold a quart.

The PRESIDENT. But how are you going to know that it holds a quart? Just for one moment, grant that you are right in this matter, and that you are going to say that the bottle shall hold a quart. How are you going to tell it?

Mr. VIRDIN. Because we have our standard to go by.

The PRESIDENT. Oh, but you see your error in using that is one-tenth of 1 per cent. You can not use it any more accurately than that. So you are unconsciously making this mistake all along that you say you should not do.

Mr. VIRDIN. But we are not making a mistake when we find so many under and so few over.

The PRESIDENT. It may be so, but we are trying to set up here a sort of standard to go by, and we are trying to be reasonable and make allowances for your own shortcomings, as well as those of others.

Mr. VIRDIN. No, sir; you are not doing that when you allow tolerance below a quart.

Mr. SHERMAN. Mr. Chairman, I wish to speak to the proposition contained in the third paragraph, which is the paragraph under discussion and is not the paragraph on tolerances. It seems to me

that before we pass on the question of tolerances, which is in the fourth paragraph, we should finish up with the third paragraph. The third paragraph, as I read it, is as to whether we shall grade the bottle from the level of the stopper or from a point one-quarter of an inch below, or one-eighth of an inch below, according to the diameter of the neck of the bottle. I am strongly in favor of that provision, for the reason that I once drove a milk wagon and I found that customers would complain bitterly if the bottle was filled up to the stopper. The ordinary way of taking out the stopper is to jab something into it, and the milk cap is not popular, and it is not good for clothes either. A quarter of an inch is about as near as you can go to the stopper without giving the customer a bath, and to provide that the bottle shall hold a quart when filled clear to the stopper means that the customer must receive short weight or the dealer will lose his customer.

Mr. Richardson, of Virginia. Mr. Chairman, I would like to ask the gentleman who just preceded me if he allows an eighth or a quarter of an inch from the stopper as the point where the milk must come, how is anybody going to tell when he gets the milk up to that eighth or a quarter of an inch of the top, and how can the casual observer or buyer know when his bottle is filled up to within a quarter or an eighth of an inch of the stopper?

Mr. Sherman. I would answer to that, that if your bottle is required to hold a quart when filled to within one-quarter of an inch of the stopper, the variation due to the inability of the man who fills the bottle to judge of what is a quarter of an inch would probably, I should imagine, be well within the limits of any reasonable tolerance that you might set. It would be a very small percentage, I am convinced, because it occurs at the narrowest section of the bottle, and a pretty wide variation at that point of the bottle makes very little difference in the total cubical content.

Mr. Umstead. Mr. Chairman, I would like to ask a question. This paragraph says the bottle shall hold the correct capacity. What is it the intent of the committee to convey at that point by the words "correct capacity"?

Mr. Connors. The word "correct" in the specification always means within the established tolerance. It does not mean exact; it means within the tolerance allowed.

Mr. Wallenmeyer. Mr. Chairman, nearly all of the milk put up by milk companies in the larger cities is filled by automatic fillers, and it is absolutely impossible to bring the milk up under the cap. They usually leave about the variation allowed by this section—about a quarter or an eighth of an inch.

The President. Unless there is objection, this section stands approved.

(There was no objection.)

Mr. Connors. The next paragraph relates to the tolerance. We provide that the tolerance on an individual 1-quart jar shall be 4 drams. The committee thinks that with the tolerance allowed and with the liquid measured to this point below the cap the customer will get a full quart delivered from the bottle. But we also provided that the average error be only one-fourth of that. That is, on an individual quart bottle the tolerance allowed would be 4 drams, but in making the test a sealer usually takes a number of

bottles; so we say that the total error on 25 1-quart bottles shall not be over 25 drams, or an average of 1 dram on a quart. Now, if a customer can get a quart milk bottle and get it within 1 dram on an average, he is getting as near as the manufacturers can make them, or as near as the sealers can measure them. So we recommended this specification:

"The following errors in excess and deficiency may be allowed on individual bottles, and on the average content of bottles, as noted in the column headings."

"The latter figure"—which means the average content—"shall be determined by finding the error on each of not less than 25 bottles selected at random from at least four times the number tested, and taking the average of these errors."

That is, on a hundred 1-quart bottles the average errors would not be over 1 dram apiece.

The tolerances are all given in the table before you.

Mr. MARONEY. Why is it, Mr. Connors, that you come in here with a tolerance, for instance, on a quart bottle of 4 drams, when you know at least three bottle manufacturers that will manufacture a bottle that will come within a tolerance of 1 dram?

Mr. CONNORS. A tolerance of 4 drams on an individual jar is recognized by law in at least four States in the country. I think the sealers who know anything about glass blowing or making glass milk jars know that it is impossible to get every bottle exact. As I understand it, a man can get correct jars, but he has to pay a higher price for them, since they must be selected and tested. So the committee thinks this is a fair tolerance right through. I would like to hear the expressions of the members on it.

Mr. MARONEY. Then you stand out to help our friends the glass blowers rather than the public at large—the fellow who buys?

Mr. CONNORS. Oh, no. We are helping the public at large, Mr. Maroney, in this way: That we have changed the point which was always used to test the bottle, and put it down one-quarter of an inch below.

Mr. MARONEY. But you and I agree that we can have a bottle made within half a dram. Still, you give them a tolerance of four, from the fact, according to your own statement, that it is a matter of expense.

Mr. PILLER. Mr. Chairman, this milk-bottle proposition is a serious affair at this time. My friend from Philadelphia has spoken of the fraud and deception. We have had that thing going along in New Hampshire for quite a number of years. Now, as regards the tolerances that are allowed here, I am against any such thing, for the simple reason that in our particular State, when our milk dealers contract for milk, they generally contract with the farmers that when buying 8 quarts of milk they shall receive 8 quarts and a half. So you see the milk dealer is protected, and I do not know why we should allow our general public, that we are supposed to protect and aid in getting what belongs to them, to stand for a tolerance which amounts to a good deal in volume of business. Our friend Mr. Connors tells us we can get bottles within half a dram. If we can do so, let us get them that way, and let us establish a standard by which the people can get exactly what they pay for.

In our particular State of New Hampshire we have been used as somewhat of a dumping ground. When they passed the bottle law in the State of Massachusetts it seems as though quite a number of the short bottles that were used in Massachusetts began to be dumped into the State of New Hampshire. We had no bottle law there, but during my time in office, which is three years, I have got around and tried to bring things around as near as I possibly could to the satisfaction of both the dealer and the consumer. Mind you, I do not want to antagonize a dealer; I do not say that we should antagonize a dealer. I believe that the dealer should be honest in his dealings, and that the consumer should pay for everything and get what he pays for each time; and, as I said before, I am opposed to any such tolerance as is called for in this specification.

Mr. CONNORS. Mr. Chairman, I think the gentleman misunderstood my remarks. I did not say that all bottles could be made within the one-half dram. What I did say was this: It is possible to get bottles within half a dram, by this method. A manufacturer can make up a hundred jars, and out of those hundred jars he may get 10 that are within half a dram, and you can buy those 10 of him for the same price that he sells a hundred for now. That is what I meant when I said that bottles could be made and are made within half a dram. I may not have the proportion just right, but in my opinion there would be about 10 in a hundred, and for the 10 jars you would pay what they are getting now for a hundred.

Mr. BUCHTEL. Mr. Chairman, the question of cost, as stated by Mr. Connors, is to my mind very important. The very minute we begin to try to make milk bottles accurately and perfectly we are going to run the cost up, and the very minute you begin to run the cost up, then your constituents, the people for whom you are working, will begin to complain. I had a similar experience in connection with ice, and I noticed a piece in the paper saying, "Our genial city sealer of Portland has succeeded in raising the price of ice from 50 cents per hundred to 75 cents per hundred." And that is the position we are going to place ourselves in on milk bottles if we insist on an absolute bottle.

Mr. SHARP. Mr. Chairman, as I read these amendments. I think the amendment as to the manufacturers' tolerances on page 10 has something to do with the question of tolerance on these milk bottles. That section reads, "The manufacturers' tolerances and sensibility reciprocals or the tolerances and sensibility reciprocals on all new weights and measures and weighing and measuring devices shall be one-half of the values given heretofore in the tolerance tables."

Mr. CONNORS. I will say this, Mr. Sharp: The committee did not intend that provision to apply to this table.

Mr. SHARP. The milk bottle is a measure; that is what I was after.

The SECRETARY. The milk bottle can not change, and the tolerances referred to refer to other apparatus liable to change.

Mr. BARNARD, of Michigan. Mr. Chairman, I wish to indorse this tolerance that the committee has provided here, and to state that the average tolerance here is practically the same tolerance that our ordinances allow in Battle Creek. I think I can explain in a very few seconds a method that we have used there that has enabled us to get a bottle that is within 1 dram, on the average. We passed a bottle ordinance requiring all manufacturers that sold bottles in

Battle Creek to execute a $1,000 bond to keep these bottles within the average tolerance allowed, and I wish to say that my experience has been that there has been a variation of less than 1 dram on the average in our bottles in Battle Creek.

Mr. DOWNING. Mr. Chairman, I was going to say practically the same thing as the gentleman that preceded me, but I would add this: It seems to me that we are splitting hairs. The average tolerance on 25 bottles, you will notice, is 1 dram. Now, 1 dram is one two-hundred-and-fifty-sixth of a quart. Milk is worth, say, 7 or 8 cents per quart. That brings the value of that milk down to an extremely small figure, and our experience in Wisconsin has been that if you make tolerances any closer than this you can not get the milk-bottle manufacturers to make bottles that will comply with them. If these tolerances were the tolerances given on individual bottles—say 4 drams on the quart—I would oppose it; but when you get down to 1 dram on a quart you are getting just as close as you can manufacture bottles at the present price.

(Cries of "Question!")

The PRESIDENT. Question is called for.

(The question was taken, and the paragraph was adopted.)

Mr. CONNORS. The next specification relates to dry measures. We found we had not covered certain types of measures which have come on the market lately, with a bottom that raises up. Out in Indiana and in Minnesota the committee saw a type of measure which, when the bottom was on the floor, was a peck measure, and when it was pushed up halfway was a half peck. So we want to add this specification, reading as follows:

"Dry measures with adjustable bottoms shall not be used."

The PRESIDENT. If there is no objection this will stand approved.

(There was no objection.)

Mr. CONNORS. Then, at the end of the dry-measure section, where it reads, "The following errors are allowable," we recommend that that be changed to read: "The following errors shall be allowed in deficiency and double these errors on dry-capacity measures." That is, double the errors in excess and use the table in deficiency, the same as with the liquid-capacity measure, since the same arguments apply on the dry measures as on the liquid-capacity measures.

The PRESIDENT. If there is no objection this paragraph will stand approved.

(There was no objection.)

Mr. CONNORS. Then we recommend a new heading and specifications, reading as follows:

"BERRY BASKETS OR BOXES.

"Baskets for berries or small fruits of a capacity of 1 dry quart or less shall be one of the following sizes:

"One quart, one pint, or one-half pint, dry measure."

That is, we did not want to allow the "dinkies"—the three-quarters of a quart, and so on.

The PRESIDENT. Unless there is objection this first paragraph will stand approved.

Mr. CUMMINGS. Mr. Chairman, I would suggest that the text of that paragraph does not agree with the heading. The word "boxes"

should be contained in the text as well as in the heading, so that it will read, "Baskets or boxes for berries."

The PRESIDENT. That is easy to do. That will be changed.

Mr. CONNORS. The next paragraph reads:

"The following errors are allowable in deficiency and double these errors in excess on berry baskets or boxes:

Capacity.	Tolerances.
	Cubic inches.
1 quart	3
1 pint	2
½ pint	1

The committee thought that was a fair tolerance. It is double what the dry-measure tolerance is that was adopted last year.

Mr. STEINEL. Mr. Chairman, I would like to make a motion to cut out the tolerance in deficiency on berry boxes. Berry boxes can be made exact, or more exact than milk bottles or other containers. We have no tolerance in deficiency on berry boxes in Wisconsin. We find that where we allow a tolerance on berry boxes the manufacturer will invariably try to make the boxes small by this amount. Now, in the case of a quart, 67 cubic inches, we find those boxes come in containing 64 cubic inches when a 3-cubic-inch tolerance is allowed. They are made for States where they allow this tolerance, and we find that if we insist of 67 cubic inches we get 67. Now, 3 cubic inches is quite a percentage, and they take advantage of that.

(The motion was seconded.)

The PRESIDENT. I would like to state, in connection with this, that there are two principles involved, and we should not lose sight of them. The inspector, in testing a single box, is really testing the amount of that sale; but when he wishes to test the accuracy of his container, then he should take a large number. Take bottles, for instance. He is testing either the accuracy of those bottles or the accuracy of the particular contents at that time. So I think that, granting that the 3 cubic inches might be a tolerance allowable in a sale, it should never be allowed in the manufacture of boxes; and that point has been overlooked, to my mind, in this amendment. That is to say, in a large number of boxes, how much should we allow for the average variation? That ought to be much smaller than the other. I may be wrong. That is the point you wished to make?

Mr. STEINEL. Yes, sir.

The PRESIDENT. The question is, If a manufacturer makes his berry boxes as nearly alike as he can, how nearly alike will they be?

The SECRETARY. I would like to say that at a hearing before the Committee on Coinage, Weights, and Measures a great many months ago a Member of Congress from Ohio who was familiar with the situation regarding the packing of berries, stated—and this was afterwards verified—that there were millions of these boxes that were shipped to the farmer knocked down, perfectly flat, and he bends them up. They are rough measures; these are not standard quart measures or pint measures. They are wooden things that are stamped out, and they swell and shrink and everything else. They are simply folded up by the farmer, pins put in them, filled with berries, and

sold. Now, these do not always come from a factory, and they are not always where they can be handled by machinery that can be adjusted so as to turn out a uniform product.

Mr. DOWNING. Mr. Chairman, I think that Mr. Fischer is absolutely right in what he says. The only objection I saw to this was the large tolerance of 3 cubic inches, which, in my opinion, is altogether too much. I think we should cut that down to 1½. If you get it much closer than that, the boxes could not be made to comply with it. Take the matter of the shrinkage. We have made a test of the shrinkage of the wood, and there is a decided shrinkage in some of the wood from which boxes are made. A dry box would have to have a much larger tolerance. When the berries are placed in these boxes, if they are dry they absorb moisture from the berries, so that they practically come back to the point of their original capacity.

Mr. WALLENMEYER. Mr. Chairman, we made a special study of that at Evansville, where they have a big berry-box manufactory, and we find that it depends a great deal upon whether the veneer out of which the boxes are manufactured comes from the heart or from the sap. If the box is made out of the veneer from the sap, it will shrink 3 or 4 cubic inches—4½ in one case—per box. The average shrinkage of gum and poplar wood was 2½ cubic inches.

Mr. SHERMAN. Mr. Chairman, is it not possible to make a distinction between wooden boxes and boxes of pasteboard? The wood from which these boxes are made is growing scarcer every year and the price is going up, and it is only a question of time when they will have to be made of some other material. In fact, I know that boxes for such purposes are now being made of pasteboard, and when so made they can be made practically exact and the shrinkage is negligible. The proposition when dealing with pasteboard or any kind of metal is entirely different from the proposition when dealing with wood, and it seems to me we should make a distinction, from an engineering point of view, between the box made of wood and the box made of any other material that we now seek to make it of—pasteboard or metal.

Mr. VIRDIN. Mr. Chairman, I can not understand why so many are anxious to allow tolerances. I may be wrong, gentlemen, in this, but it grinds on me pretty hard. Here is a gentleman who says that they can make these boxes accurately and that people can get what they are purchasing. Now, if that can be done, why do we want to allow tolerances and deceive the people? Because the manufacturer will manufacture according to the tolerance, and every man here knows it that knows anything about business. They are all working on tolerance, and that is the way they are making a great deal of money. Now, we are paid to protect the public, and we ought to require an exact measure, and if there is any tolerance let it be a little over. But we are all trying to protect the manufacturer and allow a little under, and they work under. So the party that puts out the commodity works on that tolerance and gives you less all the time. Now, I do not know whether we are paid for that or not. I think every man here is paid to protect the public and not the manufacturer; and I can not get it into my head—and I would like some of these scientists to try to beat that into my head—where it pays to go below what is marked on a measure, and why we want to

allow a tolerance to the manufacturer when he will get right down to that tolerance. Say a quart, say a pint, or whatever it may be, and make them give it. That is what I think we are here for. The people have been fooled for years by tolerances, and I am surprised, here at the seat of Government, that they work out any such thing as that.

Mr. ALBRECHT. Mr. President, I would like to ask Mr. Connors whether a raised bottom is permissible.

Mr. CONNORS. We have no specifications here as to the manufacture of berry boxes. Some berry boxes are made with a raised bottom, some are round, and some are hexagonal, but we have not included any specifications as to construction, on the ground that the boxes are flimsy anyway, and are used but once, and if we can get them to contain the proper capacity we are doing pretty well.

Mr. DOWNING. Mr. Chairman, I believe I can say a word or two that will help to clear this up. There is a prevailing opinion that if the bottom of a berry box is raised the box is short. Now, all we are interested in is that that box shall contain a standard dry quart. The type of berry box that we manufacture in Wisconsin has a bottom raised about one-half inch. It is raised with a definite purpose in view, so as to prevent the crushing of the berries in the box below. There are two or three tiers in a crate, and if we had a flat bottom there would be crushing of the berries. As they are packed by the growers they are heaped. By the time they get to the market they are either level full or about to settle. There is an advantage in having a raised bottom, provided you have 67 cubic inches above it.

Mr. WALLENMEYER. It also provides for ventilation for the fruit, to prevent the fruit from perishing.

Mr. SHERMAN. Mr. Chairman, referring to the paragraph under discussion, I move that this paragraph be amended to read:

"The following errors are allowable in deficiency and double these errors in excess in boxes constructed of wood."

The same tolerance is not needed for boxes not constructed of wood.

(The motion was seconded.)

The PRESIDENT. Mr. Sherman, have you made any experiments on the pasteboard boxes with regard to the expansion?

Mr. SHERMAN. No, sir; I have not, but I know there have been tests made. In this manufactory that I speak of, the boxes are coated with wax, I think it is paraffin.

The PRESIDENT. Because, if they are not, the paper would expand almost as much as wood.

Mr. RICHARDSON, of Illinois. Mr. Chairman, in listening to this talk about tolerance and this matter of the bottle I have been somewhat surprised. I would like to say a word from the standpoint of the general welfare of the country, the interest of honesty, and the interest of the common masses of the public. When a bottle can be made within 1 dram of the right amount, why should we give 3 drams for tolerance? In this matter of tolerance if you give some parties an inch they will take a foot; and you should be very careful on the tolerance question. Now, on the box question I can see very clearly how those things can differ, from moisture, and so on, and the condition of the different parts of the log from which the box is made, but on the bottle it does appear to me, with all the knowledge

of conditions and all the science we have to-day, that we ought to get closer than 4 drams on the quart.

Mr. STEINEL. Mr. Chairman, the men that put up thousands of boxes, as these strawberry growers do, can tell with the naked eye whether they have got them drawn up too tight, but they try to crowd them and make them smaller. I can tell a short quart 10 feet away now. I picked out some the other day that were 4 cubic inches short; I found they measured 63 cubic inches. These parties who put out tens of thousands can tell the same as we can, and we want a chance to get at the man who is selling the berries, not the manufacturer. I think that tolerance is too large.

Mr. O'ROURKE. Mr. Chairman, I move an amendment to the amendment—that we change this paragraph covering tolerances, split the tolerances in half on the sale, and eliminate the tolerances entirely from the manufacturers of berry boxes.

(The motion was seconded.)

Mr. O'ROURKE. My understanding, Mr. Chairman, from the opinions expressed by different gentlemen here, is that there is no question about the pasteboard boxes being manufactured and placed on the market accurately, but there seems to be a difference of opinion on the wooden boxes. Personally, I feel as though the tolerance on wooden boxes submitted by the committee is too large, and I am not in favor of allowing the manufacturers of berry boxes any tolerance at all. I have had a riot every day this year on this berry-box question. We do not get any berries in my town that are shipped from our State; we get them from other States. I am in a battle all the time, and I have gone so far as to go into the stores and compel the grocers to make them full quarts and pints—to repack them after they have received them from the commission men. Now, I am a little selfish in this. I want to save a little trouble for myself. I believe that if the Federal Government goes at this and adopts a specification that gives these manufacturers no leeway whatever the trouble will be eliminated in all the States.

Mr. SHERMAN. Mr. Chairman, I would like to explain my amendment. I intended to follow, in case this amendment were passed, with the suggestion of another paragraph containing an entirely different set of tolerances for containers made of pasteboard. A pasteboard container can be easily made which will fall within a tolerance of 1 dram to the pint, easily, under very widely varying climatic conditions. I know. I am speaking here now, not as a weights and measures man, for I know nothing about that end of the work. I am speaking as an engineer—of what I know can be done with a pasteboard box. I am entirely willing to take the word of the gentleman who says that these tolerances are correct for the wood box, but I think it would be a great mistake to omit this opportunity to put a tight restriction on the manufacurer of the pasteboard box. It seems to me that is a thing we can settle first, before we discuss the general question of tolerances in this case.

The PRESIDENT. There are two entirely distinct principles here, and before we go too far and get this mixed up I am going to get it straightened out. This amendment to the amendment would have the right of way. It is not the best way to handle it, but if you insist, we will take that up—the amendment to the amendment.

Mr. STEINEL. Mr. Chairman, my motion was the first motion—to cut out the tolerance entirely. I would like to have a vote on that. Simply as a matter of information, I will say that this tolerance can be enforced to the letter. For the last two years, in Milwaukee, 98 per cent of the berries came in in full-sized quart boxes. As to the other 2 per cent, we either made them dump them or we confiscated them and sent them to hospitals. We have been enforcing this for two years. I would like to have a vote on this—to cut out this tolerance in deficiency on berry boxes entirely.

Mr. BROWN. Mr. Chairman, there seem to be three separate questions before the house, and if the movers thereof would agree to consider them in the order in which they were introduced, I think it would simplify matters. If Mr. Sherman, who introduced the first amendment, would agree to let that lie over until we dispose of this one, this gentleman here, I am sure, would agree to let his lie over until that is done.

Mr. SHERMAN. I will agree to that.

Mr. O'ROURKE. That will be satisfactory to me.

The PRESIDENT. Then both amendments are withdrawn, and remarks are in order to the original question.

Mr. WALDRON. Mr. Chairman, my State makes more baskets than any other one State in the Union, and we all know that baskets can not be made perfectly exact. It is very foolish for us to expect to find a common basket as accurate as our standard. When a basket is made and filled with fruit, it will expand instead of getting smaller.

Mr. STEINEL. Mr. Chairman, I would like to mention how we carry out the enforcement of this law. We have a law, and the shippers do not dare to ship anything but full standard quarts; and our dealers in Milwaukee have buyers, and when the buyers run across boxes the first question they ask is, "Are they full standard capacity?" If they are not, they do not touch them. If they find they are short, they go somewhere else, and in that way we handle it. Our buyers do not touch anything but what is 67 cubic inches. If they did that in all States, there would not be any short boxes. They could not ship them anywhere.

Mr. HARTIGAN. Mr. Chairman, it seems that the discussion on the berry box is much more important in the minds of this conference than the previous discussion on milk bottles. With all due respect to this committee in charge of the tolerances and specifications, which has been working honestly for a whole year upon this matter, it seems unfair to this conference to present at the very last moment a report containing suggestions and recommendations of very great value, and ask us on the spur of the moment to take up these most important problems and pass them off in the heat of a convention. It is unfair to the manufacturer, to the producer, to the public, and to ourselves. I recognize that this particular subject of weights and measures is in its infantile stage, and therefore I think that this conference might, with further consideration for all the elements that make up the work under our direction, arrange a program from year to year, even though it be 10 years or 15 years, or until such time as the Nation is ready to receive Federal legislation on this matter. We ought to obtain the very best information and grant the most exact fairness to all elements concerned.

Mr. MURRAY. Mr. Chairman, the philosophy advocated by my friend from Philadelphia may be sound, and my friend from Milwaukee may be a sound philosopher; but they are dealing with the impossible. My friend from Milwaukee spoke about berry baskets being made to contain 67 cubic inches. Now, if I understand rightly, he has allowed a tolerance there, because it is 67.2 plus. So he has allowed a tolerance to start with, and a tolerance that should be allowed. We have got to allow a tolerance. We can not deal with the impossible; and if we compel the berry-box manufacturer to make each and every one of his berry boxes absolutely accurate and perfect, then it all falls back on the poor consumer, whom these gentlemen have been solicitous about during this meeting.

Mr. BUCHTEL. Mr. Chairman, I agree with the gentleman who has just spoken. It all goes back to the same thing, the question of the cost to the consumer; and the very minute that this convention goes on record as wanting an absolute box made, that minute we are going to increase the cost to the consumer, and I doubt very much whether the consumers that have to pay this additional cost will appreciate the efforts of the different sealers throughout the country. The minute that we begin running up the cost, they lose sight of the fact that they are getting their full weight and measure. They want it measured very closely, but they do not want it hedged in with a lot of rules that are going to increase the cost to them. I am in favor of allowing these tolerances as suggested by the committee.

Mr. STEINEL. Mr. Chairman, when I said 67 cubic inches I meant 67.2 cubic inches. Another point has occurred to me. You find 90 per cent of the boxes not filled up when you get them. The berries are shaken down, and if you make the tolerance in excess people will not be getting over a quart. No shipper will lose anything on his berries, and the consumer will hardly be getting his full quart then. It is a different commodity from milk, where there is no chance for shaking down. If you do not allow any deficiency and allow a little tolerance in excess, the consumers will get the full quart of berries to which they are entitled.

The SECRETARY. Mr. Chairman, let me ask the gentleman this question: What are we trying to do in this country? Are we trying to maintain standards, or do we want to increase every capacity measure so that it is a little bit larger than the standard? Now, every country in the world, and every man who has ever had any experience in the practical application of weights and measures laws, knows that you have got to have a tolerance. You can not make things exactly correct; and if the tolerance is placed so small that a man in attempting to make the thing correct can just keep within that tolerance—have as many on one side as the other—you have reached the ideal condition of tolerance. But you must have tolerances, unless you are going to make these things cost a fortune. We can not make two weights exactly right, with all our facilities and all the time at our disposal. We can get them to within a certain amount, and then we stop. Every scale man here, every railroad track scale man, knows that after he adjusts his scale to a certain point he has got to stop, otherwise he will keep on adjusting all day, or a week, or a month, or a year. So you have to have tolerances, and if you require that all variations shall be above, by and by our quart will be 1, 2, or 3 per cent above the standard. What we want to

do is to have the consumer, on the average, get a quart; and the differences above or below, the permissible tolerances, are going to be extremely small. They are going to be negligible. But if on the average he is getting the right amount, that is fair to him and it is fair to the dealer. A good many of the people around here talk as though the dealer or the merchant is not part of the public. He is part of the public, too, and it is our duty to protect him just as much as we do the consumer; and, as Mr. Buchtel has said, every time you put a restriction on these standards, on boxes, or whatever it may be, so as to increase the cost, it is an unnecessary expense. What we want to do is to have the average box, the average bottle, or whatever it may be, correct, so that in the long run the consumer gets the proper amount.

Now, of course, there is room for a great deal of discussion as to what those tolerances should be. If they are made so large that a manufacturer can take advantage of them, then they are too large. They ought to be so set that if a man tries to get the correct amount when he makes a box, tries to make it exactly correct, and then finds that there is an unavoidable error, due to manufacture, this defect would be allowed for; and that is what we are aiming at.

Mr. RICHARDSON, of Illinois. Mr. Chairman, the point I wanted to bring out is this: To allow a 4-dram tolerance on a quart bottle would be a little unfair to the consumer. That is the reason why I ask the question, Could we not get down to a closer margin than the 4 drams on the bottle, as it does not expand or contract? I realize, on the other hand, that with a box the matter is very hard to decide, due to the condition of the weather, and so forth.

The SECRETARY. I will simply state that as far as these tolerances are concerned, they were fixed with all the information that we had at hand. Now, if anybody is more competent to do it or has any additional information, we would be very glad to know it.

Mr. RICHARDSON, of Illinois. That is what we are here for—to decide these matters. As I understand it, we are here to represent the United States, different quarters and different interests, and for that reason, gentlemen, if we can arrive at a better conclusion, let us do so. I think the best conclusions are always drawn out from various ideas that we get from other men. We can represent the different conditions in our immediate localities. I think that tolerance is a little too much, and the question is now, Shall we have some amendments on this or shall we take it just as the committee has recommended?

The SECRETARY. I want the gentleman distinctly to understand that I am not preventing amendments. We expect to have them; we want to entertain them and consider them.

The PRESIDENT. I would like to answer the gentleman's question. We are here for exactly that purpose. The motion before us is to abolish this altogether, and if you think it is right, vote it down. We have had a lot of talk and discussion. Now, the thing to avoid is both extremes. When a man gets up and says you can not have a tolerance and you must always have it exact, he simply does not know what he is talking about, because the very weights he uses have a tolerance, and he does not know it. Now, as Mr. Fischer says, what we want to get is your experience.

(Cries of "Question!")

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

Mr. WALLENMEYER. Mr. Chairman, I would regret very much to see any of these tolerances changed, because we had a conference out in Indiana in February, and Mr. Connors and Mr. Fischer were present, and they fixed these tolerances after granting hearings to all the interests involved, and I believe they are more competent to fix these tolerances than men who live in communities where these boxes are not manufactured. We have adopted the specifications out there just as they are, and we are working under them very satisfactorily now.

The PRESIDENT. The first amendment, made by Mr. Sherman, is now in order.

Mr. SHERMAN. Mr. Chairman, in order that the intention of my amendment may not be misunderstood, let me say that my proposed amendment reads: "The following errors are allowable in deficiency and double these errors in excess in boxes constructed of wood." If that amendment is passed, I shall immediately move another table of tolerances in the case of pasteboard boxes. I state that so that that question may not enter into the discussion of the present amendment, which is simply the insertion of the words "in boxes constructed of wood" in this paragraph.

(The motion was seconded.)

The PRESIDENT. You have heard the motion and the second with regard to the insertion of the words "in boxes constructed of wood."

(The question was taken, and the amendment was adopted.)

Mr. SHERMAN. I move to add a third paragraph reading:

"The following errors are allowable in deficiency and double these errors in excess for containers constructed of pasteboard or fiber: One quart, 1 cubic inch; 1 pint, one-half cubic inch; one-half pint, one-quarter cubic inch."

(The motion was seconded.)

The PRESIDENT. Are there any remarks?

Mr. O'ROURKE. Mr. President, we had another amendment that we agreed to consider before we considered anything else.

The PRESIDENT. I admitted this, because it referred to the same question of boxes, and the other will come next.

(The question was taken, and the amendment was adopted.)

The PRESIDENT. Now your amendment is in order.

Mr. O'ROURKE. Mr. Chairman, I do not know that that is quite clear to all the delegates assembled here, and in order that we may have our records correct, and that there may be no misunderstanding on this matter, I move that we rescind all action taken on this berry-box proposition, and that we appoint a committee of five to confer with the standing committee, and to report back a new set of specifications covering this proposition, to be considered later in the day.

(The motion was seconded.)

Mr. VIRDIN. Mr. Chairman, I move you that we amend that by adding the milk bottle also.

The PRESIDENT. Is there a second to that amendment?

(The motion was seconded.)

The PRESIDENT. Are there any remarks?

Mr. VIRDIN. The reason I am putting that in is that there seems to be so much discussion over what I term a luxury; something which is like the migrating birds—it comes and it goes. The milk stays

with you 365 days in the year, and you gave that very little consideration as to tolerances, and so forth, and you are discussing something here which lasts only a short time.

Mr. SHERMAN. Mr. Chairman, the amendment is made apparently on the ground that more attention has been given in this meeting to strawberry boxes than to milk containers, and that milk containers are more important than berry boxes. It seems to me that is entirely beside the question. The length of time given to a question in this meeting appears to be determined by the amount of division of opinion that exists as to the motion made; and if milk containers got less consideration than berry boxes it must evidently be because the meeting was pretty well of one mind on the question of the milk container.

Mr. GODDU. Mr. Chairman, I wish to speak on the motion. If we rescind all the action we have taken and start over again, we will be here next week. We have done some work already, and if we have to go all over that again we will never get through. So I hope the men here will vote against the motion and the amendment.

Mr. RICHARDSON, of Illinois. Mr. Chairman, answering the last speaker, I think that if we were to stay here a month more we would not be spending too much time. This question of tolerance is a very vital one to the people of the United States to-day, and especially on the milk question, and I think if the tolerances are left as they are it would be the biggest mistake that has been made along this line in years.

Mr. O'ROURKE. My motion was to rescind the action that we had taken. We seemed to have a misunderstanding here on account of the number of motions that were put, amendments, etc., and my idea was to eliminate the thing entirely and give the committee a chance to draft something new and submit it to us here after lunch, so that we will know just where we stand.

The PRESIDENT. The amendment to include the milk bottle is before the house, and the question is called for.

(The question was taken, and the amendment was lost.)

The PRESIDENT. The question is now on the original motion.

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

Mr. GODDU. Mr. Chairman, I move we adjourn for lunch.

(The motion was seconded and agreed to.)

Thereupon, at 12.50 p. m., a recess was taken for luncheon.

FOURTH SESSION (AFTERNOON OF THURSDAY, MAY 28, 1914).

The conference reassembled at 2.10 p. m.

NOMINATING COMMITTEE AND ANNOUNCEMENTS.

Mr. WILLETT. Mr. Chairman, I move that a committee on nominations to consist of three members be appointed by the Chair.

The motion was seconded and agreed to.

The PRESIDENT. The Chair will appoint Mr. Van Duyn, of Iowa; Mr. Schwartz, of New Jersey; and Mr. Brown, of Tennessee.

A number have asked as to the time and place of meeting to-morrow morning. The place will be the District Building—the municipal building of the city of Washington—at 9.30 a. m. It is necessary to meet down town to-morrow morning in order that we may get luncheon and go promptly to the President's reception, which is at 2 o'clock sharp. This reception will not interfere much with the business; it shifts the hour a little, that is all.

DISCUSSION ON TOLERANCES AND SPECIFICATIONS, CONTINUED.

The PRESIDENT. Before we start this afternoon I want to say just one word in regard to the order of procedure. While it is true the conference is for the purpose of bringing together the experience of men and getting good advice, it is appropriate, I think, that those who are new listen rather than speak. While we welcome anything that they have to say to the point, I am afraid that some of the new members feel that this is a fixed thing and that this ends it; that they must go home with some definite action that is lasting. This conference will meet every year and we hope to improve all of these things every year, and my advice to the new man is, if he has not had experience in any of these things from either the manufacturing or the other side, to listen and get all the good points that he can, go home and try it out for a year, and then come back and give advice afterwards—not before. Now, this morning we wasted a lot of time, and yet it came from the very best of spirit. People were anxious to know, and it is very difficult for the Chair to be arbitrary in a ruling; but we can facilitate business if we leave the suggestions to those who have given these matters attention. We have now with us many sealers who have gone into these things very carefully and can speak from extended experience. I do not mean this as personal, because I have not anybody in mind; I am speaking to all of the new men. While they are enthusiastic, and naturally so, their attitude should be more that of learning, and then to take home with them what we enact as the best that these men who have had experience can advise, and come back to us next year and say to us, "That is good," or "It is not good, because I have tried it and found out."

We will proceed with the next paragraph, Mr. Connors.

Mr. Steinel. Mr. Chairman, I have another amendment to make on berry boxes. I have talked with a number of members this afternoon—some who voted against the proposition to cut out the tolerance entirely—and a lot of them are of the opinion that 3 cubic inches on a quart is too large a tolerance. I therefore now offer an amendment to reduce the tolerances on wood berry boxes to one-half what they are stated in this paper that we have, making the quart an inch and a half, the pint one inch, and the half pint one-half inch.

(The motion was seconded.)

Mr. Egan. Mr. Chairman, I want to make a statement on this proposition. As it strikes me it is this: We had a motion on this subject before that, and an amendment to it. The amendment was lost and the motion was carried. A movement was then made to rescind, and the motion was lost. It appears to me that that was similar to a motion to reconsider. Now, the motion to reconsider was lost, and I doubt if we can at this meeting open this question.

The President. I think it is entirely in order; it will take but a moment to take a vote on it.

Mr. Egan. All right.

The President. It only opens the question in regard to the wooden boxes.

(Cries of "Question!")

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

Mr. Connors. The next specification relates to scales. These are the general specifications applying to all scales. We found that we had not covered a type of scale which I might describe as a counter platform scale with a removable scoop, and with a latch or poise on the short arm of the beam which is to be moved back and forth according as the scoop is on or off. We feel that that scale should have some representation on the customer's side to show whether the scoop should be on or off. So we introduce this specification which, if it is approved by the body, will force the manufacturers to put on the scale a representation showing the customer that the scoop is to be used on or off the platform. This specification reads as follows:

"When the scale is equipped with a device attached to the scale intended to counterbalance the weight of the scoop, this shall clearly indicate on the customer's side whether the scoop should be on or off the scale platform."

I think you sealers know the type which indicates "scoop on" or "scoop off," and this regulation requires that to be plainly on the customer's side. I think we all are agreed that it is a very good idea to represent to the customer whether the scoop should be on the platform or off.

Mr. Henry. Mr. Chairman, I have one interrogation to make. That is, whether we are to confine this to the regulation to which this is an addition. If my memory is right, the other regulation includes all scales which have a removable weight.

Mr. Connors. This is not an amendment to any specification. We have a specification which forbids the use of any scale which has a removable poise or weight to counterbalance a removable scoop.

The President. If there is no objection this addition to the specification will stand.

Mr. CONNORS. The next specification is an amendment to the specification reading, "The normal position of the beam shall be horizontal." Scales have recently been placed on the market, usually of the pendulum type—some counter scales and some large platform scales—in which the normal position of the beam is not horizontal. That is the only way it can be made, as far as I know. Now, we do not want to throw this scale out, because there were some features about it that are very good. So we propose that "when scales are equipped with a beam or beams, the position or oscillation of which is used to indicate the balance of the scale, the normal position of this beam or beams must be horizontal." That is, where it is equipped with a beam only, and where the beam determines the reading, then the beam should be horizontal; but where the reading is made on the face then the beam may take another position.

The PRESIDENT. If there is no objection to this it will stand. [After a pause.] We will proceed to the next paragraph.

Mr. CONNORS. The next is a new specification. We found we had not covered some points, and I think you will agree that this specification is necessary: "All scales shall be of such construction that they are permanent in their adjustment"—that is, if it is a reading face they must return to zero when unloaded—"and will repeat their weight indications correctly, and are not designed to, or may not be used to, facilitate the perpetration of fraud."

Mr. BARNARD of Michigan. Mr. Chairman, I would like to understand what is meant by "to facilitate the perpetration of fraud."

The PRESIDENT. Certain scales are manufactured so that it is easy to adjust them in a fraudulent manner. A spring balance, for instance, may have its face made so as to slide up or down. Are there any other questions? If not, we will proceed to the next paragraph.

Mr. CONNORS. If a scale had a reading face or dial, the sensibility reciprocal does not and should not apply, because when the weight is placed on the scale the indicator or pointer should give the reading within the allowable error, irrespective of any sensibility. In order to make this clear we add the following words to the definition: "In the case of scales provided with a reading face or dial the sensibility reciprocal does not apply to the face or dial."

The SECRETARY. Sensibility reciprocal, as a matter of fact, never did apply; but this simply makes that clear to the sealer who is trying to follow his instructions.

The PRESIDENT. If there is no objection this paragraph will stand approved.

(There was no objection.)

Mr. CONNORS. It is necessary to change the specification for platform scales reading, "The beam shall have equal play above and below its normal horizontal position," because in the case of the scales I referred to before we no longer require the normal position to be horizontal. So we propose an amendment to read, "On scales which are required to have the normal position of the beam horizontal the beam shall have equal play above and below this normal horizontal position." That is simply to make it conform to the general specification as amended.

The PRESIDENT. If there are no questions or objections, this paragraph will stand approved.

Mr. CONNORS. In the next specification we wish to include counter platform scales; that is, require counter platform scales to have the same tolerances and sensibilities as counter scales; and we suggest that the specification be amended to read this way:

"The sensibility reciprocal of platform scales except counter platform scales shall not exceed the value of two of the minimum graduations on the beam at the capacity or at any lesser load. Counter platform scales shall be governed by the sensibility reciprocals given hereafter for counter scales and balances."

The specifications are indefinite in that counter platform scales are not mentioned, and the sealers who started to enforce them were not sure whether they should be included in the counter-scale class; and we had intended that the counter-scale tolerance should apply.

The PRESIDENT. You have heard the proposed amendment. If there is no objection, it will stand approved.

Mr. CONNORS. The next specification is along the same line; it is necessary to clear the matter again:

"The tolerances to be allowed on platform scales, except counter platform scales, at the loads indicated, shall not exceed the values given in the table following. Counter platform scales shall be governed by the tolerances given hereafter for counter balances and scales."

That simply throws the counter platform scales into the class for counter balances and scales in regard to the sensibility reciprocal and the tolerance.

The PRESIDENT. If there are no questions or objections, it will stand approved.

Mr. REICHMANN. Mr. Chairman, I am a very new man in this business and I do not exactly understand what this refers to. Will that make any difference in that tolerance between platform scales and counter scales of the same capacity, or even-arm scales or scales of various types? I always thought a platform scale was a scale which had a platform superimposed on multiple levers which are connected to a connecting rod or beam or some other indicating device, and I always, in the ordinary language of the street, called a trip scale a scale which had two pans on it, either above the beam or below the beam. Now the question I ask is, Does this change the tolerances of, for instance, a hundred-pound capacity platform scale and a hundred-pound capacity even-arm scale? Do they have different tolerances under this specification?

Mr. CONNORS. No. Any scale known to the trade as a counter platform scale would have the same sensibility reciprocal and tolerance as a trip scale or counter balance.

Mr. REICHMANN. You do not define "counter platform scale" anywhere, do you?

Mr. CONNORS. We do not define it; no.

Mr. BROWN. Mr. Chairman, I would like to ask Mr. Connors a question myself. I do not think I see what Dr. Reichmann is driving at, and, being a new man myself, I would like to know how the trade distinguishes between a counter platform scale and an ordinary floor platform scale. In other words, how would a green inspector know which he was dealing with, provided the man had a pretty big platform scale elevated on his counter above the floor?

Mr. CONNORS. The counter platform scale is a recognized trade name. They are called counter platform scales, and they are usually below 400 pounds capacity. We are of the opinion that most of the sealers here, or anybody that goes out to inspect weights and measures, knows what a counter platform scale means, and therefore we do not define it. It is perfectly clear in the minds of most people that I know.

Mr. BROWN. But, Mr. Chairman, these trade observations are very often confusing. It confused me in that particular case, and that is the reason I raised the point; because there is nothing definite to go by in that particular matter. Your trade specification is the only thing that governs.

Mr. CONNORS. But the counter platform scale usually has a short pillar, designed to use on a counter the same as the ordinary portable scale equipped as you see here [indicating]; and, on the other hand, there are the scales with the tall pillar, designed to be used on the floor and having a higher capacity.

Mr. REICHMANN. Mr. Chairman, I seriously object to the proposition of saying "which is ordinarily used in trade," and so on. There have been various discussions about trade customs, things "understood by the trade," and so on. In my very limited experience it is not a well-recognized fact what a platform scale is and what a counter platform scale is, and so on. I think it would be well to define what a counter platform scale is, in some form or other. I have no objection whatsoever to these specifications. I think they are most admirable, unless the amendments have been changed since this morning; I do not know whether they have or not.

The PRESIDENT. Very few. Amendments are in order, if you have in mind some particular definition.

Mr. REICHMANN. I have no amendment. If there is a difference in the amount of error allowed upon different types of scales, then the specification, it seems to me, to be logical, must very clearly indicate what the distinction and difference between those scales is, without simply saying, "Why, the trade generally recognizes what is so-and-so, and so-and-so." In other words, it makes the sealer rely upon the judgment of the particular man whose scale he is trying to seal. We ought to absolutely define what is and what is not, if you are going to allow a different degree of error on different types of scales. My personal position has always been this—I am undoubtedly in error, because I have been overruled by the majority, and being an American citizen I believe in the majority—that we care not what the internal workings of a scale are or what its construction may be; if it is of a certain capacity and divided in a certain way, we want to have a certain amount of error in the result. What the interior construction is ought to be immaterial to us as weights and measures officials, because that is a technical proposition; and along that very line I intend to make a suggestion to-morrow at the business meeting. Therefore, if you will pardon me, I would suggest that in the specification be incorporated a very specific definition of what the kinds and types of scales are; because it is a very difficult matter to regulate by saying that everybody with common sense recognizes it. It would be very much clearer to me to define those specifically, if the logical purpose of the specification is to be carried out. I submit

that to the chairman as a question or I submit it to the tolerance committee. I do not care to have a vote on it. I do not care to delay the action on this particular tolerance.

The PRESIDENT. I think, Dr. Reichmann, that it was stated, to begin with, that these were for discussion, and we invite the fullest discussion from those who have had experience. We do not quite agree as to the extent of your experience that you place upon yourself, but if you have in mind any definite suggestion here, I think it would be quite in order, and the conference would be very glad to have it.

Mr. REICHMANN. Mr. Chairman, in order to present the matter to the conference, I move that the tolerance committee be appointed to define specifically the distinction between the different kinds of scales.

The PRESIDENT. Then your request would be that the tolerance committee be more explicit in defining the types of scales.

Mr. REICHMANN. Yes. Well, no; not more explicit, because I want to make some argument about mandatory legislation and explicit legislation. I want to make this a mandatory provision—that they shall.

The SECRETARY. Mr. Chairman, perhaps Mr. Connors was not particularly fortunate when he said that everybody understood it. As a matter of fact, most of the catalogues of the manufacturers do list what are known as counter platform scales, and they, I think, invariably have a short column. That is the main distinction between them. But I quite agree with Dr. Reichmann that the thing ought to be perfectly explicit, and if it is not perfectly explicit it ought to be made so. I did not feel myself when we drafted this particular specification that it was explicit, but I think as a general thing the platform scale of the counter type has this low column.

(The motion was seconded.)

Mr. NEALE. Mr. Chairman, I wonder if the tolerance committee found it expedient to consider the size of the scale—the capacity. As I understand it, the larger and heavier working scales are given a greater error because of their inferior sensibility. It seems to me that that could have been clarified somewhat by simply adding after "except counter platform scales," a limit as to capacity. Now, in different kinds of trade there are very heavy scales on counters; for instance, in the meat-packing business and salt scales of certain kinds. It seems to me that it could have been worked out following their own lines just as they proposed, but making a cut-off as to capacity; because there are certain times when we find a scale of about 500 pounds capacity up on a counter for the purpose of check-weighing flour in large bakeries. Now, of course, we recognize that scale as the ordinary portable scale, for which the proper place was on the floor.

This is only a suggestion that I thought would clear it up some—simply making a cut-off as to the capacity, because in my mind it is the capacity that determines what error is going to appear there. A small delicate scale requires less error allowance than a large scale.

Mr. CONNORS. I will say the committee considered that and considered some lines to be drawn. It was suggested that 400 pounds be the line to be drawn, because 400 pounds is the smallest portable

scale which the committee has seen, but it would be necessary in that case to except bathroom scales of 300 pounds capacity and personal weighing scales, and it would be necessary to except some of the penny-in-the-slot scales of 250 and 300 pounds capacity. So we thought that if we let it go this time the sealers would understand it and we could round it out into shape some other time.

The PRESIDENT. You have heard the motion and second. Are there any further remarks?

Mr. REICHMANN. Yes, sir; I want to speak to the motion, please, sir. Mr. Fischer raised the point that I think is the very error that the committee has fallen into—the very error that everybody falls into—that of attempting to make a general specification in a case of this kind, namely, the catalogues. Everybody will admit—the manufacturers themselves will admit—that their catalogues are, as a rule, abominably classified. As a matter of fact, in very many cases a person has to go and see the scale rather than go by the description in the catalogue. Now, why not follow the suggestion of my motion? If the committee does make a broad, general distinction, then they will arrive at the conclusion, I think, that it is better to have a broad general rule than try to do just exactly as the distinguished member of the committee who just sat down said—try to change this every time to fit the conditions, because the conditions will change every hour of the year.

The PRESIDENT. Are there any further remarks?

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

Mr. CONNORS. The next specification is an amendment under the heading "Counter balances and scales." We said in the specification that "pendulum scales must be equipped with a device for indicating when the scale is level." Further investigation during the past year convinced the committee that there are other scales besides pendulum computing scales which should have an attached level. So we propose that if the scale is placed on an angle of 3°, or 5 per cent, with the horizontal, and if the indication on that scale is changed by an amount greater than one-half of the tolerance, then it must be equipped with a level. So it reads this way: "Counter scales whose weight indications are changed by an amount greater than one-half the tolerance allowed when set in any position on a surface making an angle of 3°, or approximately 5 per cent with the horizontal, shall be equipped with a device which will indicate when the scale is level: *Provided, however*, That the scale shall be rebalanced each time its position is altered during this test." That is, placing the scale on an angle will change the zero reading. The scale should be rebalanced. Then, if the weight indications are changed by an amount greater than one-half of the tolerance, the scale should be equipped with a level. Now, that is not a regulation that the sealer will follow out very much in actual work; but the question has come up several times during the past year whether this scale or that scale should be equipped with a leveling device or an attached level, and we thought this was very fair to everyone.

Mr. REICHMANN. This provides that a pendulum scale shall be equipped with a level?

Mr. CONNORS. "Equipped with a device which will indicate when the scale is level."

Mr. REICHMANN. The pendulum itself is a leveling device, as every bricklayer and mason knows. I used to be a bricklayer. And, in addition to that, they have to have a spirit level?

Mr. CONNORS. Not necessarily; "a device which will indicate when the scale is level."

Mr. REICHMANN. The pendulum itself indicates when it is level. Every pendulum is a plumb bob. I submit that as a general physical proposition.

The SECRETARY. Mr. Chairman, Mr. Reichmann is mistaken in that. The scale can be thrown out of level and then a weight can be added to the platform so as to bring the zero so that it reads just as it did before, and the indications after that will not be what they were in the first case. That is possible with the pendulum scale. So that the pendulum does not necessarily indicate when the scale is level. If the scale is properly made in the first place, and is always kept that way, it will do so.

Mr. REICHMANN. And the pendulum itself will show when it is level.

The SECRETARY. No; it simply indicates an initial position; that is all.

Mr. REICHMANN. In other words, the pendulum itself would not be allowed under this specification?

The SECRETARY. No.

Mr. REICHMANN. Mr. Chairman, I make a motion that it be specifically embodied in this specification that in no case shall the pendulum operating the scale be considered a leveling device.

(The motion was seconded.)

The SECRETARY. Mr. Chairman, that was the object of it; this leveling device was intended to be something other than the pendulum.

Mr. REICHMANN. To make it perfectly clear, I am in hearty accord with this, but I want it to be absolutely explicit. That very point has been raised innumerable times and on a broad physical basis. Of course, on the face of it, taking out of consideration other factors, it is absolutely saying that the pendulum itself is a leveling device.

(The question was taken and the amendment was agreed to.)

The PRESIDENT. Unless there is objection, the paragraph as amended will stand without further vote.

Mr. CONNORS. The next is an amendment to the specification reading: "Pendulum scales must be equipped with leveling devices which require," etc., making it read as follows: "When any scale is equipped with a leveling device this shall be of such construction that it is operative or accessible only by the use of some tool or device which is outside of and entirely separate from the scale itself." That was to clear the atmosphere, because the question came up during the year whether or not a screw driver hanging to a chain on the scale would come within the meaning of the regulation. It is simply to clarify the meaning.

Mr. REICHMANN. Does this take the screw driver off? I think it ought to be so clear that one could tell immediately.

The PRESIDENT. Would this require it to be off of it or not?

Mr. REICHMANN. Absolutely, if it is entirely separate. If it is tied to it with a chain or string, it is not entirely separate.

The PRESIDENT. But you asked the question if it took it off.

Mr. REICHMANN. I asked the question because in our conversation they said, "No; you can hang it on there," and it seems to me a person ought to have the right to tie a string to a screw driver to hang it on his scale if he wants to.

Mr. CONNORS. There is no question but what the screw driver attached to the scale is all right.

Mr. REICHMANN. May I ask the committee to make a distinction for my own personal information, as it is a matter I may run across some time. If the screw driver is attached with a string to the post or pillar of a scale, which string is 13¾ inches long, attached thereto by means of a No. 8 double-pointed carpet tack, would or would not that be allowed under the specifications? If there was a shelf attached to the platform of the scale, and on that shelf were laid the identical screw driver with a string attached to said screw driver, but without the said string attached to said carpet tack and the pillar of the scale, would that be nonattached and would that be allowed? I ask for informaion, Mr. Chairman.

Mr. HOLBROOK. Mr. Chairman, I will introduce an amendment to this specification saying that the tool or device must be outside of and entirely separate from the mechanism of the scale itself; introducing the words "mechanism of the" before the word "scale." I believe those words were in there at first and were stricken out as unnecessary by the committee.

(The amendment was seconded.)

The PRESIDENT. You have heard the amendment and the second; are there any remarks?

Mr. REICHMANN. Mr. Chairman, while it is customary for the mover of the original motion to accept the amendment—and I accept the amendment—I submit that there ought to be something else besides the word "mechanism." I submit that Mr. Holbrook's idea is the right one, but if it is the opinion of the members here that the pillar should not be construed to be part of the mechanism, then I suggest that the word "movable" be inserted before the word "mechanism."

The PRESIDENT. Is that acceptable to you, Mr. Holbrook?

Mr. HOLBROOK. I think so.

The PRESIDENT. You have heard the amendment as modified. Are there any further remarks?

(The question was taken, and the amendment as amended was agreed to.)

Mr. CONNORS. The next is to strike out the two specifications in regard to the shift test. Now, the regulations adopted last year provided that on the weight pan, when the edge of the test weight was coincident with the edge of the plate, the tolerance at half load should not exceed the allowable error at its full capacity. The question has come up during the past year that weights of variable diameter are used, which would make a variable test by different sealers; and the same thing on the commodity plate or scoop. Some scales have, as you know, two plates, either one of which is used for the commodity or either one of which is used for the weights. They are reversible. So we recommended that both those specifications in

regard to the shifting of the weights on the weight plate, or the commodity plate or scoop, be stricken out and the following inserted:

"When a weight whose body has approximately equal diameter and height, and which represents one-half of the capacity of the scale, is shifted on the weight plate, or the commodity plate or scoop to a point one-half the distance between the center and the edge of the weight plate, or the commodity plate or scoop, the resulting error in the weight indication shall not exceed the allowable error for the scale at its full capacity: *Provided, however*, That in this test the weight shall not project over the edge of the weight plate or the commodity plate or scoop."

It simply clears it up this way: That using a weight equal to half the capacity of the scale, a weight whose body has approximately equal diameter and height, and shifting it to a point where the center of the weight will be one-half the distance between the center of the plate and the outside edge, the error allowed on that test would be what would be allowed for the scale at its full capacity if the weight were placed in the center of the weight plate or the scoop. In that way we get away from the inaccuracy or the nonuniformity of testing with variable weights. In this test it represents the weight as a body approximately of equal diameter and height.

The PRESIDENT. You have heard this paragraph as read. Are there any questions or objections?

Mr. REICHMANN. Yes, sir. I would suggest that we amend that to read "a weight whose body has a diameter approximately equal to or not more than twice the height of the weight." It is a very minor objection. My reason for doing that is this: Very often in roughly testing scales one will pick up a weight the diameter of which may be about twice the height. The only thing to avoid, as a matter of fairness, is a weight which is excessively flat or taking a stone and standing it on end. I thought—not having had any practical experience—that from the technical standpoint of the sealer in the field it might be of some assistance if he had more latitude in his weight. I make that as a motion to amend.

(The amendment was seconded.)

Mr. HOLBROOK. Mr. Chairman, it seems to me that the purpose of this specification is to obtain a similar test on every scale which has a similar pan or weight plate. The objection to the old specification which might be raised was that the accuracy of the scale would depend upon the diameter of a variable weight, inasmuch as we provide that the edge of the weight shall not project over the edge of the plate. Now, an ordinary sealer's test weight, I suppose, has been taken as the standard, inasmuch as the diameter of the body is usually equal to the height in such a weight. Now, if we should amend that specification as Dr. Reichmann proposes we would have a condition where, if a man used a flat weight, he would have the center of the weight and the center of gravity of the weight much nearer the center of the pan than if he used a weight such as that specified here. Therefore the whole purpose of the specification—that is, obtaining the center of gravity of the weight in the same place on every scale—would fall to the ground, because the center of gravity would in reality be in different places over this weight plate.

Mr. REICHMANN. Mr. Chairman, Mr. Holbrook says that he supposed they took a standard test weight. I do not know; he ought to

know. The variation due to change in making that test is not excessive and comes well within the tolerance. It is easily ascertained by test and calculation. Furthermore, we know that in a great many cases it is very convenient to use weights which are not cylindrical and in which the diameter is not approximate to the height. Different forms of weights are going to come up more and more; in fact, in some there is no such a thing as the diameter, and there ought to be sufficient latitude so that a man is not held down to a certain weight. I will withdraw my motion if Mr. Holbrook, who represents the bureau in this matter, thinks it is best to do so; but I submit that just as a common-sense proposition.

The SECRETARY. Mr. Chairman, I might state for the benefit of Dr. Reichmann, as I said for the benefit of the other gentlemen here this morning, that these are not the Bureau of Standards specifications. The Bureau of Standards has never adopted any specifications. The only connection between the Bureau of Standards and these specifications is that I happen to be on the committee on tolerances and specifications, and I might add that Mr. Holbrook's familiarity with them is that he has assisted the committee in drafting them. He had considerable experience in putting into effect the old specifications in Porto Rico, and as a result of that experience he made a great many valuable suggestions to this committee. But the committee does not represent the bureau.

Mr. REICHMANN. Then I am against them.

Mr. HOLBROOK. I might say at this time that I am not representing the Bureau of Standards at this conference, but that I am representing the island of Porto Rico. I am at present a delegate from the island of Porto Rico.

The PRESIDENT. Are there any further remarks? [After a pause.] The amendment is before you.

(The question was taken, and the amendment was lost.)

Mr. CONNORS. The next specification comes under the heading of "Spring scales." We adopted a specification at the last meeting that where a dish-shaped pan is provided there shall be an opening in such pan to allow for drainage. We found that there were a number of dish-shaped pans on scales that were used in weighing dry commodities, and the question came up as to whether or not those should be provided with holes for drainage, as well as those used for weighing fish and other wet commodities, and, further, that the specification was indefinite, because a dish-shaped pan might be in any of several different shapes. So to clarify it we recommend the following: "Scale pans in which fish or other wet commodities are placed when weighed shall be so constructed as to provide for drainage." We also transfer this specification to the "general specifications" on scales, to apply to all scales.

The PRESIDENT. You have heard the paragraph. Are there any questions or objections? If not, it will stand approved.

Mr. CONNORS. "Spring scales whose weight indications are changed by an amount greater than one-half the tolerance allowed when set in any position on a surface making an angle of 3°, or approximately 5 per cent, with the horizontal shall be equipped with a device which will indicate when the scale is level, provided, however, that the scale shall be rebalanced at zero each time its position is altered during this test."

The same argument would apply to spring scales as applies to counter scales for which this specification has been already adopted.

The PRESIDENT. You have heard this paragraph. Are there any questions to ask of the committee or any objections?

Mr. REICHMANN. Does that apply to hanging spring scales also?

Mr. CONNORS. No.

We also recommend a new specification reading as follows: "When spring scales are equipped with devices intended to compensate for changes in elasticity of the springs due to temperature effects, these devices shall be automatic in their operation and shall be so constructed or covered that they can not be readily manipulated." That is, the committee is of the opinion that a hand-operated device for compensating for temperature effects will facilitate the perpetration of fraud, and any device on a scale which will compensate or is intended to compensate for these temperature changes should be automatic.

Mr. BARNARD, of Michigan. Mr. Chairman, it appears to me that this particular paragraph is discriminating.

The PRESIDENT. In what respect?

Mr. BARNARD, of Michigan. Well, if my understanding is correct, there is a certain kind of spring scale that has a patent covering this particular specification here, and this would bar these other scales.

Mr. CONNORS. I can clear that question up. You understand that we say: "When spring scales are equipped with devices intended to compensate for changes in elasticity of the springs due to temperature effects, these devices must be automatic." You get the distinction there—that it is not mandatory that they shall be so equipped? But we say that when they are equipped with such a device it shall be automatic.

Mr. AUSTIN. Mr. President, I am not quite sure that this Conference on Weights and Measures cares to go upon record as recommending the enactment of laws that will specify how the compensating device shall be operated—whether it shall be operated by hand or by an automatic adjustment. While I am not here as a representative of any scale industry or any other equipment industry, it is my position to be from a part or a section of this country which is manufacturing a scale containing a compensating device for taking care of the temperature and also a balancing device for the same machine. In our section of the country there are many hundreds of these scales that are in use, and have been in use for a number of years, giving equally as good service and apparently as much protection to the consumer as any other scale upon the market; and I am not willing to go on record here, without being heard, as recommending the adoption of any recommendation from this conference that will disbar, if you please, an organization or manufacturing industry of my section of the country simply because they are prevented from using an automatic device by reason of some patents which may be existing, and it is claimed do exist. Upon the adoption by this organization of this recommendation, no doubt, many States, by virtue of the influence of these recommendations, would pass laws forbidding the use of this particular scale or any other scale which had not an automatic device, and I think it would work a decided harm and a decided injustice upon commercial interests. I would be glad to hear, of course, and undoubtedly will, of any-

thing that would be unfavorable or discreditable to this class of scale; but I fail to see where any service or any protection to the public would be accomplished by the passage of this amendment, and to bring the matter before this convention I would recommend that this new added specification be stricken from the report.

Mr. REICHMANN. Mr. Chairman, in rising to second that motion, I do so for two reasons. In the first place, I come here as a representative from the State of New York, having been appointed, together with the superintendent of weights and measures of the State of New York, the Hon. Mr. Farrell, by his excellency the governor. Gov. Glynn not only is a man who believes in equity and fairness, but, aside from that, he is also a personal friend of both Mr. Farrell and myself, and I know he would be against any proposition which would start any kind of a discussion which would disrupt the great benefits of a conference of this kind by drawing up lines and sides; and there have certainly been many mutterings as to that particular feature. Now, I take it for granted, of course, that the committee has investigated carefully and would not tolerate a specification that would give a monopoly to any particular scale concern. I do not think there is any question about that. The matter of its being a permissive feature is a matter of absolutely no moment. It is almost as bad as being mandatory, for this particular reason: Because it serves as an advertising asset, and an advertising asset is as good as capital.

I therefore second the motion, so as not to bring any unfortunate discussion at this time, because I personally have the greatest faith in the outcome of the great good work that is going to come from this conference under the direction of the Bureau of Standards; and I say advisedly "under the direction of the Bureau of Standards," because it should and always shall be under the direction of the Bureau of Standards.

The PRESIDENT. You have heard the motion and the second. Are there any further remarks?

Mr. NEALE. Mr. Chairman, in support of that motion, it seems to me that our tolerance committee have taken care of this poposition where they say that "all scales shall be of such construction that they are permanent in their adjustment and will repeat their weight indications correctly and are not designed to or may not be used to facilitate the perpetration of fraud." I take it from Mr. Connors's readings that one of the main principles involved was to prevent the perpetration of fraud. Now, if the sealer's province is to devise weighing and measuring devices and to know at announced times or unannounced times when they are right and used correctly, it seems to me his business is to know that the user of the scale is using it correctly, the way it was intended to be used, and then punish him if he uses it in the perpetration of fraud; and I think the best scale on the market can be used to perpetrate a fraud by the user.

Mr. HENRY. Mr. Chairman, it seems to me that if any interpretation of the amendment is correct and legally correct—and I feel rather certain that it is—I would say, without absolutely knowing, that it will exclude about 90 per cent of the spring scales we have already sealed in the State of Vermont and the spring scales used by all the peddlers. I am very sure I am right about it. Those scales have to be adjusted on account of changes in temperature. They are taken

care of, as Mr. Neale says, under the previous amendment, and I think the proper legal interpretation of this proposed amendment excludes those scales. If that is so, then it would be practically a physical impossibility to carry out our weight-per-bushel law. It would be the same way all over the country; it would be a practical impossibility to carry out the recommendations of this conference one year ago, that dry commodities be sold by weight. I do not know whether that is the intention of this amendment or not, but it would take some persuading to show me that that is not the result; and if it is, it is a very impracticable amendment for us to pass.

Mr. Holbrook. Mr. Chairman, I would call attention to two features of this specification which it seems to me Mr. Henry has overlooked. First, it is permissive. It applies only to those spring scales which are equipped with a device intended to compensate for certain changes. The peddler's scales which he talks about are certainly not equipped with such a device and therefore do not fall under Mr. Henry's objections. Second, his point that the scales will change in balance at the zero point, and can not be adjusted except by means of such a device as is prohibited here, also is not well taken, since it says here "Devices intended to compensate for changes in elasticity." That does not refer to changes in the length of the spring itself.

The Secretary. Mr. Chairman, I would like also to state to this conference just why this particular specification was put in here, and then they can use their own judgment as to whether they want it there or not. The one particular device that has a hand compensating temperature arrangement has the same objection that was referred to in one of these previous specifications, namely, you can put a weight on the platform or under the platform, thereby changing the balance, and then set the zero of your scale, and the scale after that will not indicate correctly, because in changing the zero you change the length of your leverage. Now, you can throw your scale out of balance by putting a weight on or taking a weight off of the platform, and then set your zero, and your scale no longer indicates the correct weight, and the elimination of that was our object in putting in this clause.

Mr. Reichmann. Can you do that only with a hand-operated compensating device, or is it with an adjusting screw which raises or lowers the support of the spring? There is such a multiplicity of scale construction that some of them have various adjustments. Do you mean to refer to the scale which has only one adjustment?

The Secretary. I simply wanted to demonstrate what can be done in one type of scale that has not an automatic temperature adjustment. I simply cited that as an instance. It is not automatic. It is hand regulated, and if it is used in a perfectly honest way, and the way it comes from the factory, and if it is made right, to begin with, it will give correct weight; but you can throw the balance out, and then readjust your zero, and your weight indications are thrown off completely. Now, it seems to me that a device of that sort is such as to facilitate the perpetration of fraud.

Mr. Henry. Mr. Chairman, just one word more in regard to the reply Mr. Holbrook made to my statement. Of course that is a matter of judgment, legal judgment, legal interpretation, for each member of this conference; but I am not in the least persuaded that

his explanation changes the legal effect of this amendment at all. All the spring scales—I am referring to the peddler's scales—are equipped with a set screw, or something of that sort, to change the zero indication of the scale, and it is there that they change the zero indication on account of the change of temperature; and it will not make any difference with the legal interpretation of this amendment whether there is a placard on the scale or not that states that is the purpose of that adjustment. The adjustment is there for that purpose, and is included in this amendment.

Mr. AUSTIN. Mr. Chairman, inasmuch as there has been reference to the hand-regulated compensating device, if it is not a set rule that no one outside of the regular weight and measure delegates can be permitted to speak upon any of these subjects, I would like to ask permission that Mr. King, a citizen of my city, be permitted to answer those objections. I am not sure, Mr. Chairman, whether that ruling has been made here and whether they have permitted any outside deliberations; but if so, I would be glad to have you call on Mr. King.

Mr. REICHMANN. Mr. Chairman, the gentleman is out of order. There is a motion before the house, and I would personally like to make one more remark.

The PRESIDENT. You are quite right. I thought the last gentleman was speaking to the question.

Mr. REICHMANN. It would be a most deplorable thing to allow the various computing-scale interests to come here and argue their cases before this court, if you please. Let them argue their case on the outside. Let them sell their devices on the merits of the proposition, and do not let us have anything injected into this discussion which might, by implication, give some one an advantage. We do not want to have one side without the other, and if we comply with that, we will stay here until next January. We do not want to listen to a computing-scale fight. I was in hopes that those fights, such as we had three or four years ago were a thing of the past. Do not let the conference go on record and start them up again.

(Cries of "Question!")

The PRESIDENT. You have heard the motion and the second. Before putting the motion I want to say, for the benefit of the last speaker, that I agree with him heartily, and that he need have no fear; that that fight will not be projected into this conference.

Mr. REICHMANN. Thank you, sir.

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

Mr. CONNORS. The committee recommends that a new specification be adopted, reading as follows: "Spring scales equipped with a device intended to compensate for changes in elasticity of the springs due to temperature effects shall be governed by the same allowable errors as heretofore given in the tolerance table under the heading 'Counter balances and scales.'"

The committee is of the opinion that if a spring scale is equipped with a device intended to compensate for temperature changes, it should not be allowed any more error than the counter scale.

The PRESIDENT. Are there any questions or objections? If not, this paragraph is approved.

(There was no objection.)

Mr. CONNORS. The next amendment is under the heading "Computing scales." The conference adopted last year a specification reading: "The maximum value graduations on the chart must not exceed 2 cents." The committee were of the opinion that up to a certain point 1-cent graduations should be used, and higher than that a 2-cent graduation could be used, but they are of the opinion that a 5-cent graduation on a chart is too large, inasmuch as a dealer has to guess at it to get his proper values; but they also were of the opinion that a chart could be made with a 5-cent dot or a staggered graduation, or something representing 5 cents on a chart where the 2-cent graduation is used. So they recommend the adoption of this specification: "The value graduations on all computing charts shall not exceed 1 cent on all prices per pound up to and including 30 cents. At any higher price per pound the value graduation shall not exceed 2 cents: *Provided, however*, That nothing in the above shall be construed to prevent the placing of a special-value graduation to represent each 5-cent interval. These special graduations may take the form of dots, staggered graduations, or similar forms; they shall be so placed that their meaning and value may be clearly understood, but they shall not be placed in the space between the regular graduations."

The PRESIDENT. If there are no questions or objections, this amendment will stand approved.

(There was no objection.)

Mr. CONNORS. The next specification refers to the width of the indicator. Last year the committee recommended, and the conference adopted, a specification saying that the width of the value indicator must not be any greater than that of the finest graduation on the chart. During the past year our attention was called to the fact that if that was so, the wire—assuming that it was a wire that indicated the values—would be of such small diameter that it would be practically unreadable. So we recommend that this specification be stricken out and that the following two specifications be added in place of it. The first one is: "The distance between the chart and the weight indicators and the distance between the chart and the value indicator or indicators shall in no case exceed 0.06 inch." That is practically the same as adopted last year.

The PRESIDENT. You have heard this suggestion. If there are no questions or objections, the committee's action stands approved.

(There was no objection.)

Mr. CONNORS. We also recommend this specification: "Weight indicators shall be present on both the dealer's and the customer's side and their width shall not exceed 0.015 inch. Both indicators shall reach to the graduated divisions and shall indicate clearly and correctly."

The PRESIDENT. Is there any objection to this? If not, it will stand approved.

(There was no objection.)

Mr. CONNORS. In regard to the maximum value of the weight indications, the committee last year recommended and the conference adopted a specification, reading: "The maximum value of the weight indications shall be 1 ounce."

There are computing scales now—if they are not made now, they are intended to be made—to be used for wholesale weighing, and the

committee are of the opinion that large-capacity scales used for wholesale weighing may be graduated to something higher than 1 ounce. In the spring-scale regulations we say that the maximum value of the weight graduations in the sale of foodstuffs at retail shall not be more than 1 ounce. The committee is of the opinion that this specification should be adopted: "The maximum value of the weight graduations on computing scales used in the sale of foodstuffs at retail shall be 1 ounce."

The committee believes that no scale used in the sale of foodstuffs at retail should have a higher graduation than 1 ounce; but there are certain scales used for wholesale weighing, which we think might be graduated to 2 or 4 ounces, depending on their capacity and the use to which they are put.

Mr. REICHMANN. Mr. Chairman, I personally can not see the real necessity for that specification. A man who is going to use a scale is going to use some discrimination, if he is any kind of a merchant, to find out how fine he wants his scale graduated. Now, if he wants a 2-ounce or a 3-ounce graduation, why not let him have it? What is the difference? I can not see the necessity for that on a computing scale, because you already have the other graduations, you know.

Mr. NEALE. Mr. Chairman, it seems to me rather an unhappy proposition to put this in, because our great retail trade in this country would not understand all the complications that exist in the minds of the tolerance committee, and they would properly say: "Well, you prescribe scales of a certain fineness for us and let our friend, the big wholesaler, use a coarser weighing machine." I think we should let the future take care of itself, if, as Mr. Connors has said, these other scales are intended to be made; but I would not want to go home and tell my retail people that they must have a scale with a graduation of 1 ounce, while the wholesalers can weight on a 3 or 4 ounce scale. I believe it is unfortunate to discriminate between the retail and the wholesale trade.

The PRESIDENT. I notice you use the word "maximum" instead of "minimum."

The SECRETARY. By "maximum" we mean that the value shall not be greater than an ounce. That means that the maximum value of a graduation shall not be greater than an ounce. I think that is perfectly clear.

Now, I think perhaps there is something in what Mr. Neale has just said. It seems to me that if we require that the maximum value shall be an ounce in scales used in retail trade we might stop right there; but I think that an ounce is about as large as ought to be permitted on a scale used for retail trade.

Mr. REICHMANN. It is entirely too large on some commodities. A man has to use his discretion, anyway.

The SECRETARY. It seems to me that if we restrict that merely to scales used in retail work, there is no more objection to that particular specification.

Mr. REICHMANN. I move you, sir, that we omit this specification.

(The motion was seconded.)

The PRESIDENT. Are there any further remarks?

Mr. HOLBROOK. Mr. Chairman, it seems to be the impression of some of the delegates that this specification is leveled exclusively at computing scales. I would call attention to the fact that in the report

of the committee submitted last year, and adopted by the conference, the maximum value of the weight graduations on spring scales used for the sale of foodstuffs at retail was made 1 ounce. Now, that specification really was intended, I believe, to apply to all scales with a reading face, and inasmuch as it was so intended to apply, this specification was put in here to make computing scales conform to the same maximum value of the graduation as is required of spring scales by the present specifications.

Mr. REICHMANN. Mr. Chairman, I withdraw my objection. I thought this did refer to computing scales.

Mr. CONNORS. This particular one does; but there was another, under the heading "Spring balances," which was adopted last year. This does apply to computing scales, but a similar regulation was adopted last year in the case of spring scales. What the committee wanted to get away from was the use by retail dealers, such as sell a half pound of butter and small quantities of meat, of a scale graduated at 2 ounces. Most of you gentlemen have been up against that, in going into stores where they would weigh a quarter of a pound or a half a pound on a scale weighing 60 pounds, graduated to 2 ounces. The committee is of the opinion that that is not a fair scale to use for small commodities, inasmuch as you can not get anywhere near a correct determination of weight. Now, we say the maximum value of the weight graduations in weighings made at retail shall be 1 ounce. But there is use for a scale—either a spring scale or, as I understand, a computing scale—in large places where they weigh out 50, 75, 100, or 200 pounds at a time.

Mr. REICHMANN. They are not made at present, are they?

Mr. CONNORS. I understand, Doctor, they are in process of being made; and as a fair provision, if we make the same provision for spring scales, why should not that apply to computing scales?

Mr. NEALE. Mr. Chairman, may I ask what is the status of this now? Is there a motion to strike this out?

The PRESIDENT. The motion to strike out has been seconded. Do I understand that you withdraw that [addressing Dr. Reichmann]?

Mr. REICHMANN. No, sir; I do not withdraw it. I thought I might have been in error. I understood Mr. Holbrook to say this did not refer to computing scales, and I was under the impression that it did. So I stick to my original motion, on account of the difficulties raised by Mr. Neale.

Mr. SHERMAN. Mr. Chairman, as I understand it, this regulation is already in force in the case of spring scales. As I understand it, the gentleman from New York wishes not to enforce it in the case of computing scales. I would like to hear an explanation of the reasons why we should continue to enforce it in one class of scales and not in the other.

Mr. REICHMANN. It is the simplest explanation in the world, sir. In one case you have a weight dial and no other indication. In the other case you have primarily a value-computing chart and a supplemental set of weight indications. Now, let this second set be at the discretion of the man who is going to use it. The reason for this, as explained by the chairman of the committee, was that there might in the future be some computing scales for wholesalers, and that the committee want to exempt those. Now, I say, do not let us cross a

bridge until we come to it. You have got the biggest competition in the world among the scale salesmen themselves, and I do not think it would be fair to allow one man a 2-ounce graduation when the other man is limited to 1 ounce. The objection which Mr. Neale voiced I had in mind. It simply brings about a difficulty when you go home and tell the retailer "You have got to do this, but the wholesaler does not have to do this." Now, do not forget that these specifications are going to be taken and rehashed and revamped and put in the hands of retailers and wholesalers by scale salesmen themselves and everybody else. If I were in the scale business, I would have about 1,000,000 copies of them struck off, and have those that applied particularly to my product printed in red. They do it. There is nothing original about that. I do not blame them. Of course, the matter is so unimportant, really, that I will withdraw my motion, if it will raise any discussion, Mr. Chairman.

Mr. HOLBROOK. Mr. Chairman, one point Dr. Reichmann brought out was that the weight graduation is only supplementary to the value graduation.

Mr. REICHMANN. Absolutely.

Mr. HOLBROOK. But I would call Dr. Reichmann's attention to the fact that the purchaser can not see the value graduation. The only thing the purchaser has to check his commodity by is the weight graduation. Now, the more difficult you make it for the purchaser to read how much he is getting and to figure out the price for himself the easier it is going to be for a merchant to overcharge him by a cent or two on every purchase.

Mr. SHERMAN. Mr. Chairman, I am appointed to see to it, as far as may be, that both the purchaser and the seller in the District of Columbia get fair and square dealing. To my mind, then, the fact that the weight indication is connected up with the price indication is all the more reason why we should require more exactness in the weight-indicating mechanism. It seems to me that stands out without any question of doubt. It is the very fact that the machine is computing the price that makes us want the closer indication on the weight-computing part of the mechanism.

The PRESIDENT. The question is on the motion to strike out this last specification.

(The question was taken, and the Chair being in doubt, a count was ordered, resulting in 13 for and 27 against. So the motion was lost.)

Mr. NEALE. Mr. Chairman, it seems to me that inasmuch as the gentlemen have voted not to strike this out, I might waste time enough to make this motion; that the words "at retail" be stricken out, letting the rest of the sentence stand as it is.

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

The PRESIDENT. Are there any remarks?

Mr. REICHMANN. Mr. Chairman, I would like to ask what the specification in this matter covering the spring scales says?

Mr. CONNORS. The spring scale regulations say that the maximum value of the weight graduations in the sale of foodstuffs at retail shall be 1 ounce; provided, however, that that shall not apply to the sale of vegetables, such as on a peddler's cart in some cases, where the law requires sale by weight; we allow them to be of a higher value.

Mr. REICHMANN. I do not see any reason then why we should strike out any of this paragraph. If the specification on spring scales is the same as this, why not let this stand as it is, and make the specification read the same for computing scales as for spring scales?

Mr. SHERMAN. It seems to me then that if the words "at retail" occur in the spring scale specification that the answer to the charge that we are favoring the wholesalers is pretty well made. But it seems to me also that the advantage of the words "at retail" is that they enable us to provide for the possible introduction of a scale for heavier weights which has engineering advantages over scales now on the market. In that case, would it not be well to replace the words "at retail"—if we desire to avoid them—by some specification as to the range for which the sale is to be used, and in that way make a distinction between the small weight and the larger one, without the appearance of favoritism toward any class, and at the same time keep the way open for new scales which contain distinct engineering advantages? It seems to me it is a great mistake to close the door to any new invention that promises a saving in this field.

Mr. REICHMANN. Mr. Chairman, the gentleman forgets that a gram of radium is a wholesale amount of radium now, but a ton of coal or of hay is a small quantity.

Mr. SHERMAN. Mr. Chairman, I have no idea that radium or hay is going to be weighed on computing scales that figure to the ounce of weight and 2 cents of value. I have never seen anything to indicate it, and it seems to me unfortunate that such objection should be made. There has been a good deal of effort this afternoon to turn the discussion into a farce. I think that is a pity. It seems to me that we are up against a simple proposition here—either to leave the words "at retail" in, or to change the wording of the paragraph to limit the range of the scales to which this paragraph shall apply.

Mr. CONNORS. Mr. Chairman, if we apply that to the range, the whole force of this will be lost. What we are trying to do is to force the use of a scale with 1-ounce graduations or less for weighing small commodities in retail stores. Now, if we apply this to the range, a man can buy a high-range scale and still weigh small amounts of commodities on it. We have a case now with which most of the sealers are familiar. You take a dial scale of 60 pounds marked with 2-ounce graduations. Sealers find them in use right along in small corner groceries and corner meat shops where 10 cents' worth is a whole lot, where half a pound or a quarter of a pound is weighed out. It is impossible to give correct weight with that scale within any allowable tolerance on a small quantity, and that is what the committee is trying to do with this. Personally I still think "at retail" covers the whole thing.

Mr. SHERMAN. Personally I prefer to keep in the words "at retail." I was merely suggesting a substitute for those words.

The PRESIDENT. The motion before the house is to strike out the words "at retail."

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

Mr. CONNORS. Last year the conference adopted a specification reading: "The width of the value indicator must not exceed the width of the value graduations."

The same remarks made on the weight indicator apply to the value graduations. It seems to be impossible to get a wire, if a wire is

used, of small enough diameter so that it will not exceed the width of the value graduations; and if such a thing were possible it would be practically unreadable. Therefore the committee recommends that this specification be adopted:

"A value indicator shall be present on the dealer's side, and its width shall not exceed 0.015 inch. This indicator shall reach to each value graduation and shall indicate clearly and correctly."

The PRESIDENT. You have heard this paragraph. If there is no objection, the action of the committee will stand approved.

(There was no objection.)

Mr. CONNORS. Now, having adopted those specifications, it will be necessary also to check the width of the value graduations. So the committee recommends this specification: "The weight graduations and the value graduations shall be clear and distinct, but in no case shall their width be less than 0.008 inch." When you check the diameter of your reading wire it is also necessary to check the width of the value graduation.

Mr. STIMPSON. Mr. Chairman, just for information, I should like to ask Mr. Connors if that is approximately the width of the graduations on a good chart?

Mr. CONNORS. That is the width of the graduations on a good chart.

The PRESIDENT. How does the sealer test them in this case?

Mr. CONNORS. They are generally tested in the laboratory by the State sealer, and he informs the local sealers of his findings.

The PRESIDENT. Is there any objection to this paragraph? If not, it will stand approved.

(There was no objection.)

Mr. CONNORS. The committee recommended and the conference adopted last year a specification reading as follows: "On scales equipped with a magnifying device the clear interval between the weight and value graduations shall not be less than 0.02 inch. On scales not equipped with a magnifying device the clear interval between the weight and value indications shall not be less than 0.04 inch."

After conferring with sealers and various manufacturers of computing scales, the committee recommends this specification: "The clear interval between the weight graduation marks on all computing scales shall not be less than 0.04 inch." That, I may say here, is the same as on the spring scales. Spring scales are required to have four one-hundredths of an inch clear space between the weight indications. (Continuing:) "The clear interval between the value graduation marks on all computing scales shall not be less than 0.02 inch: *Provided, however*, That the latter requirement shall not be construed to apply to the special value graduation denoting the 5-cent interval mentioned heretofore."

The PRESIDENT. You have heard this paragraph. If there are no objections, it will stand approved.

(There was no objection.)

Mr. CONNORS. Another specification which the committee recommends has already been adopted in the case of counter scales and spring scales. It reads as follows: "Computing scales whose weight indicators are changed by an amount greater than one-half the tolerance allowed, when set in any position on a surface making an

angle of 3°, or approximately 5 per cent with the horizontal, shall be equipped with a device which will indicate when the scale is level: *Provided, however*, That the scale shall be rebalanced at zero each time its position is altered during this test."

That is the same as adopted before in the two other classes of scales.

Now, the committee recommends that the following specifications be added: "Computing scales must give correct results, whether the load is being increased or decreased."

It is the committee's opinion that the scale should give correct results, whether you are taking weight off or putting it on, because that is the way it is used. A butcher selling chipped beef or hamburger steak or butter decreases the load in certain emergencies; he puts on too much and has to take off some. So the scale should give correct results whether the load is decreased or increased.

The PRESIDENT. You have heard these specifications. If there is no objection, they will be approved.

(There was no objection.)

Mr. CONNORS. The next specification which the committee recommends is that "All devices intended to increase the capacity of computing scales by the addition of an added weight or weights shall operate properly, irrespective of the speed with which they are manipulated." That is, if there is a knob to turn or a lever to pull which will increase the capacity of the scale, it ought to act correctly, irrespective of whether it is turned fast or slow or at medium speed.

Mr. REICHMANN. Is not that pretty broad, Mr. Chairman?

The PRESIDENT. I do not know. Mr. Connors, have you run across devices where the opposite is true?

Mr. CONNORS. We have. The committee has seen devices where the opposite is true.

Mr. REICHMANN. What scale is that? Mention the name of it.

Mr. CONNORS. The device on the market sometimes operates incorrectly when the knob is turned slowly.

Mr. REICHMANN. What kind is it?

The SECRETARY. Mr. Chairman, I object. I do not think that we ought to place the names of particular scales or manufacturers in our record.

Mr. REICHMANN. If it is a well-recognized scale, I do not think of it offhand. I was just asking for information, not for the record. I will ask afterwards.

Mr. NEALE. Mr. President, let me say that I personally saw the test, which brought out just what Mr. Connors has mentioned.

The PRESIDENT. I think that is all we want to know. If there are no objections, that will stand approved.

(There was no objection.)

Mr. CONNORS. The next specification reads: "Spring computing scales not equipped with a device intended to compensate for changes in elasticity of the springs due to temperature effects shall be governed by the same allowable errors as heretofore given in the tolerance table under the heading 'Spring balances.'" That is simply clearing the specifications up, so that there will be no difficulty in knowing what tolerance to use. It was inferred in the regulations last year, but it was not clear.

The PRESIDENT. Are there any questions or objections? If not, this will stand approved.

Mr. CONNORS. (Reading:)

Spring computing scales equipped with the above-mentioned device and also all those not operated by springs shall be governed by the same allowable errors as heretofore given in the tolerance table under the heading "Counter balances and scales."

The committee's opinion is that if a scale is equipped with a compensating device it should be allowed the same error as given for counter scales.

Mr. REICHMANN. Those errors are different? I just ask for information. If a computing scale is equipped with a compensating device—say of 30 pounds capacity—the allowable error is different from that on a scale which is not equipped with a compensating device?

Mr. CONNORS. Yes; the allowable error is smaller if the scale is equipped with a compensating device.

Mr. REICHMANN. Why is that?

Mr. CONNORS. Because the object of the compensating device is to reduce the errors.

Mr. REICHMANN. It is not a matter of equity but of mechanical necessity?

Mr. CONNORS. Mechanical necessity.

The PRESIDENT. If there are no objections, we will proceed to the next paragraph.

Mr. CONNORS. The next paragraph refers to the specification which the conference voted to strike out. I will read it over:

When spring computing scales are used, equipped with devices intended to compensate for changes in elasticity of the springs due to temperature effects, these devices must be automatic in their operation and must be so constructed or covered that they can not be readily manipulated.

The discussion on that device should have come up here instead of on the spring scales. That is the specification that the conference voted to strike out on spring balances.

The PRESIDENT. Inasmuch as this is a separate paragraph, I think some action should be taken on this.

Mr. CONNORS. To be consistent, it should be taken out here also.

Mr. STIMPSON. Mr. Chairman, I move that this section be stricken out.

(The motion was seconded and agreed to.)

Mr. CONNORS. The next specification relates to cream test and butter-fat test scales. The committee reported and the conference adopted last year a specification to the effect that these scales should be provided with leveling screws and an attached level. The committee recommends now the following; and I may say that this specification is almost the same as has been adopted in the case of counter scales, computing scales, and spring scales:

"All scales whose weight indications are changed by an amount greater than one-half the tolerance allowed, when set in any position on a surface making an angle of 3°, or approximately 5 per cent, with the horizontal, shall be equipped with leveling screws and with a device which will indicate when the scale is level. Provided, however, that the scale shall be rebalanced at zero each time its position is altered during this test."

The PRESIDENT. Is there any objection to this paragraph? I want to ask just one question—if that "5 per cent" is clear. Is that always understood by sealers?

The SECRETARY. Mr. Chairman, that is the reason it is stated in two ways. We say 3° or 5 per cent. We had a good deal of discussion about that. My feeling was that 3° was much clearer to the average sealer than 5 per cent; but we have a good many engineers around here, and they seem to think that with inclinations expressed in per cent it was very much clearer; and in order that there might be no doubt about it, we put in both.

Mr. NEALE. To make that more plain, how much would that be, with an ordinary computing scale? Would it be three-eighths of an inch, or half an inch, or what?

The SECRETARY. It is 1 inch in 20.

Mr. CONNORS. The next specification is under the heading of "Weights." The committee reported and the conference adopted last year a specification in which they defined the way to make holes in weights to contain adjusting material; and they thought this year that they would recommend, after an investigation, that they might make a hole in a weight anyway, as long as it would hold the material securely instead of requiring a cast hole of a certain shape or an undercut hole.

The committee recommends that this specification be amended to read as follows:

"All holes in which foreign material is to be placed for adjusting purposes must be of such form that this material will be permanently and securely held in place. In no case shall this adjusting material project beyond the surface of the weight."

The PRESIDENT. You have heard this pararaph. Are there any objections to this or any questions? If not, it will be approved.

(There was no objection.)

Mr. CONNORS. We recommend the adoption of a new general specification, as follows: "The manufacturers' tolerances and sensibility reciprocals or the tolerances and sensibility reciprocals on all new weights and measures and weighing and measuring devices shall be one-half of the values given heretofore in the tolerance tables." That means that new scales or scales just from the factory, which have never been in use, should have half the sensibility reciprocal and half the tolerance allowed in the case of scales or weighing and measuring devices which have been in use for some time. The committee felt that that was a fair recommendation to make, and the conference adopted last year a precedent for that, since the manufacturer's tolerances or tolerances on new weights are specified as one-half of those given in the table.

I would recommend that that be amended in some way so that that section shall not apply to milk jars, because a milk jar never changes, and we decided this morning that the tolerance on the milk jar was equitable and fair, and it was adopted. There is no reason why the manufacturer's tolerance should be one-half of that.

Mr. REICHMANN. Mr. Chairman, I move you, sir, that the committee be instructed to change that paragraph to enumerate weights, scales, and so on, instead of making an all-inclusive statement with an exception. That will make it perfectly clear, and the committee

having this in hand can do that more readily than we can do it on the floor. Mr. Connors's point is well taken there.

(The motion was seconded and agreed to.)

Mr. CONNORS. The next specification which the committee recommends is something that must be done. The metric system must be recognized since it is legalized by a United States law.

"Nothing given in the specifications heretofore shall be understood or construed to prohibit the sale or use of weights and measures or weighing and measuring devices constructed or graduated in units of the metric system."

The PRESIDENT. If there is no objection, this will stand approved.

(There was no objection.)

Mr. CONNORS. The remaining paragraph is as follows:

"The committee recommends that it be empowered and instructed to revise the wording of the specifications and tolerances without changing their meaning and effect, in order to clarify them."

That is, during the year we have had different people come along and say, "What does this mean?" or "What does that mean?" We found that the wording could be improved in a great many cases.

The PRESIDENT. Is there any objection to this paragraph? If not, it stands approved.

(There was no objection.)

Mr. REICHMANN. I think, Mr. Chairman, there should be a paragraph in the specifications relating to a special milk bottle in which a greater distance from the cap to the surface of the milk should be allowed if there is a clear indicating mark on the bottle, showing to what point the capacity is to be measured, and the bottle is marked "Pasteurized in the bottle." The same tolerances as heretofore specified should apply to these bottles also. It is an exceedingly important proposition at the present time, especially with the great amount of discussion on pasteurized milk, and one of the methods used in distributing millions of bottles of milk weekly is to pasteurize the milk in the bottle. Now, it is very evident that if you pasteurize the milk in the bottle, the expansion of the liquid being considerably greater than that of the glass, you have to allow a space above the graduated mark. Furthermore, it would be impracticable to pasteurize it and then pour it into the bottle, because that would not be pasteurized in the bottle. You understand that pasteurizing in the bottle is simply to avoid reinfection by pouring. I know this is exceedingly important in the city of New York. I have just consulted Mr. Hartigan, and I know he is heartily in accord with that.

The PRESIDENT. In your experience, do you think this quarter of an inch is insufficient?

Mr. REICHMANN. I think it is insufficient. I think it will take half an inch. It would do no injury if the bottle were particularly marked "Pasteurized in the bottle." That could be blown in the bottle with no additional cost to the manufacturer. I know it is a matter that the milk committee of New York, and also the milk committee appointed by his excellency Gov. Glynn, have taken up, and I know that they would be rather chagrined if we cut that sort of proposition out.

Mr. HARTIGAN. Mr. President, if Dr. Reichmann will frame a resolution along those lines, I will be very glad to second that resolution.

Mr. REICHMANN. I just wanted to put it in this informal way and let the committee, on the authority conferred upon them by the resolution just passed, draft it. I will state it briefly in this way: That where milk bottles are used for the purpose of pasteurizing milk in the bottle, they shall be provided with a mark or graduation blown into the bottle, showing to what point the capacity of the bottle is indicated; also, that it shall be clearly marked on the bottle that that bottle is intended for milk pasteurized in the bottle.

The PRESIDENT. Why that last provision, if you have the mark?

Mr. REICHMANN. Because otherwise it would be a bottle that would be over a quart, and would not agree with the tolerance.

The PRESIDENT. Yes; but the mark is there. That is the point I was making.

Mr. REICHMANN. Or, opposite that mark shall be the wording "1 quart" or "1 pint," as the case may be, "to this mark."

The PRESIDENT. That is right.

Mr. REICHMANN. Yes; the other might lead to advertising milk pasteurized in the bottle.

Mr. HARTIGAN. Mr. Chairman, I am very glad to accept that as a motion, and to second it.

The PRESIDENT. You are willing, Dr. Reichmann, to put that in the form of a motion?

Mr. REICHMANN. Yes, sir.

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

The PRESIDENT. Is there any further business for this afternoon?

Mr. WALDRON. Mr. Chairman, I move that a vote of thanks be extended to the committee on specifications for the time and patience they have given to the preparation of these specifications.

(The motion was seconded and agreed to.)

The SECRETARY. Mr. President, before this meeting adjourns I want to have it clearly understood where we are to meet to-morrow. Before Col. Haskell died he obtained permission from the commissioners' office to hold the meeting in the District Building, and many of the members seemed to think that it would save some time and be more convenient to meet down there to-morrow, the last day. They have a room there with a seating capacity of 150, and unless there is objection the meeting will be held to-morrow morning at 9.30 in the District Building in that room.

Mr. SHERMAN. I move we adjourn, Mr. Chairman.

(The motion was seconded and agreed to.)

Thereupon, at 4.30 p. m., an adjournment was taken until May 29, 1914, at 9.30 a. m.

FIFTH SESSION (MORNING OF FRIDAY, MAY 29, 1914).

The conference assembled at the District Building at 10 a. m., the vice president, Mr. Waldron, presiding.

REPORTS OF STANDING COMMITTEES.

The PRESIDING OFFICER. Gentlemen, the first number on the program this morning is the reports of standing committees, and we will call on Mr. Rinehart, the chairman of the committee on by-laws.

The SECRETARY. Gentlemen, I would like to make a report for Mr. Rinehart, who is out of voice at the present time. He has caught a bad cold and is unable to speak, and he has asked me to submit what has been done by his committee.

The committee has not finished its work. It has corresponded with quite a number of people throughout the country and looked at the constitutions of various organizations, but Mr. Rinehart and the other members of the committee did not feel as though they were competent to settle a good many important questions, and consequently they are left open. I will read what has been prepared up to date.

CONSTITUTION AND BY-LAWS OF THE NATIONAL ASSOCIATION OF WEIGHTS AND MEASURES OFFICIALS OF THE UNITED STATES.

Whereas it is necessary in order to secure the highest efficiency, establish uniformity of laws and inspection, and promote the general welfare of weights and measures departments in all the cities and States of the United States; and

Whereas we are all agreed that systematic organization is the keynote of success in accomplishing these results: Therefore

We do constitute ourselves the National Association of Weights and Measures Officials of the United States, and have adopted for our guidance and government the following constitution and by-laws:

CONSTITUTION.

ARTICLE I.

This association shall be known as the National Association of Weights and Measures Officials of the United States.

ARTICLE II.

The objects of this association shall be: First, to promote interest and harmony in the departments of weights and measures of the various cities and States of the United States; second, to hold conferences from time to time for mutual exchange of views on matters of importance to the officials; third, to secure uniform legislation throughout the United States; fourth, for the advancement of the work of the National, State, and city departments of the United States, and for social intercourse of its members.

ARTICLE III.

Article IV.

The officers of this association shall be a president, vice president, secretary-treasurer, sergeant at arms, and ——— committees, executive, legislative ———.

Article V.

It shall be the duty of the president to preside at all meetings of the association; to enforce a due observance of the constitution and by-laws; to decide all questions of order; to offer for consideration all motions regularly made; to call special meetings, appoint all committees, and to perform such other duties of his office as it may require. He shall make no motion or amendment, nor vote on any question or motion, unless the association be equally divided, when it shall be his privilege to cast the deciding ballot.

Sec. 2. It shall be the duty of the vice president to preside in the absence of the president and perform the duties of that office.

Sec. 3. It shall be the duty of the secretary-treasurer to keep the minutes and records of the association; to inform candidates of their election; to notify them of dismissal; register the names of the members; issue all notices required; and perform all other duties pertaining to his office as may be required of him by this association. He shall receive all moneys and keep a written account of all receipts and disbursements.

Sec. 4. It shall be the duty of the sergeant at arms to preserve order at all meetings of the association and to perform other duties pertaining to his office as may be required of him by this association.

Sec. 5. It shall be the duty of the executive committee to ———

Sec. 6. It shall be the duty of the legislative committee to acquaint itself with legislation that would directly benefit the United States, State, or city departments of the various States of the United States; to draft, or have drafted by the Attorney General of the United States or of the various States, all legislation needed; and to assist in all other ways that may be deemed necessary to promote the best interests of weights and measures.

Sec. 7. It shall be the duty of the membership committee to pass upon the eligibility of members making application to this association and to report their findings to the association.

Article VI.

ELECTION OF OFFICERS.

Article VII.

AMENDMENTS TO CONSTITUTION.

Every proposed alteration, amendment, or addition to this constitution or the by-laws, hereto annexed, must be submitted in writing to the secretary of the association, who shall notify the members present at the next regular meeting, at which time the said amendment, alteration, or addition may be adopted by a two-thirds vote of all members present.

Article VIII.

SUSPENSION OF BY-LAWS.

A by-law may be suspended, in case of an emergency, by a two-thirds vote of all members present.

BY-LAWS.

ARTICLE I.

MEETINGS.

This association shall hold its meetings—

SEC. 2. ——— members shall be necessary to constitute a quorum.

SEC. 3. At the written request of ——— members the president will call a special meeting. No bills shall be presented nor shall any new members be admitted at a special meeting.

ARTICLE II.

INAUGURATION OF OFFICERS.

At the inauguration of each officer he shall make the following affirmation: "I do hereby solemnly swear that I will faithfully and impartially discharge the duties of my office to the best of my ability and knowledge."

ARTICLE III.

The election of members shall be by ballot subject to the provisions of Article III of the constitution. A majority vote shall constitute an election of a member.

ARTICLE IV.

The dues of this association shall be ——— dollars per year, payable in advance, with no initiation fee. Should it become necessary, however, to raise additional funds to defray expenses, the association shall vote the amount of same and a tax imposed upon each member.

ARTICLE V.

Any member of this association may be suspended by a two-thirds vote of all the members present at any regular meeting. Members may be suspended for unbecoming conduct, refusal to pay dues or assessments, or other misdemeanor. Members suspended may be given a hearing by appealing to the executive committee in writing, and a two-thirds vote is necessary to restore any suspended member to the asssociation.

ARTICLE VI.

Should any controversy arise which is not included in the rules of order hereto attached, general parliamentary law shall govern the presiding officer.

ARTICLE VII.

Amendments to the by-laws may be made in accordance with the rules laid down in Article VII of the constitution.

RULES OF ORDER.

1. The president, or in his absence the vice president, shall preside at all meetings of the association.

2. The president shall have the right to take the floor in any debate on any subject under discussion after calling to the chair the vice president or some other member he may select.

3. After a meeting has been called to order members shall be seated and shall not speak or otherwise interrupt the proceedings till given permission by the presiding officer.

4. No member shall speak on any motion more than twice without permission from the Chair, nor shall any member speak more than five minutes at any one time unless given permission by a majority vote of the members present.

5. Should two or more members address the Chair at the same time the Chair shall choose the one who, in his judgment, is first entitled to the floor.

6. When a member is called to order by the president or by any other member he shall at once resume his seat pending the decision on the point of order raised. Every question of order shall be decided by the president, subject to the appeal to the sense of the meeting.

7. No motion shall be debatable until it has been seconded.

8. Appeals and motions to reconsider or to adjourn are not debatable.

9. When a question is under debate no motion shall be received, except to lay on the table, postpone, commit, or to amend.

10. No member shall interrupt another when speaking, except to call to order as prescribed in rule 6, or, with the permission of the member speaking, to ask a question relevant to the subject.

11. A motion to adjourn shall always be in order, except when another motion is being voted upon, provided the member moving adjournment has properly secured the floor.

12. When a motion shall be made and seconded the mover thereof may be called upon by the president or any member to reduce the same to writing, from which it will be read by the secretary.

13. The mover of a motion shall be at liberty to accept an amendment thereof, but if an amendment be offered and not accepted, yet duly seconded, the association shall pass upon it before voting upon the original motion.

14. When a motion to adjourn is carried no member shall leave his seat until the president shall have left his.

15. Every officer, at the end of his term of office or service, shall deliver to his successor any moneys, papers, documents, books, or any other records under his charge and belonging to the association.

ORDER OF BUSINESS.

1. Call to order by the president.
2. Roll call by the secretary.
3. Reading of minutes of previous meeting by secretary.
4. Election of officers.
5. Propositions for membership.
6. Report of committee on membership.
7. Election of members.
8. Report of executive committee.
9. Report of legislative committee.
10. Report of other committees.
11. Report of officers.
12. Unfinished business.
13. Business of the day.
14. New business.
15. Adjournment.

The presiding officer shall announce the order of business, each subject in its proper turn.

DISCUSSION.

The PRESIDING OFFICER. Gentlemen, you have heard the report of the committee on by-laws. What is your pleasure?

Mr. WILLETT. Mr. Chairman, I move that the committee be given another year to complete their report.

(The motion was seconded.)

The PRESIDING OFFICER. The motion is made and seconded that the committee continue for another year. Are there any questions on the motion?

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

The SECRETARY. I might state that in that event this constitution as presented at this time will be printed, so that the members will have an opportunity to see it and perhaps make suggestions more intelligently at the next meeting.

Mr. REICHMANN. Mr. Chairman, if I may, I would like to make a suggestion. In listening to this constitution it appears that it

provides for an association of weights and measures officials of the United States, for an election of members, and so on. I would like to find out what the sense of this conference is on this point; instead of calling it an association of weights and measures officials, to call it a weights and measures association, and have every person who is an active weights and measures official, by virtue of such fact, a member of the association, and entitled to a vote if he pays his dues; and also to have a subsection of that association, namely, Section B, of you please, composed of representatives from civic bodies, who may be delegated or asked to come, or representatives of manufacturers or ex-officers of States, cities, counties, or districts. It does not seem to me quite proper to have a weights and measures association of officials, with a great many representatives and ex-weights and measures officials having also a vote in the active management of that association. I will put that as a motion in this form: That it is the sense of this conference that the weights and measures association should be divided into two sections, one section being weights and measures officials who are in active service and the second section composed of all other representatives who may come here or be invited here or delegated here; the second section not to have a vote. I think I am in a position where I have a right to make that suggestion, because having been a weights and measures official, and not being now a weights and measures official, but being delegated by the governor to come here, I think I really ought not to have any right, in any manner, shape, or form, to a vote on matters of the association. That is simply an ethical question, I think.

Mr. Willett. Mr. President, I would like to ask Dr. Reichmann if he intends that the members composing Section B shall have the privilege of debating any question that comes up.

Mr. Reichmann. That is a matter that the active members should decide—whether they want to give them the privilege of the floor. Personally I feel that they should not have a right to speak except by the consent of the association.

(The motion was seconded.)

The Presiding Officer. Are there any remarks?

Mr. Brown. Mr. Chairman, does Dr. Reichmann mean that members of section B shall be, we will say, any persons interested sufficiently in weights and measures to go to the trouble of coming down here and attending these meetings; for instance, members of women's clubs, and so on? Is that your idea, Dr. Reichmann.

Mr. Reichmann. Yes. Suppose the conference passed a resolution inviting a member of a women's club here; then certainly she would naturally come under section B, because she is not an active weights-and-measures official—unless, of course, she has been elected a superintendent of weights and measures in Colorado or some other place.

Mr. Brown. My reason for asking that question was in order to know just how far we should extend this field. The sentiment in favor of regulation of weights and measures is fast growing in the United States, and it is to be imagined that it will continue to grow at an increasing rate, and that it will assume phases which we do not now see; such, for instance, as a sentiment in favor of the metric system, if you choose, or matters of like moment. Now, the question is whether this organization shall invite all persons thus interested

in the general subject, and in any of its phases, to become, we will say, associate members under section B, as suggested, or whether we shall confine that to persons having an official or a quasi-official standing. It seems to me that it might be just as well to take those questions under consideration. I am not sure that I am not anticipating matters just a little in making this suggestion; possibly I may be anticipating the trend of the sentiment at this time; but it is a thing we will have to consider sooner or later.

Mr. Reichmann. Mr. Chairman, I agree absolutely with Mr. Brown. That was exactly the reason I ventured to ask the opinion of the conference—because the sentiment is growing all the time, and as it grows the association should actually and always be in the control of the active weights-and-measures officials. Otherwise you may have the same effect that is brought about in so many other associations which are killed by the fact of a looseness of statement as to who are the active members and have the vote. Many others come in and they practically run the thing, you might say, to the detriment of those who are primarily interested. I was anticipating that very thing. As I am now out myself, I make this suggestion. It does not affect me one way or the other; it does not help me and it does not hurt me, except that it shuts me out of section A, and I would like to be in section A.

The Secretary. Mr. Chairman and members of the association, I agree with what Dr. Reichmann and Mr. Brown have said in regard to this matter. I believe that we ought to anticipate the fact that we are going to have many people here by and by, resulting in discussions such as we had yesterday, that the weights and measures officials will have to get together. We will have to be able to discuss those questions and settle them without having a lot of people unfamiliar with such technical matters given the right to vote on them. On the other hand, we have to make some provision for those people who are interested. We have that question coming up, and nobody realizes that more than I do; a number of people have been invited to come here and be present at this conference, and they really have very little status. Most of the manufacturers, for example, are invited to come here and exhibit. I do not feel that their status is very much in doubt, because they are here as exhibitors; but there are a great many members representing other associations who have practically no status at this time at all, and it seems to me that we have to have two sections or two associations or something to handle that situation. Those people are going to be extremely valuable to this movement; perhaps they will have even more influence than the officials will have; and that, I think, ought to be considered by the committee on constitution and by-laws very carefully.

Mr. Egan. Mr. Chairman, I would like to inquire what the effect of this motion will be if it is passed; whether it will be a suggestion to the committee on constitution and by-laws, or whether, if passed in the present form, it is adopted finally. I think Dr. Reichmann can explain what his purpose is.

Mr. Reichmann. My purpose in making the motion as it is stated is simply that it is a suggestion to the committee on by-laws that that is the sentiment of this conference; and, of course, as a committee of the conference, they would naturally respect the wishes of the conference and word the thing upon investigation as it seems best fitted

to them. It is in just the same spirit that Mr. Fischer mentions. There are so many thousands of illustrations—every one of you knows them—where, instead of having all the people interested in a similar line of work, they may be interested in different angles of it; then they go and form a separate association, and the first thing you know you have a clash, and just as soon as you have a clash you are pulling at cross purposes. What all of us want is, above all, to be pulling together. We do not want any of the others who are interested to form a separate organization, but we want them to come into this as a part of it. In other words, if they get out and form a separate association, then they are insurgents, and you know what insurgents are.

Mr. SCHWARTZ. Mr. Chairman, I am in accord with the sentiment as expressed by both Dr. Reichmann and Mr. Brown regarding the scope that the membership should assume. But I feel this: I think that the definition should be placed on record or the suggestion made to the committee on constitution and by-laws. As I understand it, this committee is continued for a year, and naturally will have to work it out after we receive the printed copies, which will give each member of the conference an opportunity of studying the different sections and coming down next year and voting intelligently on them as they are presented. But I feel that this section A and section B should be eliminated. State your membership as active, associate, or honorary members. The active members constitute the working force. They have the ruling, the government of your conference in hand. The associate member, or honorary member, as you may see fit to create the term, is simply so by sufferance. We appreciate the fact that we want to get all of the information, and we want to bring all of the different scale people, manufacturers, and those interested in the subject of weights and measures together. That is Dr. Reichmann's idea, as I understand it. Now, define what an active member is, and then define what an associate member is. The associate members, as I take it, should not have the right of control of a meeting of this conference. The active members are the ones to do that. Then if by invitation an associate member is asked to take the floor, and is given permission to talk on a subject, he is under the control of the active members of the association. He does not come here, if I may use the term, to "hog" the conference. We might have a number of scale men come in, and if their standing as to membership in the conference is not clearly defined, they might take up all the time of the conference, when we have other matters to consider. I think that definition should be made. Make the term "active" and "associate," if you please, but say what an associate member is; what his membership consists of; what rights he has in the association; and define it in that way. I think that would be the proper way of doing it.

Mr. REICHMANN. Mr. Chairman, I am in hearty accord with what the gentleman has said, and therefore I specifically made the statement that this would simply be a suggestion to the committee. "A" and "B" are simply one term. I thought of associate and active members; as a matter of fact, had written out a resolution on this matter with active and associate members. But I fear the bringing in of honorary members, because, in the nature of honorary members, a great many men want to show their friendship for some one, some

particular Congressman, or some one else, and the first thing you know you are littered up with honorary members. It is just the same as we have in the association of the State of New York. We have the term "honorary members," and we have more honorary members than active members. Why? Some man will say, "This man is a particular friend of mine," and the other fellow will say, of course, "We want to help him out," and we get a very long list of honorary members; whereas my original intention was to confine it to State officials and members of the bureau. That is how such things go; and so, personally, I think it would be better not to make a definite mandatory amendment to the constitution as suggested by the committee at this time, but simply leave the question to them, suggesting that it is the sentiment that some distinction should be made, and leaving it to their judgment to work that out.

Mr. SCHWARTZ. Mr. Chairman, not to take up any more time than necessary, I would suggest to the doctor that we could limit that by placing a limitation on the number of honorary members. Then we would not have that long list. You could have, say, twenty-five or ten or one.

Mr. BROWN. Mr. Chairman, in order to get the matter in the record, I want to suggest that Mr. Schwartz's idea of the limitation of the number of members is an excellent one, but I would also further limit it by prescribing the qualifications for honorary membership; that an honorary member should only be some person who has either through his scientific attainments or through his legislative actions helped the cause of metrology materially, and this honorary membership to be conferred upon him simply as a recognition of his services along those lines.

The PRESIDING OFFICER. Are there any other remarks?

(Cries of "Question!")

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

The PRESIDNG OFFICER. The next number on the program, gentlemen, is the demonstration of testing of various types of scales, by Mr. O. Evans Mikesell.

Mr. MIKESELL. Mr. Chairman, inasmuch as this subject has been fully developed from every angle and every phase in reference to scales, I cheerfully yield my time to the distinguished gentlemen who follow me upon this program—in particular, Mr. Holbrook.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. HENRY. Mr. Chairman, is it the pleasure of the house that I make a report for the committee on resolutions at this time? At the present time there are only two of us here.

The PRESIDING OFFICER. If there are no objections, I think it will be perfectly proper.

Mr. HENRY. We have here four resolutions, and it would seem to me that unless there is objection these had better be taken up separately, to avoid confusion and save time. The first one is—

We, the National Conference on Weights and Measures, assembled in our ninth annual session, express and record our deep regret at the death of our former colleague, Col. William C. Haskell, of the District of Columbia.

We esteemed him as a man and friend; we admired his zeal and ability; and respected him for his kindness and fairness.

We extend our heartfelt sympathy to those he has left behind, and direct that a copy of these resolutions be sent to his family.

Introduced by J. H. Sherman and unanimously recommended by the committee.

Mr. SCHWARTZ. Mr. Chairman, I move the adoption of the resolution by a rising vote.

(The motion was duly seconded, and was carried unanimously by a rising vote.)

Mr. HENRY. The second resolution reads:

Resolved, That a standing committee of three be appointed by the president of the conference as a national committee of reference for the purpose of securing information of importance relative to weights and measures for the benefit of all members of the conference; and to cooperate with the National Bureau of Standards in the securing of such information.

That was introduced by myself, and unanimously recommended by the committee; and I would like to say a word to explain that.

This is a matter which I wanted to put in the form of a resolution, after some talk with the Bureau of Standards; that is, I made the suggestion to the bureau some time ago of something of this sort, for the reason that I thought it might be of some assistance if this conference, by part of its members, would be a committee to assist the bureau in obtaining this information. Now, we all know that the bureau obtains a great deal of information in all lines relative to weights and measures; but there is other information which they do not get. That is probably our own fault; but it would bring it more directly to us if we had a committee of our own to which to refer any important matter in our State or city.

Then this committee would act in conjunction with the Bureau of Standards. You understand, it is not any attempt to usurp any of the functions of the bureau, and that is the reason why I submitted it to the bureau first; and I understand they will not be jealous in the least of any committee of this sort. It is simply a committee to gather information, for the reason that they have not sufficient men to take care of some of these details; and it can do no harm, and I think may do some good, if the members of the committee are active and if all the members from the different States and cities will call these matters to the attention of the committee.

(The question was taken, and the resolution was adopted.)

Mr. HENRY. The third resolution:

Whereas, it is evident that deception is being practiced in the stenciling of the capacity of range boilers, hot-water storage tanks, and expansion tanks for hot-water heating plants, and in the representation of the surface measure of radiators;

Whereas, the housebuilder and the house owner are thus being daily defrauded; and

Whereas, it is the desire of the commissioners and sealers of weights and measures here assembled to prevent all deception of such character: Therefore, be it

Resolved, That the conference of weights and measures officials condemn such practices, and that this conference and the individual members use such powers and authority as they have under State, county, or municipal laws, or use their influence to acquire such powers and authority, to stop the sale in their State, county, city, or district of all such commodities that are under the capacity marked.

This resolution was introduced by me, by request, and I trust the purpose of the resolution is plain. It has been unanimously recommended by the committee. It is to do away with, as far as possible, the practice of overmarking hot-water boilers and overmarking the

surface of radiators, etc. I have had a little experience in this line myself; I have had some severe complaints of that kind, and presume some of the rest of you have run into that proposition.

Mr. BUCHTEL. Mr. Chairman, with reference to the adoption of this resolution, while I think that it would be a good thing for the sealers of the various States and counties to look into it, still I do not believe that it would be well for this convention, acting as a convention, to single out any one particular wrong and act upon it alone. If we are going to pass resolutions on all the things that we have reason to believe are fraudulent or not right, we will be passing resolutions here for the next six months. I think it is well enough to call a matter of that kind to the attention of the convention, but not in the way of a resolution asking a specific action on it.

Mr. SHERMAN. Mr. Chairman, as a member of the resolutions committee I want to say a word about this resolution. It was called to our attention, and so I have put in all my spare minutes for two or three days in looking into it as much as I could. It simply comes down to the question of expressing the opinion of this conference that the actual capacity of a receptacle should be the capacity which is marked on the receptacle. It is not specifically provided for anywhere else in any of the proceedings of the conference, and it appeared too late to get it provided for, it seemed to us, in any other place than this. But there is nothing in it that confers any special privilege or any special advantage upon any one manufacturer. It involves no patents or anything of that sort. It is simply that the resolutions committee believes, as a committee, that this conference ought to express its opinion on this subject—that a container should contain the amount that the label on it states it contains. That is all it boils down to; that is all the point there is for discussion, as far as the committee can see.

Mr. FARRELL. Mr. Chairman, it seems to me that it is the sealer's duty to see that every container is properly marked. It seems to me that the sealer has certain particular duties to perform, and the one thing above all others which he must do is to see that the consumer receives what he pays for. I would therefore move, as an amendment to this resolution, that it read: "*Resolved*, That the sealers are requested to do their duty."

Mr. HENRY. Mr. Chairman, I would just like to say a word of explanation. I do not think the gentleman who last spoke has ever been called upon to exercise his authority, perhaps, on this particular subject as I have been. I had to go through the whole prosecuting department, and then found that I could not do a thing after I got all through. You may have every desire to exercise your duty and then not be able to exercise your moral duty on account of lack of legal support from your laws; and I believe that there are at least half the sealers here—State, county, and city—who would find, if they tried to prosecute a case of this kind, that they could not do it. And that was my particular idea in putting my name to this resolution. It was submitted by an outsider, but I would have put it in myself if I had thought of it for that very reason. That is why I was anxious to have it discussed and adopted or rejected, as the convention sees fit. I did not know but what it might help each one of us somewhat in overcoming our difficulties along this line, perhaps by calling it to the attention of these dealers who overmark their

boilers; and if you have studied that at all you know how nicely that is done. For instance, a man building his house may order 30-gallon boilers, and 9 times out of 10, or a little more than that, he gets a 25-gallon boiler, which looks exactly like a 30-gallon boiler, because the diameter is reduced and not the length. It has the berry basket beaten a mile. And then on the radiators, which is a thing that has been called more particularly to my attention in my own State, I have found that tremendous fraud is practiced in practically every heating plant put in in the State. Now, a man has an idea how much heating surface he ought to have in his house and how much he ought to pay for it. He orders it and pays for it, and then may find that he has been cheated out of anywhere from 2 to 3 to 20 per cent of that heating surface. He freezes all winter long; he has paid for material which he did not get, and he is cheated not only in the first instance, but all the time he is using it. And it is the same way with the hot-water boiler. Not only is he cheated in the amount of material and amount of workmanship, but he never has more than 25 gallons of hot water at his disposal when he ought to have 30 gallons. It is an absolute fraud. If we could contend against it without any special attention being called to it, there would be no need of the resolution. Perhaps this resolution does not accomplish what I have in mind, but it seems to me that it would enable me personally to call this matter to the attention of my own legislature, and I do not know why it would not apply to every one of us in the same way and give us some standing to get legislation along that line. It is absolutely necessary, I believe, in 75 per cent of the States and cities to have specific legislation in order to do anything at all in this matter; and I would say for Mr. Van Duyn—I am sure that I am at liberty to speak for him on this, as another member of the committee—that he has been a contractor and builder, as I understand, for a great many years, and he told me that he was very much in favor of the passage of this resolution, because he knew exactly what it meant.

Mr. STIMPSON. Mr. Chairman, with reference to the statement that Mr. Sherman has just made, would it not be better to word this resolution so as to cut out reference to specific articles, and leave it in reference to any such articles which may be misbranded, if you please, to purport to give a larger capacity than what is really there? It seems to me that that would be a better way of handling it.

Mr. RICHARDSON of Virginia. Would not the proper construction and heating surface for radiators and boilers more properly come under the province of an architect of a building than it would under a superintendent of weights and measures?

Mr. HENRY. Why, it comes under the architect or it comes under the builder, but it is not his official duty—at least, he does not exercise it in that way—to protect the man with whom he has a contract. That is our business. His business is to obtain his money and give what he thinks he ought to give, or else give what he can give and get away with it.

Mr. MIKESELL. Mr. Chairman, I move you that this resolution be turned over to the tolerance committee, to become finally a part of the specifications.

(The motion was seconded.)

The PRESIDING OFFICER. Are there any remarks?
(Cries of "Question.")
The motion was agreed to.
Mr. HENRY. The fourth and last resolution:

Resolved, That this conference petition Congress through its secretary for an amendment to the Federal net weight law for food packages; that the net weights of all packages be 2, 4, 8, 12, or 16 ounces, and in cases of those larger than 1 pound be of even pounds, half pounds, or quarter pounds; and that no food packages shall be put up in fractional parts of a pound other than 2, 4, 8, or 12 ounces; and be it further

Resolved, That the president of this conference appoint a committee of three to draft such a law to be presented to Congress with this petition for consideration.

Mr. ROYLANCE. Mr. Chairman, for information, do we understand that that would cover potatoes, cabbages, onions, and commodities of that sort? Under the reading of the resolution, it would, I take it; and if so, I do not think it is fair.

Mr. MARONEY. Mr. Chairman, just a question for information. Even though we passed on it, is not that unconstitutional? In other words, if I wanted to put up 13 ounces, and the law said 12, what are you going to do about it?

Mr. REICHMANN. Mr. Chairman, I move that the resolution be referred to the executive committee for final action.

(The motion was seconded and agreed to.)

The PRESIDING OFFICER. The next thing on the program is a paper by Mr. H. W. Bearce, of the Bureau of Standards, on Glass Graduates Suitable for Weights and Measures Officials.

GLASS GRADUATES SUITABLE FOR WEIGHTS AND MEASURES OFFICIALS.

By H. W. BEARCE, *Bureau of Standards.*

Mr. Chairman and gentlemen, the question of glass graduates is one with which weights and measures officials are directly concerned, since graduates are likely to be used by them in testing all sorts of small-capacity measures. Though used for many purposes, the chief considerations in the use of graduates are always the same, namely, accuracy and convenience of use. The degree of accuracy required will, of course, to some extent depend upon the use to which the graduates are to be put.

The graduates in common use are of two kinds, cylindrical and cone, the name being taken from the shape of the graduate. The cone graduates are the ones ordinarily used in drug stores, while the cylinders are of the type commonly known as precision graduates. The cylindrical graduates can, as a rule, be used with greater accuracy than can cone graduates. The relatively large diameter of cone gradutes, and the variable diameter, makes it difficult to estimate the fractional parts of a subdivision, and makes it also impossible to tell by inspection whether the spacing of the graduations is approximately what it should be. Cone graduates, however, are largely used in certain lines of trade. For example, in drug stores they are almost universally used in compounding prescriptions. They are, of course, somewhat easier to pour into and much easier to clean than

cylinders, and for that reason are more convenient. If accurately graduated and carefully used, they are probably sufficiently accurate for the purpose. Cone graduates, however, should not be used by weights and measures officials in comparisons of other graduates. For this purpose only cylindrical graduates of the highest obtainable accuracy are suitable.

In the time at my disposal I shall attempt to show the essential points of cylindrical graduates and show how a good graduate can be distinguished from a poor one; also how the graduate should be used.

Glass graduates in metric units are covered in a circular published by the Bureau of Standards, but the graduates in English units—customary units, fluid ounces, or cubic inches—are not covered in this circular. Up to within a few months these graduates had not been considered by the bureau. Within the past few months specifications for cylindrical graduates in the customary units have been prepared. These specifications will be sent to the different delegates as soon as they are ready for distribution. We would like your examination and criticism.

Graduates for the use of weights and measures inspectors should meet the following conditions:

First. The error in the indicated capacity at any point of the graduate should be so small as to be negligible in comparison with the accidental and unavoidable errors of use. That is, you do not want to have to stop to apply a correction to your standard graduate before you know whether the one you are testing is within or without the tolerance.

Second. The lines should be fine but clear-cut and distinct, and should be of sufficient length to allow accurate settings to be made. To illustrate that, on graduates of this kind [indicating] all the lines should extend at least half way around, so that when you put the graduate on the table or when you hold it up and look at it you can look across from the end of one line to the other end of the same line, and in that way tell whether you are tipping it one way or the other. I can, of course, when holding it in the hand, tell that I am not tipping it to the right or left by looking at it, but I can not possibly tell whether I am tipping it front or back. Some of you over there probably can.

In regard to the actual lines, the width of the lines may be a matter of personal judgment. For myself, I like the etched and filled lines much better than the engraved; you can see them much better. Engraved lines sometimes have to be filled with black lead from a lead pencil, or something of that sort, before they are clearly visible.

Third. The glass of the graduate should be clear and free from bubbles and streaks, so that the surface of the water will not be obscured or distorted.

Fourth. The distance between adjacent lines should be such as to permit accurate estimation of the position of the water surface when between two lines. This distance should usually be from 2 to 5 millimeters. It should never be less than 1 millimeter. If they are too close together it is confusing; if they are too far apart you can not estimate any better.

Fifth. The base of the cylinder should be at right angles to the long axis, and of sufficient size to make the cylinder reasonably stable. The base should be an integral part of the graduate.

Sixth. The height of the graduated portion of the cylinder should be at least five times the inside diameter. The relation of the height to the diameter should be such that the volume of water will be spread out to a reasonable amount. If you put it in a short, thick cylinder, any slight variation in the height of a line will make several times as great an error, of course—with the square of the diameter—as it would if it were taller and slimmer. The height, however, should of course be kept within reasonable limits. If it is too tall, it tips over too easily. A cylinder like that [indicating], a mixing cylinder, would probably be too tall for convenient use for many purposes.

Seventh. Each graduate should be marked with an identification number and with a standard temperature and with the method of use—that is, whether to contain or to deliver. That is a point which I will take up more at length later.

Having indicated the conditions which should be fulfilled by a cylindrical graduate, it is equally important to consider the precautions that must be taken in order that the graduates may give results which are not in error. Correct results require the fulfillment of two conditions—first, correct apparatus, and, second, correct use of the apparatus.

Assuming that the graduate is correct, the errors which may arise in its use may be classified as follows:

First: Errors caused by failure to bring the water surface exactly to the graduation mark. That is, in filling a graduate you of course set the water surface as close to the mark as you can. How close you can do that will depend upon the care exercised and also upon the man who is doing the filling and the methods by which he is making the adjustment.

Second. Errors due to uncertainty of drainage—that is, the amount of water adhering to the inside of the graduate when the water is poured out. That is a point which I think is often overlooked. A man thinks a graduate is correct, and many times does not consider whether it is to be used to measure in or measure out. Perhaps it has not occurred to him that there is a difference. It is evident, however, that if you pour water into a dry measure and then pour it out the amount that sticks on the cylinder is lost; that is, it contains more than it delivers. The quantity of this water adhering to the side I will call attention to later.

Third. Errors due to uncertainty of temperature.

First, in regard to bringing the water surface exactly to the required line, it will be found that several things must be taken into account. The cylinder should be placed on a solid and level surface, in a well-lighted position. The question of proper lighting is one which is very important and very often overlooked. The difference between the settings when made under different conditions of lighting may amount to considerable quantities. Settings made in a poor light are invariably too low; that is, the graduate is not filled full enough. This error is caused by the disappearance of the extreme

lower edge of the meniscus—that is, the water surface—when viewed in a poor light. What is seen is not the lower surface, but a point somewhere between this lower surface of the meniscus and the top. If you take it in a good light, with a proper background, this surface comes out perfectly definite and clear-cut. You can set it on a line with perfect accuracy if you take sufficient pains. Now, as soon as you get that in a bad light and try to set it, this lower edge, which under good conditions is perfectly sharp, disappears. You see not the meniscus, which you should set on the line, but a point somewhere between this meniscus and the top. What is seen as the meniscus is actually the reflection from the table, or from the bottom of the graduate, or from your hand—something which makes a black reflection near the top of the meniscus. Now, these graduates are all calibrated for the lower edge, and in filling them this curved surface should be brought directly on a line. For this reason a graduate filled in a poor light will not be filled quite up to the graduation mark, and if tested by weighing will appear to be too small.

The difficulty of setting the water surface accurately on the mark may be overcome, as explained by Mr. Downing the other day, by using a background of two colors. We at the Bureau of Standards do not use quite that method, but that works all right. We use a black collar—a strip of black paper which should be wrapped around the cylinder immediately below the mark on which you want to set; then a white background behind. For convenience we place a piece of tracing cloth across the window or anything with a good matte surface; a plaster wall would be all right, so long as you get a good light which is not glaring in your eyes.

It sometimes happens that the glass of a cylinder has a faint trace of color in it, so that the meniscus is brought out without the use of any shade. In this particular cylinder [indicating] we have enough green apparently in the glass, so that we get an accurate setting; using it with a collar and without a collar, we get it at the same point. The meniscus comes out clear-cut in either case. That, however, is not often found.

In order that you may appreciate the magnitude of the difference in setting the water surface on a given line when the settings are made with and without the use of a collar, the following table is given. The results shown in the table were obtained by experiments recently carried on at the Bureau of Standards. The work was done be experienced observers and the differences here shown are undoubtedly less than would be found by observers less expert in making the settings.

It will be seen from the table that the difference in capacity varies from 0.05 cubic centimeter to 1.8 cubic centimeters, and that the difference in height varies from 0.13 millimeter to 0.66 millimeter. These differences are of about the same order as the tolerance allowed for the different graduates.

TABLE 1.

Capacity of cylindrical graduate.	Inside diameter.	Difference between settings with and without collar.	Difference in height between settings with and without collar.
	Centimeters.	*Cubic centimeters.*	*Millimeter.*
100 cubic centimeters.....	2.2	0.05	
		.05	
		.04	
		.05	
		.05	0.13
2 liquid ounces.....	2.3	.06	
		.10	
		.10	
		.09	.22
4 liquid ounces.....	2.9	.20	
		.11	
		.10	
		.20	
		.15	.23
250 cubic centimeters.....	3.1	.10	
		.23	
		.11	
		.15	.20
10 cubic inches.....	3.4	.30	
		.30	
		.27	
		.22	
		.25	
		.27	.31
8 liquid ounces.....	3.6	.21	
		.20	
		.22	.22
500 cubic centimeters.....	4.4	.95	
		1.11	
		.93	
		1.00	.66
16 liquid ounces.....	4.8	.90	
		.64	
		.78	
		.77	.43
32 liquid ounces.....	6.1	2.10	
		1.70	
		1.70	
		1.8	.62

REMARKS.—The settings with collar were made by placing a black paper shade immediately below the line on which the settings were to be made. This rendered the profile of the meniscus sharply defined and clearly visible against a light background. The settings made without the collar were in all cases lower than those made with the collar.

The second source of error noted was the error in drainage. In regard to this question it should be pointed out that cylinders are graduated either to contain or to deliver their indicated volumes. It is evident that a graduate will deliver less than it contains on account of the quantity that adheres to the inside of the graduate when the water is poured out. For that reason, if a graduate is intended to deliver an indicated volume, it should be made larger than the graduate to contain. If the amount retained on the walls

of the graduate is a definite quantity, or a definite percentage of the total volume. then the graduate to deliver should be made larger than the graduate to contain by this definite amount. But it is found in practice that the amount is not quite definite. The amount retained will depend on the particular graduate in question, to a slight extent upon the temperature, upon the rate at which it is poured out, and upon the cleanness of the graduate—more than anything else on this last point.

Now, I have some data on the amount retained; this is shown in detail in Table 2. I will state briefly the results for some of the different sizes—the 2, 4, 8, 16, and 32 ounce. The amount retained is in general slightly less for distilled water than for tap water; and for greasy water, under bad conditions, the amount retained is still greater. I will take for a mean value the tap water, which for practical purposes is very nearly the same as distilled, and will read off the amounts retained in the order of graduates:

The 2-ounce retains thirteen one-hundredths of a cubic centimeter; the 4-ounce, twenty-seven one-hundredths; the 8-ounce, thirty-eight one-hundredths; the 16-ounce, sixty-two one-hundredths; and the 32-ounce, eighty-two one-hundredths. That is, practically a cubic centimeter. Since there are approximately a thousand cubic centimeters in a quart, this graduate retains nearly one one-thousandth of its volume. In percentages, the amount retained will perhaps mean more, running through this in the same way. The 2-ounce graduate retains twenty-three one-hundredths of 1 per cent; the 4-ounce, twenty-two one-hundredths of 1 per cent; the 8-ounce, sixteen one-hundredths; the 16-ounce, thirteen one-hundredths; and the 32-ounce, nine one-hundredths. That is practically one-tenth of 1 per cent—1 cubic centimeter on a thousand.

TABLE 2.

Average amount of water retained in cylindrical graduates of different capacities under varying conditions of cleanness.

Capacity of graduate.	Number of graduates used in observations.	Average amount retained.			Average per cent retained.		
		Distilled water.	Tap water.	Greasy water.	Distilled water.	Tap water.	Greasy water.
		Cubic centimeters.	*Cubic centimeters.*	*Cubic centimeters.*			
3 cubic inches=49.162 cubic centimeters	1	0.11	0.11	0.13	0.22	0.22	0.27
2 liquid ounces=49.147 cubic centimeters	3	.12	.13	.14	.21	.23	.23
4 liquid ounces=118.295 cubic centimeters	2	.26	.27	.24	.22	.22	.20
10 cubic inches=163.872 cubic centimeters	1	.34	.32	.36	.21	.20	.22
8 liquid ounces=236.590 cubic centimeters	2	.38	.38	.41	.16	.16	.17
16 liquid ounces=473.18 cubic centimeters	2	.58	.62	.60	.12	.13	.13
1 dry pint=550.6 cubic centimeters	1	.56	.58	.66	.10	.11	.12
35 cubic inches=573.55 cubic centimeters	2	.64	.70	.69	.11	.12	.12
32 liquid ounces=946.36 cubic centimeters	3	.80	.82	.83	.08	.09	.09

The results shown in the above table exhibit certain slight inconsistencies, but in general they are not far from the truth.

In connection with the question of drainage, I might refer to something I have heard about the way inspectors sometimes test milk bottles. I have been told that at times they pour from the measure into a milk bottle, pour from that bottle into another bottle, and from that into another bottle, and so on for some time. Now, it is evident that if they do that the bottles will very soon appear too large; that is, they have used up one cubic centimeter on every bottle. In the course of 950 bottles they would not have any water left.

In emptying from a cylinder which is used to deliver, the cylinder should be always tilted gradually, letting the liquid pour out at a uniform rate. Then it should be, for accurate work, held in that inclined position for half a minute to allow drainage, then the tip touched to the wet surface of the receiving vessel to touch off that last drop. If used in that way, the amount retained will be very much more definite than you might think. We have some data, which I will not stop to present, which shows just about how much variation can be expected; and the variation between distilled water and greasy water for different cylinders of different sizes, under different trials, was to me surprisingly small. (See Table II for average results.) That being the case, it seems to me that graduates to deliver should be made practically as accurate as graduates to contain. In other words, the amount retained being pretty definite, the ones to deliver should be made that much larger than the ones to contain. That being done, those graduated to deliver and used to deliver will be very nearly as accurate as those graduated to contain and used to contain.

The results shown in Table II make it apparent that if accurate results are to be obtained by the use of graduates, the graduates themselves must be accurate, and they must be used in the way they were intended—that is, if a graduate is calibrated to contain, it should be used to contain; and if calibrated to deliver, it should be used to deliver.

It is possible, however, by proper manipulation, to use a graduate correctly in a way it was not intended to be used. For example, a graduate that has been calibrated to deliver can be used to contain if it is first filled and emptied before the amount to be measured is poured into it. After the first filling and emptying, the graduate will deliver the same as the amount poured into it. "To deliver" is therefore seen to be the same as "to contain wet." It is evident, then, that graduates that are to be used to pour out, or that are to be used successively without drying, should be calibrated "to deliver," while graduates that are to be used dry to contain the liquid to be measured should be calibrated "to contain."

The bureau is sometimes asked by dealers in apparatus whether the graduates to be supplied to weights-and-measures officials should be calibrated "to contain" or "to deliver." We can not, of course, tell without knowing how the graduate is to be used; but for general purposes it would seem that they should be calibrated to deliver, as it is likely that the inspector would in general use them to deliver, or, in case he used one to contain, he would probably not stop to dry it after each filling.

In regard to the errors due to uncertainty of the temperature at which graduates are used, it will be recalled that it has already been stated that each graduate should be marked with a standard temperature. This is important in order that the graduates may be accurately tested both by the manufacturer and the testing laboratory. In actual practice, however, it is not important that the graduates be used at the standard temperature. For example, since the cubical coefficient of expansion of glass is about 0.000025 per degree centigrade, the change in the capacity of a graduate will be about 0.000025 cubic centimeter per cubic centimeter per degree centigrade. A change of 10° C. either way from the standard temperature 20° C. will cause a change on a 1,000 cubic centimeter graduate of $0.000025 \times 10 \times 1{,}000 = 0.25$ cubic centimeter. That is, 0.25 cubic centimeter on 1,000 cubic centimeters, or 1 part in 4,000. This extreme temperature change would be unusual. The errors due to ordinary changes of room temperature would not exceed 1 part in from 8,000 to 12,000. It will be seen, therefore, that a graduate which is correct at its standard temperature can be used at other ordinary room temperatures without serious error.

Another point which should be borne in mind when considering the accuracy of graduates is that the smallest graduate capable of holding the amount to be measured should be used in each case. For example, if accuracy is required, a 32-ounce graduate should not be used for measuring 8 ounces. The 8-ounce graduate is subdivided to one-eighth ounce and can easily be read to one-thirty-second ounce, while the 32-ounce graduate, which is subdivided only to one-half ounce, can, with the same care, be used accurately only to one-eighth ounce. That is, the error in the use of the large graduate would be four times as great as in the use of the small one. This is simply an application of the same principle that is used in regard to scales; that is, you would not use a hundred-ton track scale to weigh a pound of sugar.

TOLERANCES.

The question of tolerances is one which needs careful consideration, but I hesitate to take it up in detail at this time. It is, of course, impossible for a manufacturer to make his graduates absolutely correct, but just how much variation he should be allowed it is difficult to say. Even the proper basis for fixing the tolerance is open to differences of opinion. The question of tolerance really comes down to this: How accurate can graduates be made without an unreasonable increase in cost?

The accuracy attained will to a great extent depend upon the methods employed and the care exercised by the manufacturer. If suitable methods of calibration are employed, it seems to me that the accidental and unavoidable errors will be very largely due to mechanical difficulties. That is to say, the difficulty in getting a line correctly placed will be not in getting the correct amount of water into the graduate, but in getting the line exactly in the plane of the water surface. The errors of graduation will therefore result from inability to put a line in a given plane, and the allowable error in a graduate might well be considered in terms of the allowable variation of a line up or down from its correct position. On this

basis a table has been prepared showing the error introduced in cylinders of various diameters when the lines are misplaced by various amounts. If it is assumed that it is practicable to fix a limit for the allowable variation of a line above or below its correct position, then the tolerance on this basis can be taken directly from the table. For example, if the allowable variation in the position of a line on a 32-ounce cylinder is fixed at 0.5 millimeter, then the tolerance is automatically fixed at 1.51 cubic centimeter. This would be the tolerance for a 32-ounce cylinder graduate to contain. If graduated to deliver, the tolerance in each case should be increased by the amount of the uncertainty of the quantity of water retained on the walls of the cylinder when the water is poured out. The magnitude of this uncertainty has already been considered in connection with Table 2.

Working on the basis of a certain allowable variation in the position of a line on a graduate, a set of tolerances was prepared; these were then compared with the tolerances allowed on metric graduates of the nearest equivalent size and were found to be in reasonable agreement. The variations in the position of a line were found to range from 0.2 or 0.3 of a millimeter for the small graduates up to 0.5 or 0.6 for the larger ones. That is, a line may be out of its correct position by about that amount.

The tolerances for graduates in customary units, interpolated from the tolerances for metric graduates (circular No. 9, seventh edition), are shown in the following table (Table 3), and following that the tolerances for metric cylinders of the usual capacities (Table 4):

TABLE 3.—TOLERANCES FOR STANDARD CYLINDRICAL GRADUATES.

[United States customary units.]

Capacity.	Limit of error of total or partial capacity.			
	To contain—		To deliver—	
	Cubic centimeters.	*Dram.*	*Cubic centimeters.*	*Dram.*
1 liquid ounce=29.57 cubic centimeters	0.07	0.02	0.11	0.03
2 liquid ounces=59.15 cubic centimeters	.12	.03	.18	.05
4 liquid ounces=118.30 cubic centimeters	.24	.06	.36	.10
8 liquid ounces=236.59 cubic centimeters	.45	.12	.68	.18
16 liquid ounces=473.18 cubic centimeters	.80	.22	1.20	.33
32 liquid ounces=946.36 cubic centimeters	1.50	.40	2.25	.60
		Cubic inch.		*Cubic inch.*
3 cubic inches=49.16 cubic centimeters	.10	0.006	.15	0.009
10 cubic inches=163.87 cubic centimeters	.33	.02	.50	.03
35 cubic inches=573.55 cubic centimeters	1.00	.06	1.50	.09
1 dry pint=550.6 cubic centimeters	1.00	.06	1.50	.09

TABLE 4—*Tolerances for standard cylindrical graduates.*

(Metric units.)

Capacity.	Limit of error of total or partial capacity—	
	To contain—	To deliver—
Cubic centimeter.	*Cubic centimeter.*	*Cubic centimeter.*
10	0.04	0.07
25	.06	.10
30	.07	.11
50	.10	.15
100	.20	.30
200	.40	.60
250	.45	.70
500	.85	1.30
1,000	1.6	2.4
2,000	3.0	4.5

It is customary in this country and in other countries to give to apparatus which is calibrated to deliver a tolerance twice as great as that allowed on apparatus to contain. This, in the case of graduates at least, it seems to me, is entirely too liberal. We have seen from the tabulated results on drainage that the uncertainty in the amount of water retained in a graduate is not great. It seems to me, therefore, that the tolerance for graduates to deliver should not be more than 25 per cent greater than that for graduates to contain; certainly not as much as 50 per cent greater.

In regard to the question of testing apothecaries' prescription graduates, it would seem to me impracticable to use cylindrical graduates of less than 2-ounce or possibly 1-ounce capacity. Cylindrical graduates smaller than this would have a diameter so small that they would be inconvenient to use and difficult to clean. On that account it will, in my opinion, be found desirable to devise some method for testing the very small graduates other than by direct comparison by means of standard cylindrical graduates. If the test of these small graduates could be carried out in the laboratory or office of the inspector, it could be conveniently and accurately done by means of a balance or a finely graduated burette. But either of these methods would no doubt be found to offer difficulties when applied to conditions in the field.

Since the subject of my paper is Glass Graduates Suitable for Weights and Measures Officials, I should perhaps not mention commercial graduates, but the question has already come up for consideration in certain States—Massachusetts, New York, and Wisconsin, at least—and will very soon demand attention in other States. It is therefore very desirable that this conference consider the question of commercial glass graduates and that suitable specifications and tolerances be drawn up and adopted. Uniform requirements by the different States in regard to design and accuracy of graduates is very greatly needed and would give the manufacturer something definite to work toward. Under the present system the manufacturer is hampered by unreasonable requirements in one State and allowed in some other State to put on the market any sort of a graduate that the public will buy.

If this conference, or a committee of this conference, can determine what qualities are essential in a graduate for commercial use and can present those qualities in the form of specifications which shall be accepted by the various States, it will then be possible for a manufacturer to make graduates to meet the requirements. If it is not, then such a manufacturer should be obliged to close his factory. There is no possible excuse for allowing a graduate to be used in one State if it is unfit for use in another. Surely a graduate that is incorrect in Wisconsin will be incorrect in Tennessee and one that is correct in California will be correct in New York.

I would therefore strongly urge that uniform specifications be drawn up and adopted.

ELECTION OF OFFICERS.

Mr. SCHWARTZ. Mr. President, at this time I would ask the privilege of the conference to present the report of the committee on nominations. I know it is out of the regular order, inasmuch as Mr. Holbrook's paper comes next on the program; but a large number of the members of the conference are present now, and if we waited until after lunch and the visit to the President, probably we would not have such a large gathering at the afternoon session.

The PRESIDING OFFICER. If there is no objection, I do not see why the committee should not make a report.

Mr. SCHWARTZ. Gentlemen, your committee on nominations present the following: For president, Dr. S. W. Stratton; for vice president, Mr. William L. Waldron, of New Jersey; for secretary, Mr. Louis A. Fischer; for treasurer, Mr. C. C. Neale. The executive committee (to include the four above-mentioned officers with the following added): Mr. H. H. Henry, of Vermont; Mr. J. T. Willett, of Indiana; Mr. F. G. Buchtel, of Oregon; Mr. F. P. Downing, of Wisconsin; Mr. A. W. Rinehart, of Washington; Mr. Thomas F. Egan, of Connecticut; Mr. F. C. Albrecht, of Ohio; Mr. Joseph Hartigan, of New York; Mr. Lucius P. Brown, of Tennessee; and Mr. E. W. Van Duyn, of Iowa.

The PRESIDING OFFICER. You have heard the report of the nominating committee. What is your pleasure?

Mr. MARONEY. Mr. Chairman, I move you, sir, that the recommendations of the nominations committee be accepted, and that the secretary be instructed to cast the unanimous ballot of the conference for them collectively, if that is legal; if not, individually.

(The motion was seconded.)

The PRESIDING OFFICER. Are there any remarks?

Mr. MIKESELL. Mr. Chairman, I represent Pennsylvania, one of the leading States in the Union of States. In this conference Pennsylvania has a representation of 17, I believe the largest representation of any State in the Union. I believe New Jersey comes next. Pennsylvania also has the largest number of sealers of any State in the Union. I find in looking over this list that there are just 14 on the executive committee. Now, as you readily see, there could be a tie, with all the members present. I believe there should be 15. Now, inasmuch as Pennsylvania holds the position it does in the world of weights and measures, I believe that Pennsylvania ought to be

represented on this committee. Pennsylvania is close to Washington, where you hold your conferences. I believe that a member of the executive committee from Pennsylvania would be ready and willing to come to Washington to attend any meeting of the executive committee, aside from the national conference. Now, upon this list you will notice we have men who can not afford to attend, and I believe that no State can afford to send them to an executive committee meeting. We have gentlemen here from the Pacific coast. It may be that those gentlemen would feel bound to come here personally or the States will feel bound to send them; but having been a member of the committee myself, during the year just closing, I attended a meeting of this executive committee and we found upon reaching Washington that a great number of these gentlemen were not present. Understand, I am not finding fault at all, because I realize and appreciate the fact that distance is some consideration in attending a mere meeting of the executive committee to formulate a program for this conference. But I would feel that I was not doing my duty representing the great State of Pennsylvania, first in a great many things in the Union, if I did not call attention to this, and I believe that Pennsylvania will not accept second place in the Union in the matter of weights and measures; and inasmuch as I represent the State of Pennsylvania I would ask this conference to add one more member to this executive committee, making 15, and select some member from the Pennsylvania delegation—but not me—for the committee.

Mr. Reichmann. I would like to amend the motion to adopt that list by adding the name of Mr. Mikesell, if the maker of the motion will accept it.

(The motion was seconded.)

Mr. Maroney. I accept the amendment.

Mr. Mikesell. Mr. Chairman, I would much rather, inasmuch as I made this suggestion, have some one else.

Mr. Maroney. Mr. President, in view of the discord in the Pennsylvania delegation, and as it seems to be the opinion of all the representatives here that there should be representation from Pennsylvania, I would suggest that the Pennsylvania delegation retire to the hall and bring in a name, and I hope it will be unanimous.

Mr. Richardson, of Virginia. Mr. Chairman, there are 25 States represented here. According to my count, the Southern States are about one-third or not quite one-third of the representation, with only one representative on the committee. While I have no objection to Pennsylvania, that great big State above us here, having representation, I think the South ought to have more representation than one member on this committee.

The Presiding Officer. Mr. Brown, of Tennessee, has just been nominated a member of that committee, and he is from one of the Southern States.

Mr. Richardson, of Virginia. Yes; that is what I said—only one from the Southern States.

The Presiding Officer. You make the motion to add one more to that committee, Mr. Mikesell?

Mr. Mikesell. Yes; I made a motion to add one more.

Mr. Maroney. Dr. Reichmann moved an amendment to my original motion, and I accepted the amendment.

Mr. Reichmann. The motion is that we accept the report of the committee and add the name of Mr. Mikesell.

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

The Secretary. Mr. Chairman and members, the secretary takes great pleasure in casting the unanimous ballot of this conference for the list of officers just mentioned by the chairman of the committee on nominations, plus the addition made thereto in accordance with the resolution of Dr. Reichmann.

Mr. Mikesell. Mr. Chairman, I believe it is due me to make an explanation. This is not a matter personal with me, as the gentlemen of the bureau and the other gentlemen who know me will attest. Since I have been a weights and measures official in Washington County my heart and my interest have been in the work. I have made every effort along honorable lines to advance the cause. I believe that 80 per cent of the success of the weights and measures cause in this country is due to publicity and education. We must educate the people. As you will remember, during the conference gentleman after gentleman got up upon the floor and made the statement that their own legislatures at home would not give them any legislation because they did not understand the question. Now, we must educate the people; and while I would much rather have some one else representing the State of Pennsylvania than myself—because it is a great expense and it involves time and worry—yet I would feel that I was failing in my duty to the great State of Pennsylvania to go back home and have them say to me that the executive committee stopped at 14 when it should have been 15 under all ethical customs, and yet Pennsylvania, the greatest State in the Union, second only to New York, was without representation.

Mr. Richardson, of Virginia. Mr. Chairman, following the remarks of the brother from Pennsylvania, I wish to state that I was one of the charter members of this organization, and one of the few representatives from the Southern States at that time—that is, in official capacity. I am not in this organization for office or for committee work. I am here to help out my people as much as I can in the way of weights and measures and getting the best laws that we can for our State. I do not want any office in the conference except the humble position of a delegate from my State. I am not asking anything, but I do think that seven Southern States ought to have more representation on that committee than one member.

The Presiding Officer. Before calling on the next number, I will announce that any member present who has not received a copy of the report of the last conference may procure one after the meeting.

WEIGHTS AND MEASURES OF PORTO RICO.

By F. S. Holbrook, *Associate Physicist, Bureau of Standards.*

In August, 1913, at an extraordinary session of the Legislature of the Island of Porto Rico there was passed a weights and measures law, and this was signed by Hon. George Colton, governor of the island, who had taken a very great interest in this legislation and who had been largely responsible for its passage.

Learning that the government of Porto Rico was looking for some one experienced in weights and measures work to inaugurate

the law, the Bureau of Standards, through the Bureau of Insular Affairs, War Department, offered to cooperate. This offer was promptly accepted, and I was selected to undertake the work, and left for the island in September of last year.

Perhaps at this time it may be of advantage to tell something of former laws on this subject. Before the occupation of the island, in 1898, it is reported that there was a law on the statute books, but that it was never competently enforced. This law probably required the exclusive use of the metric system, but the old Spanish units, nevertheless, still continued in very common use. Four years after the occupation of the island—that is, in 1902—the political code was passed which established the metric system as the sole standard of weights and measures; and the penal code of the same date provided penalties for using false weights or measures, which were described as those not conforming to the standard established by law; for giving short weight or measure; for falsely branding casks or packages, etc. As has formerly been the case in so many States, no machinery for enforcing the law was provided, however, and as a result the law was entirely ignored, and the use of various miscellaneous standards continued.

This then, was the condition of affairs when the work was commenced. The kilogram, the United States pound, and the Spanish *libre* or pound for weight; the liter, the quart, and the *cuartillo* for liquid measure; the meter, the yard, and the *vara* for length measure; and the hectare, the acre, and the *cuerda*, for land measure, were all in use side by side, resulting in the most profound confusion. When I add that the *cuartillo* was a local measure, with no certain value, but probably based in a general way upon the size of bottles containing wines and liquors received from Spain and other continental countries and from the United States; that the length of the *vara* had been altered by the promulgation of a royal decree by the King of Spain, in 1888, and that consequently there was an old and a new *vara;* that there were two size *cuerdas*, based on the old and the new *varas;* and that the value of the Spanish pound was not universally understood, you may perhaps realize some of the difficulties of the situation encountered.

It is not deemed necessary at the present time to analyze the provisions of the Porto Rico law. Suffice it is to say that it is, in the main, a fairly satisfactory one.

At the time the law was introduced it provided for only the same standards that were legalized up to that time, i. e., those of the metric system. The majority of the merchants strenuously objected to this. They were loath to see an enforceable law, and one that was intended to be enforced, passed containing this provision. They pointed out that the great bulk of the trade of the island was with the United States and it would be a great hardship upon them to use a system that was not in use there. Their protests were backed up by the attitude of the lower house, and as a result the bill was amended to put the metric system and that portion of the system used in the United States which was specifically mentioned in the Act upon an equal basis. The bushel and its subdivisions were purposely omitted so these dry measures are not legal there. Two other units were also introduced, the *cuerda* for land measurement and the

cuartillo for liquid measure, this latter being defined as the one-fifth part of the gallon.

One other provision of the law is of special interest. Evidently realizing that the law was not a complete one, a clause was inserted requiring the Secretary of Porto Rico to prescribe rules and regulations not inconsistent with the provisions of the law, providing for the periodical inspection, examination, testing and regulating, and the sealing, marking, or approving, when correct, of all weights and measures used or adapted for use in ascertaining weight or measure in any industrial or commercial transaction, and for the performance of such other duties as may, in his judgment, be required for the enforcement of the law. This authorization was sufficiently broad to enable one to work out an efficient system of enforcement and also to strengthen some of the provisions, especially in relation to the sale of special commodities. It also legalized the promulgation and enforcement of specifications and tolerances on commercial apparatus to which so much attention has recently been given.

Upon my arrival in the island my first attention was given to the kind of apparatus in use and its general condition, such information being necessary for the efficient purchase of standards and apparatus and for the framing of such rules and regulations as should be found to be proper and necessary. Perhaps a few figures showing the first conditions thus found might be of interest.

A little over 50 per cent of the weights found in use were of the Spanish system, the remainder being about equally divided between weights of the metric system and of our customary system.

The Spanish pound contains 460.09 grams as against 453.59 grams for our pound, the former thus being 1.4 per cent larger than the latter. That is, of course, the standard was larger than ours. The weights in use speak for themselves. Ninety-one per cent were incorrect, 98 per cent of these being light. The errors on about 75 per cent of these weights were so large that they were lighter than the corresponding American weights. Many of the errors were in excess of 9 per cent, the lightest pound containing only 410 grams.

Of the metric weights in use 44 per cent were incorrect, and all of these were light by various amounts ranging up to 7 per cent.

Of the weights of our system 69 per cent were incorrect, about 90 per cent of these being light by errors ranging up to 17 per cent, the lightest pound containing only 376 grams.

It may be said that in obtaining these percentages of accuracy a tolerance of one-half per cent on the larger weights and 1 gram on the smaller weights was allowed, which is about five times as large as the conference tolerances.

Of the liquid measures tested the very great majority were *cuartillos* or subdivisions thereof, this having been the measure almost universally used. Eighty per cent of those found were incorrect, only 40 per cent of them being small, however. Half of those small had errors ranging from 9 to 15 per cent. Of the measures of our system in use about one-half were correct.

The tolerance used in determining the percentage of accuracy was 3 per cent, or several times as large as the tolerances of this conference. The scales were in general of very poor construction and in very poor condition. Many platform scales had beams graduated in the Spanish system.

Such, then, were the conditions that were found to exist at the inception of putting the new weights and measures law into force and effect. Although we have had the opportunity of doing very much work in this country before many of the inspection services now existing were organized, we have rarely found a more chaotic state of affairs to exist.

After the preliminary survey, some of the results of which have been given above, standards and apparatus were ordered to meet the needs of the situation as presented, and the work of drafting the rules and regulations was then begun.

The machinery for the enforcement of the law was in part prescribed by the terms of the law itself. The *alcaldes* or mayors of the various municipalities were required to do the work of testing and sealing apparatus, and the district chiefs of police were also required to see that certain portions of the law were enforced. All this work was to be done under the direction of the Secretary of Porto Rico and he was charged with the general duty of supervising the enforcement of the Act. This included the performance of various duties when they were neglected by the other officials primarily responsible.

These duties presupposed a force of trained men in the office of the Secretary of Porto Rico. Accordingly, in the rules and regulations a bureau of weights and measures in the office of the secretary was created, consisting of a chief inspector and several inspectors of weights and measures. Their powers and duties were in general to take charge of the primary standards of the island and to compare the field standards with them at regular intervals, to supervise the enforcement of the law, to educate and assist the mayors of the municipalities and the police in the performance of their duties, to test and seal or condemn all new apparatus manufactured in the island or imported or brought into the island, and to obtain a complete enforcement of the weights and measures act. In the performance of these duties they were clothed with all necessary powers. Thus it will be seen that the machinery of enforcement differs very little from that laid down in Form No. 3 of the model law; i. e., enforcement by local men with a small central force for supervision, education, and special work. In addition to prescribing the machinery of enforcement, the rules and regulations also went into the details of the manner and frequency of sealing or condemning; the classification of apparatus, to lay a foundation for the enforcement of specifications and tolerances; provided for the certification of each type of apparatus before it could be sold; included a provision making it illegal to sell by any other weight than net weight; prescribed special conditions for the sale of coal and coke and bread similar to those laid down in the model law; required all dry commodities to be sold by weight or linear measure only; and made the collection of fees specifically illegal.

The tolerances and specifications adopted were based upon those adopted by this conference at its meeting last year. The specifications were nearly the same in all cases; the tolerances in the case of old apparatus were made twice those applying to apparatus not yet put into use, since it was realized that the same figures could not be made to apply to both of these classes on account of the deterioration which is bound to occur through use. This scheme was adopted

yesterday by this conference, and I believe by this method the tolerances will be made very much more practicable and workable than they were before. In adopting the tolerances it was necessary to increase them somewhat on account of the very rapid deterioration of all kinds of instruments, due to the excessive humidity of the climate. The conditions in this respect were much worse than are encountered in any section of the United States, and it was therefore imperative that this be taken into consideration here.

In reference to the specifications, the question has often arisen whether these should or should not be retroactive. On careful examination it appears that some should be retroactive and others should not be. Therefore we classified all apparatus and divided the list of specifications into two parts, making one set retroactive and the other set not. The manner in which this was done can best be described by quoting part of the "Description of Tolerances and Specifications" contained in our publication of "Instructions for Weights and Measures Officials." This stated:

"In the set of specifications promulgated herewith a number of paragraphs have been limited to apply only to new apparatus in order that the weights and measures act and the rules and regulations promulgated thereunder may be put into force and effect without unnecessary hardship and without wholesale condemnation of apparatus which, while not of the best construction, is nevertheless fairly satisfactory and may be used for some time without greatly prejudicing the rights of the purchasing public. The specifications taken as a whole are designed to improve the general types of apparatus and render possible the most efficient enforcement of the law. As old aparatus is replaced only that of satisfactory construction will be allowed to be put into use; and at some future date, when the gradual process of elimination has been going on for some time, the limitations on the application of some of the specifications will be recalled and all apparatus in use will be required to be of satisfactory construction. The specifications which have been applied to both old and new apparatus are those which are most urgently required; the specifications which have been limited to affect new apparatus are those which, while clearly necessary, can best be postponed for general enforcement until the general provisions of the law and of the rules and regulations promulgated thereunder and of these specifications have been put into effect and have come to be understood, respected, and observed throughout the island.

"The object of all of these is not only for the benefit and the protection of the consumer but for the benefit of the honest merchant and manufacturer as well, in assisting them to carry on their business free from the unjust competition of a dishonest and unscrupulous or an ignorant class."

I believe that in the near future this conference should and will adopt a classification of apparatus into new and old and apply the specifications in somewhat the manner described above.

When these specifications and tolerances were promulgated and printed there was included with them a description of the methods to be employed in the inspecting and testing and the sealing or condemning of all classes and kinds of apparatus. A description of general duties of weights and measures officials, methods of convert-

ing scales from the illegal Spanish system into the customary system, conversion tables, and other information of use was also included. This book was issued in both Spanish and English.

Shortly after the decision to establish a bureau of weights and measures was arrived at, Mr. Eduardo Saldaña, a native Porto Rican, was appointed to the position of chief inspector. Mr. Saldaña had held several governmental positions, the last of which was private secretary to Gov. George Colton. He is known to be unbiased and is an excellent executive, and his appointment was thus a most auspicious one to put the weights and measures law into effect.

After the promulgation of the rules and regulations and the tolerances and specifications, it became necessary to train a corps of men to act as insular inspectors, since, of course, there were no men on the island who had had any experience along the lines of testing weights and measures. The men selected were appointed probationally until a civil-service list could be obtained, and other candidates were given desk room and allowed to be present when the instructions were given and demonstrations conducted. Various inspectors were appointed in the municipalities also, and some 16 of these men came to San Juan for instruction at headquarters. In this way a competent set of men was obtained with which to begin the enforcement of the law. All the preliminary work of these inspectors was done in the capital city, San Juan, in order that the inspectors might be able to report any difficulties at once to the central office and receive further instructions. No man was allowed to do any work in the field until he had demonstrated that he had had sufficient instruction in the office to have grasped the essentials of the work. At first, also, the insular inspectors were sent out in pairs. As they gained experience they were separated and each was delegated to accompany a municipal inspector sent to learn the work. When these latter were able to perform their duties in a satisfactory manner they were given the proper apparatus and returned to their districts to inaugurate the work there. One by one, also, the insular men were assigned to districts to start the work in those municipalities which had failed to send men to the central office.

From time to time I took trips to various portions of the island, accompanied by the chief inspector or his deputy, to investigate conditions at some of the larger industrial concerns, such as tobacco factories, sugar *centrals*, importing firms, and the like. One of the first of these was a visit to the Caguas branch of the Porto Rico Leaf Tobacco Co., one of the largest on the island. It was found that this concern was following the usual practice and was employing Spanish weights in its purchases. As a result of this visit and upon our instructions, this company converted almost a hundred dormant scales of about 5,000 pounds capacity from the Spanish to the customary system. These scales were located all over the tobacco-producing section. Upon these trips also complaints were investigated and merchants and others instructed in the requirements of the law.

One of the most useful and valuable of the rules and regulations was that requiring that all new weights and measures should be sealed before being sold. The hardware stores and importers had on hand large numbers of pieces of exceedingly inaccurate apparatus. The work in these places and in the places where apparatus was in

use was begun simultaneously, and therefore when a brisk sale of apparatus began following condemnations in the stores the hardware dealers had some stock of sealed apparatus on hand and, moreover, were informed as to what stock could not be sold. This stock was not condemned if removed from the island within 30 days. Had the bureau neglected to test the apparatus before it was sold great hardships would have arisen, since merchants, purchasing it in good faith, would inevitably have had the new apparatus procured condemned as soon as it was inspected and tested.

A very great deal of this apparatus condemned had been imported from England and Germany. The former country especially contributed weights which had evidently never been adjusted or probably even tested after casting; the latter country contributed a very large number of even-arm balances, both of the hanging pan and stabilized pan types, which were of very poor construction and exceedingly inaccurate. It is undoubtedly a fact that all of these were constructed for export only, as none would be allowed in the country of their origin. A number of straight-front spring scales and family spring scales made in this country were also condemned before being sold on account of lack of conformability with the specifications and tolerances.

The following tables are presented showing the results found in one complete inspection in the city of San Juan and a partial reinspection of stores in which condemnations were made when they were first visited:

Kind.	Grand total.	Sealed.					
		Total.		Correct.		Corrected.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
New apparatus:							
Counter scales	847	100	11.8	99	11.7	1	0.1
Spring scales	189	36	19.0	36	19.0	.....	.....
Platform scales	51	17	33.3	17	33.3	.....	.....
Weights	5,875	4,018	68.4	3,933	67.0	85	1.4
Linear measures	148	88	59.5	88	59.5	.....	.....
Total	7,110	4,259	59.9	4,173	58.8	86	1.1
Old apparatus:							
Counter scales	450	222	49.3	210	46.7	12	2.6
Spring scales	170	90	52.9	76	44.7	14	8.2
Platform scales	227	78	34.4	74	32.6	4	1.8
Weights	5,461	2,209	40.4	2,193	40.2	16	.2
Linear measures	216	99	45.8	99	45.8	.....	.....
Total	6,524	2,698	41.4	2,652	40.6	46	.8
All apparatus:							
Counter scales	1,297	322	24.8	309	23.8	13	1.0
Spring scales	359	126	35.1	112	31.2	14	3.9
Platform scales	278	95	34.1	91	32.7	4	1.4
Weights	11,336	6,227	54.9	6,126	54.0	101	.9
Linear measures	364	187	51.4	187	51.4	.....	.....
Total	13,634	6,957	51.0	6,825	50.0	132	1.0

Kind.	Grand total.	Condemned.					
		Total.		For repairs.		Confiscated.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
New apparatus:							
Counter scales	847	747	88.2	747	88.2	.....	.....
Spring scales	189	153	81.0	153	81.0	.....	.....
Platform scales	51	34	66.7	34	66.7	.....	.....
Weights	5,875	1,857	31.6	1,813	30.9	44	0.7
Linear measures	148	60	40.5	60	40.5	.....	.....
Total	7,110	2,851	40.1	2,807	39.5	44	.6
Old apparatus:							
Counter scales	450	228	50.7	196	43.6	32	7.1
Spring scales	170	80	47.1	60	35.3	20	11.8
Platform scales	227	149	65.6	147	64.6	2	1.0
Weights	5,461	3,252	59.6	2,374	43.5	878	16.1
Linear measures	216	117	54.2	68	31.5	49	22.7
Total	6,524	3,826	58.6	2,845	43.6	981	15.0
All apparatus:							
Counter scales	1,297	975	75.2	943	72.7	32	2.5
Spring scales	359	233	64.9	213	59.3	20	5.6
Platform scales	278	183	65.9	181	65.1	2	.8
Weights	11,336	5,109	45.1	4,187	36.9	922	8.2
Linear measures	364	177	48.6	128	35.2	49	13.4
Total	13,634	6,677	49.0	5,652	41.5	1,025	7.5

Briefly summarizing this table, we find that of the new apparatus ready to be sold only 12 per cent of the counter scales, 19 per cent of the spring scales, 33 per cent of the platform scales, 68 per cent of the weights, and 59 per cent of the linear measures were sealed. These very small percentages were partly due to the fact that the apparatus in stock was of very poor quality and partly to the fact that some of it was graduated or adjusted in the illegal Spanish system.

In the case of old apparatus we find somewhat larger percentages of scales approved, on account of the fact that larger tolerances were allowed, as explained heretofore. Only 40 per cent of the weights and 46 per cent of the linear measures were approved, however, the condemnations falling into the same classes as previously noted.

Summarizing 13,634 pieces of apparatus, we find a total of 6,957, or 51 per cent, sealed, of which 50 per cent was correct as found and 1 per cent was adjusted before sealing. Of the 6,677 pieces condemned, 5,652 were "condemned for repairs" and 1,025 were at once confiscated. This percentage of those condemned for repairs and not confiscated is very much greater on the first inspection than it will be hereafter, since it was necessary in many cases to leave the apparatus in the stores for some time until new apparatus could be procured from the United States, the supply on the island falling far behind the demand.

The newspapers on the island, as a rule, assisted greatly in the education of the people by printing from time to time news articles and editorial comment on the features of the law and of the rules and regulations, the progress made in its enforcement, etc.

In conclusion, it may be said that Porto Rico has taken an advanced stand in the matter of honest weights and measures; that

the law is as efficient as that of any of the States of the Union; that a splendid start toward thorough enforcement has been made; and that within a reasonable time fraudulent weights and measures and the fraudulent use of weights and measures should be almost wholly suppressed.

ANSWERS TO QUESTIONS.

Mr. WALLENMEYER. Mr. Chairman, what is the tolerance on beer bottles? We have had that up in Indiana. We have a large beer-bottle industry. I have a letter from a brewing concern there that quotes the Federal board, and they would like to know what the tolerance is, in order to settle that question.

Mr. HANSON. Mr. Chairman, I am very much interested in the brewing proposition. Some time last October we made a test of some 13 of the large breweries of Massachusetts and we found that the barrel which is supposed to contain 31½ gallons, according to our State law, contained all the way from 30 gallons down to 27. We did not bring any prosecutions; we simply went to the breweries and tested the capacity of the barrels. Shortly after that we had a conference with all the brewery men in the State, and in going over the situation we found that while the Massachusetts law said that the barrel shall contain 31½ gallons, the brewers have to pay an internal revenue tax of $1 for 31 gallons. In other words, if they put 31½ gallons in the barrel they have to pay $2. Now, I did not think it was just for them to pay a dollar for the extra half gallon. I investigated the matter. I came down and had a conference with our two Senators from Massachusetts. I went down to Louisville, where the barrels are made. I went up to the great State of Wisconsin, which is made famous by its different brands of beer, and I found out there that the Wisconsin department had several prosecutions on beer barrels. I came back to Massachusetts with all the data which I had received and again had a conference with several members of the brewers' association. They then decided to put in a bill in the legislature which would take care of this particular thing. They drafted three bills. One bill was to have a tolerance of 6 per cent; the second bill I can not quite remember; and the third bill was to give me authority to allow a certain amount of tolerance. I objected to the last bill, and objected also to the 6 per cent bill. At the hearing which was given before the committee on mercantile affairs I presented a fact to show that if they were allowed a tolerance of about 2 per cent they could easily come within the law. Of course the brewers argued for 6 per cent on account of this revenue requirement. I showed the committee that the revenue law, the 31-gallon law, was for revenue only and should not be considered. Well, the committee reported giving the brewers a 6 per cent tolerance, and only a week ago that bill was enacted; so now in Massachusetts they are allowed a tolerance of 6 per cent.

Mr. REICHMANN. Mr. Chairman, I move that this matter be referred to the tolerance committee.

(The motion was seconded and agreed to.)

Mr. RICHARDSON, of Virginia. Mr. President and gentlemen of the conference, shortly subsequent to the adjournment of the conference of 1913, I drafted a weights and measures bill on the basis of the

uniform law and the resolutions adopted by that conference, and also of local conditions all over the State, such as treatment of sealers, salaries, and things of that kind. Senator Smith introduced the bill soon after the convening of the general assembly. It was referred to the committee on general laws; but that committee referred it to a subcommittee which took it up with myself and a number of county sealers and city sealers; was recommended back to the senate and passed by the senate. Then it went over to the house committee and was considered by it, was passed by the house committee, and placed on the house calendar. When the bill came up in the house for consideration, a wholesale merchant in my city and a large retail grocer came up to the capitol and interviewed their local representative, and asked him to stop the passage of the bill, or at least to have it passed by at the next calling. That was very nearly at the tail end of our session. The bill was called and this representative objected. This objection put it to the foot of the calendar, and there being only two days more to get it through it failed.

Now, the question I want to ask of you is, whether these gentlemen had any grounds for asking the passing by of that bill—the wholesaler on the ground that we had no right to make him mark the net contents on wholesale packages, the retail dealer on the ground that he had his shelves stocked with canned goods that were not marked, and he would have to go to work and ascertain the weight of all the containers to get at the net contents before he could sell his goods; that it would take him 18 months to clear his shelves of that kind of goods. What I want this conference to tell me is, whether that law is in conflict with the national law. Now, our legislature does not meet again until 1916, and I want to get all the information on that line, so that I can meet these wholesale people and retail people down there, and if any of the delegates have any suggestions to make in the meantime I will be glad to have them send them to me. We mean business down there, and we are going to have a good law.

The SECRETARY. I think perhaps I might be able to answer that question in so far as concerns the question as to what is going to become of foods put up in package form which do not comply with the net weight law. When that law goes into effect—it has been in effect since March 3, 1913, but the penalty will not be imposed until the 3d of next September—those goods can not be sold after that date without being marked.

Mr. RICHARDSON, of Virginia. I will say, Mr. Fischer, that these gentlemen claim that under the national law they had 18 months in which to adjust themselves to any law that might be passed.

The SECRETARY. And that expires the 3d of next September; so far as the national law is concerned, that goes into effect at that time.

Mr. GRIFFIN. Mr. Chairman, may I ask what has been done about the adoption of the pound standard bill—selling by weight? Was it referred to the executive committee?

The PRESIDING OFFICER. That was adopted last year by the conference. It was not referred to the executive committee. Some of the States, I understand, have adopted that; a great many have not.

Mr. MIKESELL. Mr. Chairman, I do not believe the Chair just understood Mr. Griffin's question. I think he had reference to that clause in the resolutions adopted at the last conference asking for net weight, or sale by weight, in particular. Now, he probably wanted

to know whether or not any legislation had been drafted by our executive committee, or by the conference, and submitted to Congress. Am I right?

Mr. GRIFFIN. That is it.

The SECRETARY. Mr. Chairman, I might say that a copy of that resolution was sent to each member of the Committee on Coinage, Weights, and Measures of the House and the members of the Committee on Standards of the Senate, and an attempt was made by Dr. Stratton to have the proposition to assess the duty on imports by weight rather than by measure incorporated in the tariff bill; but, so far as I know, the thing had at that time gone so far that it was impossible to have that done, and I can not report that there are any results from that action except so far as it has been taken by the States, and I think some of the States have adopted that. Mr. Van Duyn is attempting to put that through.

Mr. RICHARDSON, of Virginia. Mr. Chairman, as I understand Mr. Fischer, Congress has taken no action on our resolution which we passed a year ago recommending sales of dry commodities by net weight or numerical count. Has it?

The SECRETARY. I wish you gentlemen had a little experience along this line here in Washington, and you would not ask questions like that. Resolutions have very little effect on Congress. Congress has not acted on that.

Mr. RICHARDSON, of Virginia. Where are we going to get uniformity among the States unless Congress does? What is the use of our passing a law in Virginia if it is not a law in Maryland and these other States?

Mr. ALBRECHT. Mr. Chairman and gentlemen of the convention, I would like to state that we passed a law in Ohio that required 94 different commodities to be sold by weight, by numerical count, or by contract in writing. A man could sell otherwise than by count or weight only if he entered into a written contract. The bill was introduced by a weights and measures official, one of our city sealers in Columbus, Mr. King. It was passed in the house without a dissenting vote, and it went to the senate and was passed there very easily. It went into effect 90 days from that time. The commissioner of weights and measures extended that time for 15 days, and there seemed to be none of the city sealers enforcing it; so the State department went out, and we filed some 42 or 43 affidavits and made some arrests. The first man placed on trial pleaded not guilty. He was fined in the justices' courts, after the evidence was submitted by the State, but he refused to pay his fine, and consequently was at once remanded to the county jail. The case from there was taken into the common pleas court and the act was declared unconstitutional. It was then appealed and taken to the circuit court of appeals, and was also declared unconstitutional. I might state that it was submitted on briefs, without oral arguments. It is now pending in the supreme court, and I was very much in hopes that I would be able to make a favorable report at this meeting as to the outcome of that bill, but as yet I can not do so. But we feel confident that the law will be declared valid in the supreme court.

I might also add that the only people that are fighting this law are the commission men and the market men—peddlers and hucksters. I think we had some twenty-odd indorsements from the larger cities,

from the grocers' and butchers' associations, favoring this bill; and, as I stated, I feel that we will win out at least within the next 10 days or so.

I thank you, gentlemen.

The PRESIDENT. In regard to the last question before us, the selling of goods by weight, I will state that last week it was my privilege to address the National Retail Grocers' Association at Louisville, Ky., a very large association. The convention was very well attended—I think there were four or five hundred delegates there—and to my great surprise they passed a resolution unanimously favoring this selling of commodities by weight; and I can assure you that the Bureau of Standards will do all it can to help that along, and that during the coming session of Congress we will endeavor to secure some sort of legislation. We will at least see that a proper bill is prepared and introduced in Congress.

Mr. ROYLANCE. Mr. Chairman and gentlemen, the gentleman from Ohio referred to the commission men, and for that reason brought me to my feet. You understand I am a representative of the Western Fruit Jobbers' Association of America and chairman of its committee on weights and measures, as well as its treasurer, and I am sorry to hear the gentleman say that the only opposition that came to the sale of products in Ohio by weight was from the commission man. I want to say that the Western Fruit Jobbers' Association, as I explained before, is a very large organization of wholesale jobbers, comprising all the States west of Ohio, including Illinois and all the States bordering on the Mississippi River on the east, as well as all on the west, and we are a unit for the sale of all commodities by weight, or numerical count on the orange and the apple boxes. Let me illustrate one of the reasons why we are in favor of it: Onions in the State of Indiana are only 48 pounds to the bushel; in Illinois they are 57 pounds per bushel. Suppose, for illustration, the Chicago merchant should buy from the Indiana merchant 50 carloads of onions—which is often done—at a specified price per bushel. According to the adopted custom of the East, he only gets about five-sixths of the amount of onions he purchases. Taking as a basis 30,000 pounds per car, he would get only about 24,000 pounds of onions instead of 30,000 pounds of onions per car, which, taking the price of onions last spring—3 cents per pound—would amount to about $180. So we want the Western Fruit Jobbers' Association put on record as in favor of and recommending the adoption of a standard for the sale of all farm commodities or vegetables by the weight instead of by the bushel or other measure.

Mr. ALBRECHT. Mr. Chairman, I might state that when I made that remark about the commission men I did not have reference to the western shippers, but to our local commission men in the cities of Columbus, Toledo, Cincinnati, Cleveland, Dayton, and other cities. They opposed the measure very strongly, and were, in fact, the instigators of this suit being brought.

Mr. BYRNE. Mr. President and gentlemen, I realize that a law requiring the sale of vegetables by weight is a hard matter to obtain by the National Government until a number of States adopt it first. I have here an indorsement from the Retail Grocers' Protective Association of my city which I received in the mail this morning, and I would like to have it put in the record.

The PRESIDING OFFICER. If there is no objection, that will be inserted.

GRAND RAPIDS, MICH., *May 25, 1914.*

Resolved by the Grand Rapids Retail Grocers' Protective Association, That the selling of all root vegetables by weight is a necessity for the protection of both consumer and retail grocers: Therefore be it

Resolved, That we ask our city sealer of weights and measures to urge a national law governing same at a national convention of sealers of weights and measures held at Washington this week.

W. A. WOOD,
President.
A. A. STEVENSON,
Secretary.

Mr. HASEMAN. Mr. Chairman, I have come a long way to attend this convention—from the State of Oklahoma. I am not informed as to the true state of affairs in Oklahoma concerning weights and measures. I wrote the governor after receiving the appointment, and I failed to hear from him before leaving, as to what legislation had been passed as to regulating weights and measures. I am not a weights and measures man, although I am thoroughly interested in the standards of weights and measures. I am in university work; and the question I want to ask the delegates to this conference, especially the delegates from States maintaining State universities, is simply this: What relations do you have with your State universities, or what relations do they have with you? Is there any effort on your part to get advice or instruction from your State university? Does your State university make any effort to serve you? Your work is that of public servants; the university work is that of public servants also. In the early stages of the medical profession the doctor's work was to cure diseases; to-day it is to prevent diseases as well as to cure diseases. Now, in this weights and measures proposition the curing stage and the prevention stage, I think, ought to go hand in hand. As I see it, the National Bureau of Standards is in a way the instrument to furnish the information to prevent incorrect weights and measures, and there are officials who are to cure those things when they are discovered. So I believe there is a place for the State universities in the States that maintain State universities; there is a type of service; there is a chance for cooperation between the State university and the sealers of weights and measures of the various States; and what I want to know is whether there is any relation.

Now, understand, I do not expect ever to be a sealer or a weights and measures man. But I do hope to institute in the University of Oklahoma a type of public service that will enable any weightman or sealer in any county or city in the State of Oklahoma to carry out his work with a high degree of efficiency. In other words, I am in the educational phase of it, and, as I understand it, you men are on the administrative side. You can not administer the laws that are passed by the legislature if you do not have your public properly informed; and, as I understand it, it is the business of the State university, in States that maintain such institutions, to inform the public so that you can administer your laws efficiently.

Mr. BROWN. Mr. Chairman, the gentleman from Oklahoma recognizes two great principles which are gathering force as time passes, namely, the cooperation of every force under the purview and direc-

tion of the State government, and the fact that they all are organized for the purpose of service to the public. Now, I can best answer his question by giving him a statement of our very limited experience in Tennessee, because we have just started there. I might say that in Tennessee the weights and measures work is divided into two divisions, into which it naturally falls. One is the enforcement of the act from the police standpoint, under the direction of the superintendent of weights and measures. It is a State department, represented by me. The other is the sealing end—the scientific end, we will call it; and it is scientific—which is taken care of by the president of the State university. Now, it so happens that with us the president of the State university is one of the foremost physicists in the country, but on account of his executive and administrative duties he naturally has not time to give to the details of this matter, so our law provides that he may appoint one of his staff of professors as an assistant sealer, and that gentleman has charge of the details. He is also at this conference representing his end of the work.

Now, there is an opportunity for cooperation, and very effective cooperation, between your State university and your officials more directly concerned with the enforcement of the law. The same arrangement or a similar arrangement prevails in Kansas. It may prevail in other States that I do not know about at this time. So far, in Tennessee it is working very nicely, and I have no idea that it will ever work in any other way, because I believe we can handle it in such a way as to secure a maximum of efficiency from both ends of the work, the two ends of the work being somewhat distinct in their character, and working along lines which, while they are closely related, are not exactly alike. That may help to answer the gentleman's question to a certain degree.

Mr. GREEN. Mr. Chairman, with reference to the question raised by the gentleman from Oklahoma I wanted to call attention to the fact that at the last session of the legislature in West Virginia a bill was introduced providing that the director of the physical laboratory of the State university should be the custodian of the standards supplied by the Federal Government and should have charge of the work of testing and proving the standards used by local officers, and that the university should cooperate to that extent. Unfortunately, like much other good legislation provided for the legislature in advance of its session, this got overlooked and lost in the shuffle, and the bill did not get through. I will be very glad to send a copy of the bill to the gentleman from Oklahoma and to any other gentlemen who may be interested in the matter.

The SECRETARY. Mr. Chairman, I think it would be in order to state, if that is agreeable to this conference, that any remarks submitted by members of the conference will be incorporated in the proceedings if presented in writing within a reasonable time.

The PRESIDING OFFICER. That applies to the State officials?

The SECRETARY. To any delegate.

The PRESIDING OFFICER. If there is no objection on the part of the conference, that will be done.

REPORTS AND MISCELLANEOUS PAPERS SUBMITTED BY DELEGATES.

ADDRESS

By THURE HANSON, *Commissioner of Weights and Measures of Massachusetts.*

A pleasant duty devolves upon me at this time, one which I hasten to perform. His excellency, Hon. David I. Walsh, governor of Massachusetts, has requested me to extend to this National Conference on Weights and Measures his hearty greetings and to offer his active cooperation in our work of making better and more effective the planning of new legislation and the enforcement of legislation now in effect.

Gov. Walsh is deeply interested in the department of weights and measures in Massachusetts, and he has instructed me to furnish him with all information obtainable at this conference in the hope that he may give his good offices toward improvement and advancement in Massachusetts.

Since I have had the honor to be commissioner of weights and measures in Massachusetts I have been in a position to offer many suggestions which perhaps will improve the work of our department within our Commonwealth, and I have found that the legislators have been eager to pass legislation which will improve the work of this department. In many of the States the effectiveness of the department of weights and measures is lessened perhaps because its far-reaching influences are not well known.

Publicity, I believe, will work wonders, but it must be of the right kind. There are many matters in connection with our work which widespread and unlimited publicity will perhaps injure more than it will help.

A general campaign of education would doubtless prove of benefit to all concerned, especially when it applies to laws, but, as you know, there are many instances in the performance of our work where tact and careful judgment are required, and it is concerning these that we should direct our attention toward letting those directly interested know just how we are acting.

We should make it our business to let those who sell commodities by weight and measure, and those who manufacture weighing and measuring devices, know that we are their friends; that our business does not require that we shall be forever and eternally biased in favor of the consumer. There are two sides to this question, and it is our duty to consider both sides.

There are a few matters which I have considered, which I desire to place before this conference in the hope that eventually we can bring about national cooperation. I believe the National Government should enact such legislation as will control the type of scales manufactured and used in this country. New York has such a law now, but since scales are manufactured in various places and sent to all States and Territories, it seems to me that this business should be under the control of the national department of weights and measures, and that they should be given authority to issue serial numbers for these scales.

Another matter which is of great importance is that of sealing milk bottles. Massachusetts has a law requiring that all milk bottles used within the Commonwealth shall be sealed. Maine has another

law. Some cities of the West have ordinances relative to this. If there could be enacted a law covering the entire United States, and distinctive marks be issued from the Washington office, a vast amount of inconvenience and misunderstanding could be done away with.

In view of the fact that this is my first appearance at this conference since my appointment as commissioner of weights and measures for Massachusetts, I will not go into detail regarding the scope of our work, but rather will confine myself to a brief summary of laws enacted in Massachusetts since the last conference. I will mention these laws in the order in which they were approved by the governor.

A bill was approved April 21, 1913, entitled "An act relative to the measuring of leather." This provides that the mayor of a city or the selectmen of a town, upon request of two or more voters thereof, shall annually appoint one or more measurers of leather who have been certified by the commissioner of weights and measures as fit persons for such appointment, and who shall be sworn to the faithful performance of their duty. The commissioner of weights and measures may at any time, for cause, revoke such certificate of fitness. A measurer of leather for one city or town may measure leather for any other city or town in the Commonwealth.

At the same time a bill was approved providing for the testing and sealing of mechanical devices for measuring leather, the sealer being given authority to collect a fee of $1 for each device sealed, and being allowed to condemn or seize those found incorrect. This law was necessary on account of the enactment of the one I have just mentioned.

A shingle law was approved May 2, 1913. This establishes the unit of measure termed a "thousand." Under this law a thousand of shingles shall cover an area of 100 square feet when laid with not more than 5 inches exposed to the weather.

An act approved May 28, 1913, exempts peas and beans for seeding and planting purposes from a law providing for sale by weight.

June 14, 1913, an act to establish tolerances in the sale of commodities by weight was approved. This provides that in respect to commodities not intended for food or fuel reasonable tolerances or variations shall be permitted in accordance with established trade customs. I feel that you will agree with me that this law is open to criticism.

The present legislature has passed five bills relative to weights and measures, and there are three now pending. The legislature has established a standard for weighing diamonds and precious stones by amending the old law and fixing the carat weight at 200 milligrams.

Another law provides that a sealer or deputy sealer may seize any weighing or measuring devices which do not conform to the legal standards or are not sealed as required by law, and any person who has any such weighing or measuring device in his possession, with intent to use same in violation of the law, shall be punished by a fine of not more than $50 for each offense, and such devices upon order of any court shall be destroyed. Possession of such devices shall be prima facie evidence that they are intended to be used in violation of the law.

An act approved April 17, 1914, gives us more opportunity for effective work because it provides for prosecution for the use of false

weights and measures used in purchase or exchange by junk dealers and others, so that the law now reads:

> Whoever uses, or has in his possession with intent to use, a false or condemned weight, measure, scale, balance, or beam for weighing or measuring any commodity bought, sold, or exchanged, or for hire or reward, may for each offense be fined not more than $50.

A law approved the same day provides that complaints and prosecutions for violations of the statutes relative to the use or giving of false or insufficient weights or measures may also be begun and prosecuted in the court having jurisdiction over the place to which the goods concerned are shipped. Heretofore it has been necessary for us to pursue prosecutions at the place where delivery was made; for instance, if the consignee paid the freight, the carrier was considered his agent, and it was necessary to prosecute wherever the goods were delivered to the carrier. The new law does away with that hindrance.

The passage of an act relative to the appointment of sealers and deputy sealers of weights and measures, which was approved April 29, 1914, provides for the establishment of districts over which one sealer will have authority. Two or more towns and one city, or two or more towns, may combine under this law into a district, with one district sealer and one set of standards. We found this law to be necessary owing to the fact that in some of the towns of Massachusetts the office of sealer was regarded as a purely perfunctory office, some of the sealers being paid as low as $1 per year. Under this law, we expect that men of some degree of proficiency may be engaged in this most important work, and the expense may be shared by the various towns combining to form the district.

Chapter 367, acts of 1914, provides that all fresh food fish sold at wholesale shall be sold by weight at time of delivery. This will insure a more equitable return for the Gloucester fishermen, who almost daily risk their lives in the mackerel fisheries. Heretofore these fish were classified as No. 1s, No. 2s, and "tinkers," according to size, and sold by count, the sorting and classification being made by the agents of the large wholesale buyers. Thus many were classed as No. 2s which weighed but an ounce less than No. 1s, and were paid for at the rate of 10 cents each, when the ruling price for No. 1s was twice that figure.

Chapter 525 provides that a variation or tolerance of 6 per cent shall be permitted in barrels and fractional parts of barrels containing malt beverages. This law was enacted, although I argued before the committee that 2 per cent would be ample, if, indeed, any tolerance at all was necessary. In this connection, I believe that the United States internal-revenue law should be amended, as the present law provides for a barrel containing 31 gallons, while the hogshead, under the same law, contains 63 gallons. This discrepancy between the Massachusetts standard barrel and that upon which the internal-revenue tax is based was without doubt the controlling reason for the success of the brewers in securing the 6 per cent tolerance.

There is pending in the legislature a net-container bill, which provides that all packages containing foodstuffs shall be marked, showing the net contents. This is similar to the national law which goes into effect September 1, and, of course, applies to interstate trade. This bill provides that a hearing must be given to all those accused of violations before prosecutions may be undertaken.

There is a bill pending providing for the recodification of the weights and measures laws of Massachusetts. There are several conflicts in the present laws, which we hope to have eliminated.

A bill which is pending provides that the scales and measuring devices of apothecaries and all others dispensing drugs shall be tested each year rather than every three years, as under the present law.

Investigation has proved that 44.7 per cent of the apothecaries' weights are inaccurate. We have found that weights which might be used for weighing potent poisons were as much as 40 per cent heavy. In the testing of apothecaries' weights we supply a set to be used while those owned by the apothecary are being tested. We have found ½-grain weights that were 40 per cent heavy. One druggist was found using a piece of a suspender buckle for a 3-grain weight which weighed nearly 18 grains. Another was using lead weights which it was stated had been in constant use since 1858.

We have also given attention to the subject of testing the "slashers" and other machines used in textile mills to determine the yardage of the "cuts" upon which basis the compensation of some of the employees is determined. We have secured a suitable apparatus for making these tests, and intend to commence this work in the near future.

In conjunction with the public-service commissioners, our department was making some arrangements for testing the track mileage on all railroads in Massachusetts, but upon learning that the Interstate Commerce Commission was about to inaugurate a similar inspection the matter was dropped so as to avoid a duplication of the work.

In our department we have six inspectors, five of whom work throughout the Commonwealth, it being divided into five sections. One inspector is on duty continually in Boston, his work being largely that of inspecting taxicab meters and other routine work. We employ three automobiles in the country districts where stores are few and far between. We are planning to put into service an automobile truck of 2,000 pounds' capacity, so that we can carry weights necessary for the testing of platform scales.

I consider it a great privilege to be present at this conference. I realize that nowhere in the United States can one learn more of the modern methods relative to weights and measures than here; and on behalf of the Commonwealth of Massachusetts I desire to thank those who are enlightening us relative to our work, our business, which seems to me to be summed up in the phrase, "Fairness to those who buy, sell, or exchange by weight or measure."

ADDRESS.

By W. L. Waldron, *Superintendent of the Department of Weights and Measures of New Jersey.*

Mr. Chairman, I suppose it has occurred to most of us sometime during the past year or two that the movement for correct weights and measures has made remarkable progress. New departments are being created and, considering the brief time they have been in existence, are giving a splendid account of themselves. Every section of the country, from the East to the West and from the North to the South, seems to be contributing its share to the movement. The thing that most impresses me in the matter, I think, is that the growth has been of a steady, healthy kind, the kind that will be last-

ing and productive of much good. It is pleasing for me to recall that New Jersey is not negligent in this advance. On the contrary, the State seems to be trying to make up for time lost. Four years ago weights-and-measures work in the State was carried on only in the principal cities. Several officials operated under the fee system. The law creating the department of weights and measures of the State of New Jersey changed all this. It abolished the fee system, which is recognized to-day by all fair-minded officials as being most unsatisfactory. All the weights-and-measures superintendents in New Jersey are paid a salary sufficient in itself to enable the recipients to devote their entire time to the work. This is a tremendous advantage, and it is, to my way of thinking, responsible in a great measure for the success we have met with so far. The law of New Jersey on weights and measures contains the principal features found in the laws of other States and some features of advantage not found elsewhere. In connection with this statement anent legislation, I wish to outline briefly the principles embodied in the latest law relating to weights and measures.

It is the first law of its kind to be passed, I believe; but it will not be the last. It standardizes the sizes of baskets and boxes to be used for the sale of berries, fruits, and vegetables. It permits these sizes: One pint, 1 quart, 2, 4, 8, 16, 20, and 32 quarts. So far, the law may not differ from others of a similar nature existing elsewhere. But here is the difference; our law compels the manufacturers to mark the capacity plainly on the outside of each basket before it leaves the factory. Furthermore, manufacturers must place a designating mark on their baskets. Their trade-mark will do, provided our department is furnished with a copy of it; if they have no trade-mark, the department is empowered to supply one. Both of these features are new, but already have given proof of merit. Manufacturers would hardly dare to put odd-size baskets on the market. Detection would be certain, which would result in the imposition of a heavy fine. For the first time in the history of the State consumers are getting all that they pay for. Thousands of odd-size baskets have been confiscated because of not complying with the law. The sizes named in the act enable officials promptly to detect incorrect sizes whenever encountered. Manufacturers and consumers alike, as well as superintendents, are outspoken in praise of the new law. They state that it places competition on an equal basis. The law was made necessary because of the many incorrect and conflicting sizes being used prior to its passage. New Jersey farm and garden produce finds a ready sale in near-by States. In shipping the fruits, berries, and vegetables it was inevitable that many incorrect sizes would find their way into the State. Some were in use that were supposed to hold 16 quarts, but tests showed they rarely held more than 14 quarts—often 11, 12, and 13. The new law effectually rids the State of these odd sizes and is the medium for the accomplishment of much good. As the act becomes better understood it will result in the saving of a substantial sum annually to the housewives of the State.

While discussing conditions in New Jersey I should like to draw attention to a peculiar phase of weights and measures work we were confronted with during the early days of the department's organization. The State has a coast line extending for 200 miles along the Atlantic Ocean which is famed throughout the entire coun-

try. This coast line is dotted with a large number of towns, large and small, which are known as seaside resorts. During the winter months the population is small, but beginning in May and continuing until October the population is increased several hundred thousands. The "season," as it is called, is short and those doing business have not a very long time to realize on their investments. A preliminary tour of inspection brought out the fact that the merchants were usually from other States. They always got top-notch prices for their goods, and in many instances were not overly scrupulous as to weighing and measuring. After considering how best to deal with the situation it was decided to assign a superintendent to patrol the coast line during the summer months. This plan worked out very satisfactorily and resulted in the confiscation of hundreds of pieces of faulty equipment. Included in the collection were "doctored" scales, false weights, short measures; in fact, all kinds of poor and inadequate equipment were picked up. Of course, there were a number of arrests and convictions. This determined stand on our part speedily convinced the "shore dealers" that we were very much in earnest. It was a hard fight at the outset, but by sticking on the job we were successful. To-day the coast merchants are as honest as dealers in any other part of the State. The visits of the county and State men have done much to make permanent the results of the initial inspections.

Speaking of equipment confiscated brings to my mind the fact that the wide-awakeness of New Jersey officials has resulted in the detection of some very unusual cheating and defrauding devices. In most instances the operators had done their work so cleverly that a superficial examination failed to disclose anything out of the ordinary. Probably the most interesting and most unusual discoveries were the fake gasoline cans. The wide extent of the automobile traffic put temptations in the way of some not strong enough to withstand them. The cans found and confiscated numbered 16. They were each supposed to hold 5 gallons, but only held 3. The difference was brought about by placing a smaller can on the inside, which reduced the capacity to that already mentioned. Nothing like these cans had ever been seen anywhere before, and their confiscation caused a great deal of comment. They were shown all over New Jersey and many other places and caused weights and measures work to be viewed in a new and favorable light. The users of the cans were all prosecuted and paid heavy fines, and the traffic is now broken up. In another confiscation campaign, waged in connection with the law on baskets, our men picked up a number of baskets that were certainly out of the ordinary. They were so woven that two baskets were made into one. The weaving was executed so cleverly that it was necessary to look inside the basket to discover the extent of the fraud. Another unusual fraud detected recently, which some here may have already been confronted with, was the use of barrels for selling potatoes. A smaller barrel was turned upside down with potatoes covering it. The peddlers were able to reduce prices by making use of this ruse and they were doing a thriving business until apprehended. Fines, heavy ones at that, were imposed, and the judge made the dishonest vendors refund sufficient cash to reimburse the number of persons defrauded, most of whom appeared as witnesses in the case. The hucksters were emphatic in leaving court that they would leave New Jersey alone in the

future. Detection of frauds of this kind go far in convincing the public that weights and measures work is taken seriously, and that by cooperation with officials much can be accomplished.

In conclusion, I would urge upon all superintendents to be vigilant, courteous, and fair toward all. Only by observing these requirements can success be permanently attained.

REMARKS

By Mr. F. G. Buchtel, *Deputy Sealer of Weights and Measures of Oregon.*

Mr. Chairman and gentlemen, for the last few years I have received notice, along with an invitation, to be present at the annual conference, but, owing to the fact that it requires a considerable expenditure to make this trip from Oregon, I have up until the present time been unable to attend. However, we, through the courtesy of the bureau, have had the reports of these past conferences, as well as various pamphlets on the subject of weights and measures, which have been of benefit and assistance.

Owing to the fact that the report of the committee on tolerances and specifications was to be taken up and discussed this time, I was more anxious than ever to be present, in order that I might have first-hand knowledge of the subject and be in a position to place before our next legislature in Oregon a law that would cover the recommendations of the present conference on this subject, as well as additional amendments that would make our law conform closer to those of the other States, and thus avoid the confusion that results in interstate shipments, due to the present lack of uniformity.

The past year's experience under the present Oregon law has shown a number of places wherein it is weak. Our system of having county sealers appointed by the various courts and not under the direct supervision of the State office often causes confusion, and in counties of small population and large area needless expense; we have no standard for berry boxes or small-fruit containers, which is something that should be remedied, and there are numerous provisions of law dealing directly with weights and measures that are under the supervision of other State officers. I believe that this conference, as well as the bureau, will agree with me when I say that this is wrong, for where there is a division of authority there is a tendency to leave enforcement of law to the "other fellow," and the best results are not obtained.

If there are any questions relative to weights and measures in the Northwest which my experience will allow me to answer for the delegates, I will gladly do so, for, in turn, I expect to take advantage of their knowledge and experience. I also wish to thank the bureau for their assistance and advice, which, in conjunction with the visit of Mr. F. S. Holbrook some time ago, has done much in assisting us in our work.

REPORT.

By J. C. Wallenmeyer, *Sealer of Weights and Measures of Evansville, Ind.*

Mr. Chairman and gentlemen of the Ninth Annual Conference on Weights and Measures, I am very glad to report that the scales, weights, and measures in southern Indiana are in very good shape at the present time. The first inspection in 1912 revealed deplor-

able conditions, 65 per cent being incorrect, as against 6 per cent incorrect in the 1914 inspection. These conditions were brought about by practicing the golden-rule policy, advised by former Mayor Charles A. Heilman.

Evansville is a great dairy center and butter market. A great deal of the butter made by farmers and weighed on the old-style 99-cent even-balance scale ran from 13 to 19 ounces to the pound. By condemning and confiscating this type of scale and compelling farmers to buy reliable scales all butter now weighs uniformly 16 ounces to the pound.

A number of new modern railroad track scales have been recently installed by firms and corporations, who have been paying exorbitant freight charges, no attention being paid to claims filed with the Southern Weighing and Inspection Bureau. Investigation revealed the surprising fact that most of the cars about which there was a controversy were being weighed on an old worn-out 36-foot scale, although some of the cars were 60 feet long. First one end of the car was weighed and then the other, and one-half of this combined weight given as the weight of the car. This method of weighing resulted in an error of 35 tons on one carload of junk sold at $12 per ton. I was asked to report this scale to the Interstate Commerce Commission, which has been investigating the accuracy of railroad weights throughout this country.

A test was made of a beer meter, used by a certain brewing association, for the purpose of determining the amount of internal-revenue tax, at the rate of $1 per barrel of 31 gallons, to weigh 258 pounds. The average weight of 40 barrels was only 256.1 pounds. As the above-named firm bottles 100,000 barrels per year, they paid the Government $650 per year for tax on beer that did not pass through the meter, and I was informed this type of meter is in use in most of the large breweries in the United States.

Gas meters tested out 97 per cent correct, this high average being due to the fact that our local public utilities commission has an expert working on meters all the time. A number of complaints were caused by the fact that increased gas bills were due to meters being within a few feet of the furnace, causing the gas to expand before it entered the meter. I found that for every increase of 5° in temperature over the normal the meter would register 1 per cent fast.

Rice flour imported by a baking company through a New York firm and billed at 280 pounds per bag net, was found to weigh as low as 253 pounds, due to the sacks having been torn by ship hooks and then resewed.

A carload of 500 bags of flour from St. Louis, and billed as 49,000 pounds, was found to be 849 pounds short, the sacks weighing from 93 to 99 pounds, showing extreme carelessness on the part of the packers. Evansville bakeries use hundreds of cars of Minneapolis spring-wheat flour, which, with very few exceptions, weighs uniformly 98 pounds net to the bag, showing results of the good work of Commissioner Neale.

I am pleased to report that most commodities in package form are now being marked with the net contents, although a few of the cereals and breakfast foods made in the East are so marked that a microscope must be used to find them.

I thank you, gentlemen.

REMARKS

By Mr. Frank J. O'Rourke, *Sealer of Weights and Measures of Hammond, Ind.*

Mr. Chairman, these discussions have brought out many views on the weights and measures proposition that are of great interest to the delegates assembled here. They all seem to be striving for the one end. It appears to me that gentlemen come here seeking information, and with their minds fully made up that if any action that they could take would bring about the uniformity necessary throughout this country, they would be glad to take that action. We have heard the gentlemen speak on the conflicts that they are confronted with in their respective communities on legislative matters pertaining to weights and measures. We have heard the views expressed by delegates from different States, and all the trend of thought seems to be along the same line. Everybody is anxious to have a uniform law prevail on this matter throughout the length and breadth of this land of ours. Now, I believe—as the gentleman from New York well said a few moments ago—that this will probably take many years to accomplish, but its accomplishment can be hurried more by the weights and measures officials through a program of publicity in their respective communities than by any other single agency that may take hold of this proposition. I think that with the information we have received here—and the work has been of an educational nature—we can all go back to our homes and say to the people that men all over this country, men who have been engaged in this work for years, who are intensely interested in the welfare of the general public, are very anxious to bring about a uniform condition in the buying and selling of all the foodstuffs in the markets of the United States.

My idea is that our next duty lies with our Congressmen. We have been successful in bringing about much beneficial and greatly needed State legislation; but, as Mr. Fischer, of the Bureau of Standards, says, it is a difficult matter to get anything through the Halls of Congress. Now, it strikes me that each of us has a message to his Congressman at home, and that we must bring it to his attention that the people are interested in this subject; that they all are desirous of uniformity throughout this country; and I hope that each delegate, when he returns home after this conference, will make it his business to get in touch with his Congressman and let him know what the views of the various men are who represent the various States of this country.

I just want to say a little on this question of selling by weight. In my particular locality I am probably more fortunately situated than others, from the fact that I have never asked for any legislation or for any assistance in my work and been refused. Just a short time ago I called a meeting of the retail men of my town and had them indorse the proposition to sell everything by weight. At the last meeting of our council I submitted an ordinance abolishing the dry measure entirely. It will come up for final passage at the next meeting on next Tuesday night, and I have the assurance of the majority of the members of the council that it will pass. It has taken two years to convince the people of my city that they were never treated fairly when buying by measure, and I believe the same conditions prevail all over the country. While the measure may be of standard size, it is an instrument that can be used in a fraudulent way by a man if he so desires, regardless of whether it is standard or not.

Now, I hope that the opinions expressed on this question of selling by weight, as well as the opinions and desires expressed by many men here to bring about uniformity, will furnish food for thought for the various delegates when they go home, and that each will consider himself a committee of one to take this matter up with his Congressman or Senator and see if this conference can not bring about this legislation that we hope for, that will bring about this uniformity in all the States of the Union.

REPORT.

By HERMAN F. ADAM, *Inspector of Weights and Measures of Indianapolis, Ind.*

Mr. Chairman, I have a few data here to which I would like to ask your attention, and being a new member I will be very brief.

I have been in office less than three months, and when I took office I was confronted with a lot of work which should have been taken up before. These three months have been a campaign of education to me and my deputies, and also to the various merchants of Indianapolis.

We had to acquaint the grocer and the butcher with the conditions as to what kind of a scale would pass inspection and could be sealed. That was quite a big problem, but the obstacle has been overcome to some extent, and a great deal of good work has been accomplished. Now and then we come across a scale which we have to condemn, and the merchant will invariably say he did not know his scales were wrong. His excuse is that he "never reads the papers."

If it was a case of ignorance on the part of the merchants, I would use common sense and act accordingly. We have inaugurated quite a few reforms in Indianapolis during my short time in office. The grocer and peddler are weighing their potatoes, and eventually will be weighing all their vegetables. The housewife is now demanding the weight of almost everything she buys. The following was clipped from the Indianapolis Star of May 21, showing that I have the indorsement and the cooperation of the merchants of the city of Indianapolis.

MERCHANTS TO AID ADAM.

The members of the Indianapolis Business Men's Association have indorsed the law providing that potatoes and other vegetables must be sold by weight instead of measure, and also have voted to uphold and assist Herman F. Adam, inspector of weights and measures, in his effort to enforce the law.

The merchants throughout the city indorse the policy that is being pursued by my department.

Department and dry-goods stores have eliminated the brass tacks and installed the standard yardstick. This has also been indorsed by the heads of the large department stores.

The ice dealers all have scales on their wagons, and the ice must be weighed, and the ice peddler caught without an ice scale on his wagon and failing to weigh his ice will be arrested. I adopted the policy when I took office of giving an offender a second chance, believing I could accomplish much good out of court, and I find that I have had good success. Hence, up to date we have only made 10 arrests. One merchant had sold 10 bags of potatoes with a total of 190 pounds short, an average of 19 pounds to a bag, equivalent in cash to $2.25; another 4 bags 42 pounds short, 60 cents in cash; another sold 3 pecks for a bushel, 18 cents short. These were convicted and each fined $10 and costs, making a total of $20 apiece.

Reviewing my department since I have taken office, I find in the 10 weeks' time that we sealed 1,485 scales and confiscated 92 scales; sealed 4,570 dry measures and confiscated 254 dry and liquid measures. We have only received 35 complaints, which have been trivial and satisfactorily adjusted to both dealer and merchant. In summing up the conditions as they exist, I consider that the merchants are giving the public a square deal.

REPORT.

By JOHN S. BURKE, *City Superintendent of Weights and Measures of Jersey City, N. J.*

Mr. Chairman and gentlemen, I have been sent here to be among you to-day by a man who is very much interested in the cause of honest weights and measures and the securing of full quantity to the purchasing public. This man is the Hon. Frank Hague, director of public safety of Jersey City, under whose supervision my department is operated, and who has given me all possible assistance and encouragement.

In former years I was obliged, by city ordinance, to charge fees for the tests made, and this was one of the greatest handicaps I encountered, for under this system it was not possible to have the cooperation of the honest merchants. However, when the State department was established all fees were abolished, and I am now happy to say that the honest tradespeople of Jersey City welcome the visit of the inspector.

The city of Jersey City is the second largest in the State of New Jersey, with a population of approximately 300,000 people, composed largely of the laboring classes. The stores, as a rule, are small, and it requires constant effort to educate the proprietors of these stores to equip themselves with weighing and measuring instruments of a type that will weigh and measure accurately at all times. I think that the National Bureau of Standards should use its best efforts to cause a law to be enacted by Congress that will prevent the manufacture and sale of these inaccurate instruments throughout the country, and allow none unless it be of a type which is approved by the bureau. If a law of this kind were passed, it would be possible for a dealer to purchase any weighing or measuring instrument with the knowledge that it would be accurate at all times and that it would not be such as to facilitate the perpetration of fraud.

I earnestly recommend to the conference that legislation along these lines be sought, and I think that if the conference did nothing else at this convention but cause this legislation to be enacted that in itself would be sufficient recompense to our States and municipalities for the money expended to send us here.

REPORT.

By JOHN H. SULLIVAN, *City Sealer of Weights and Measures of Newark, N. J.*

Mr. Chairman and gentlemen, as the representative of the city of Newark, N. J., I desire first to express my appreciation of the honor conferred upon me by the city of Newark, which I represent in part, and my thanks for membership in this great body of men interested in the problem of weights and measures.

In submitting a report for Newark your attention is respectfully directed to one of the laws regulating weights and measures now in force in the State of New Jersey, commonly known as the basket law, the provisions of which practically eliminate all odd-size baskets and measures from use in our State.

Many useful city ordinances are now in force in the city of Newark. In the many cases we have prosecuted within the past year or more not one point has been raised by any defendant that has not been satisfactorily covered by the ordinances. One section of our ordinance provides that it shall be unlawful for anyone to sell or give away any instrument that is to be used for weighing or selling purposes unless the same shall have been tested and sealed by the department of weights and measures. For a violation of this section I prosecuted the representative in our city of one of the largest scale companies in the United States, and after a fair and impartial trial by jury the defendant was found guilty. Five other like charges are now pending. I believe that every instrument should be tested and sealed before it is allowed to be purchased or sold and that every scale so mechanically constructed that the moving of it from place to place will cause a change in its correctness should be tested by the proper authority each and every time it is moved. I have known scales that have been tested and sealed in my office as correct to be found incorrect when placed on the counter of a merchant within a few blocks of the office, and through some change to go fast or slow from 1 to 3 ounces.

The type of scale that I have in mind should be tested or inspected as often as possible for the benefit of the merchant and the purchaser. These scales are not of one particular make, but to the best of my knowledge are made and sold by six or eight different companies.

Another section of our city ordinance provides that no person shall use for weighing or measuring any commodity to be purchased or sold or used for weighing or measuring any work of employees in factories any instrument that has not been tested and sealed by the department of weights and measures; also that all commodities, goods, or merchandise must be sold either by weight or measure. These two sections are very important, as they require the use of either an accurate scale or measure in the sale or purchase of all goods, and are also a pretty good guaranty of protection both for the employer and employee where scales or other instruments are used for the purpose of weighing or measuring work.

I would like to describe the mode of procedure followed by this office where violations of the laws governing weights and measures are found or brought to the attention of this department.

The person accused is first summoned to the office and is asked to show cause why he or she should not be prosecuted. If I find that the person accused committed the violation through ignorance or through innocence—this being shown to my satisfaction—the offender is allowed to go after a warning has been given, and the person is provided with a copy of the laws on weights and measures, with the distinct understanding that any further violation of same will mean a heavy fine. I have found this manner of handling cases to be very good and very effective.

During the past year this department has secured 28 convictions for violations, the fines collected from same amounting to $1,175.

Of this number, 17 convictions were secured from coal peddlers, who sell by the hundred pounds, their fines amounting to $850.

In conclusion, I desire to express my sincere thanks to Dr. S. W. Stratton, Director of the Bureau of Standards, also to Mr. Louis A. Fischer, for the useful information they have supplied us with during the past year, and for their willingness at all times to lend their assistance to our department, the same having been of untold benefit to us.

The secretary presented a letter from Mr. Charles B. Woolley, city sealer of Boston, Mass., expressing his regrets at not being able to be present at the conference, and inclosing a press clipping describing the manner in which confiscated apparatus is destroyed by the Boston department, and several photographs showing large numbers of faulty weighing and measuring devices condemned in that city.

SERIALIZATION OF TYPE.

By Joseph Hartigan, *Commissioner of the Mayor's Bureau of Weights and Measures of the City of New York.*

Mr. Chairman and gentlemen, this conference, national in scope, prompted by desires of mutual understanding for the betterment of conditions and the solution of problems that confront all those interested in the subject of weights and measures, might direct its attention to the cause of establishing ways and means for the formulation and adoption of uniform specifications and tolerances for the regulation and use of weighing and measuring devices.

This conference could with profit and credit to itself devote considerable of its time to the creation of a broad and constructive policy that will be so far-reaching in effect as to be a guide to all officials of weights and measures throughout the United States to follow the specifications and tolerances adopted.

To present at this time a program for uniformity of action throughout the United States on the part of officials of weights and measures would be another and great step forward in the history of the development of this subject.

This conference should select a group of officials, mature in experience and judgment and versed in knowledge of the subject of weights and measures, for the purpose of establishing as a permanent part of this work a national board of examiners, the duties and responsibilities of this board to embrace the general subject of weights and measures, with the object in view of securing a more ready response from weight and measure officials in the United States for the promulgation of uniform specifications and tolerances; this board to receive suggestions and recommendations from weight and measure officials, such suggestions and recommendations to be considered in conjunction with an opportunity to be offered the manufacturers of weighing and measuring apparatus to be heard on the subject before adoption, and when a determination has been reached to acquaint weight and measure officials with the decision of the board.

This board, assuming the character of a clearing house of ideas, will take on the more important rôle of encouraging the building up of rules and regulations that may be subscribed to by weight and measure officials, zealous in the performance of their duties, in a manner that will promote equity and justice.

By reason of the influence and importance of this board, the procedure established will tend to advise weight and measure officials of a proper and uniform conduct in the discharge of their duties. In addition, it promises the elimination of the opinions, various and diverse, among weight and measure officials throughout the United States, and which, as you know from knowledge and experience in the matter, is of grave concern to the manufacturer; without the manufacturers of weighing and measuring appartus, I venture to say, we would have no weight and measure officials and no work of this kind to deliberate upon.

No statement made herein is directed at any weight and measure official; the condition is likely to arise in the minds of numerous individuals.

We in the city of New York, sincere and honest in our motives for the betterment of weights and measures apparatus for the benefit of the consumer, and in consonance with the advanced spirit of the age, have adopted rules and regulations to apply to the conditions of our metropolis, so significant in its cosmopolitan character.

By way of illustration, and for the consideration of this conference, the mayor's bureau of weights and measures has a regulation, perhaps the first of its kind in the United States, formulated on the opinion that all spring-actuated weighing machines show a considerable error, due to variations in springs subjected to changes in temperature. Carrying the opinion to fulfillment, provision was made and known as regulation No. 9 of the mayor's bureau of weights and measures of the city of New York, which reads as follows:

MAYOR'S BUREAU OF WEIGHTS AND MEASURES.

Mechanical division, 244 West Forty-ninth Street, city of New York.

OFFICIAL BULLETIN.

(Regulation No. 9, adopted by the board of examiners June 7, 1913.)

Automatic compensating devices: Combined spring and lever weighing machines which indicate value of commodities weighed must be equipped with automatic compensating devices to control variations in springs due to changes in temperature.

JOSEPH HARTIGAN, *Commissioner.*

As to the merits concerned in the determination for the adoption of this regulation, comment affirmative and negative is not absent; it remains a subject for further discussion.

Manufacturers of weights and measures apparatus, more particularly, however, of scales, are strangers to me. My principle is to meet each and every manufacturer on a common ground and deal with them with full and fair consideration for the respective merits of their product.

We must give heed to the genius that inspires the inventor, and which is molded into mechanical form by the talent of the manufacturer. The room for improvement is large, the industry, while established from time immemorial, in this progressive age is as yet in its infant stage.

As commissioner of weights and measures for the city of New York, my duty is to afford the people of that city protection from the use of instruments (which are to weigh or measure commodities for man and beast) possessing elements of a nature that facilitate the perpetration of fraud. Prosecutions under the law, while drastic and oftentimes injurious to many interests, will, in the nature of

things, continue until that time when education for the better and truer has been accomplished.

The mayor's bureau of weights and measures demands that the weighing and measuring apparatus used in the city of New York shall be of such caliber as to give honest weight and honest measure to the people of that city. We will continue to exact from all manufacturers of weighing and measuring apparatus who apply for admission to sell their products in the city of New York instruments that are inherently honest and true in construction and principle. When apparatus is discovered in use in the city of New York of such character as to afford the storekeeper an opportunity, either deliberate or by accident, to defraud the purchasing public it will be confiscated and the manufacturer will be disfavored until he has corrected the faults of his instrument. The manufacturer in such instances may have his remedy in recourse to the judicial branch of our governmental system, and if the decision of the courts of last resort rule against the enforcement of the regulations as adopted the mayor's bureau of weights and measures of the city of New York will abide by the judgment.

While my principle is to be fair and just to the manufacturer of weighing and measuring apparatus and to the merchant who uses it, nevertheless my duty transcends always in the service of protecting and assisting the consumer in obtaining full value with honest weight and measure.

Weight and measure officials are not created to antagonize and obstruct the manufacturer or the merchant; their duties should be so performed as to mutualize understanding, with a view to the encouragement and promotion of commerce along lines of honest intent and purpose.

The Mayor's Bureau of Weights and Measures of the City of New York, in the establishment of its rules and regulations, is not prompted to arbitrary action, nor does it descend to amusement or trivial diversion in its conduct toward its communicants. It does, however, exercise its privilege as an administrative function of the municipal government to regulate its own affairs and to cause the avoidance of occasions that facilitate the easy practices that make for the perpetration of frauds upon the purchasing public.

In view of your understanding of existing conditions and your desire to further promote the cause of honest weights and conditions, I urge upon you gentlemen the establishment of a national board of examiners, with duties and responsibilities as heretofore outlined.

Federal regulation of weighing and measuring apparatus, if not provided for here, will be prepared for and established within a brief time. Such regulation, centralized and controlled under national authority, is the only solution for the problems that confront the manufacturers of scales and other weighing and measuring apparatus of this country. In the absence of legislation of such a character as to provide for Federal control and regulation, this conference should proceed to advance the proposition of the serialization of weighing and measuring devices, as begun by the Mayor's Bureau of Weights and Measures of the City of New York, the pioneer of this subject in the United States of America.

The Mayor's Bureau of Weights and Measures of the City of New York invites this and future conferences, and any board of examiners

established in conjunction with the Bureau of Standards, to utilize the advantages and facilities of the mechanical division of the Mayor's Bureau of Weights and Measures of the City of New York for whatever purpose in the furtherance of this project. Our mechanical division has on exhibition permanent types of weighing and measuring devices of every description, which are offered to the board of examiners as objects for research work. Nowhere in the United States, in a department of weights and measures, housed under one roof can be found so numerous a variety of weighing and measuring devices.

As the subject of weights and measures develops, the Bureau of Standards of the Department of Commerce assumes a position of inestimable value and importance. This bureau, equipped with apparatus of the latest and best that science has produced, presided over by men who have devoted their lives to the study of scientific principles and their application, will ultimately be the final institution to determine the matter of the construction of weighing and measuring apparatus, as proposed by the mayor's bureau of weights and measures of the city of New York.

The Bureau of Standards will be the final arbiter of questions pertaining to construction of weighing and measuring instruments. Questions are now determined in such a variety of decisions as to confuse not alone the manufacturers and the officials of weights and measures, but are puzzling and misleading to the purchasing public. To illustrate: If the city of New York should require a locked adjustment on a scale, every other section of the United States should have a similar requirement. As conditions exist now, the manufacturers of weighing and measuring apparatus are confronted with the problem of being able to satisfy the weight and measure officials, after considerable expense and effort (and all manufacturers are willing to comply with reasonable requirements, as it means added trade), all, however, to the ultimate end that the purchasing public is obliged to be an unconscious contributor and made to pay for the increase in values. It is impossible with the present trend of events for the manufacturer of weighing and measuring apparatus to establish any order from the chaotic situation in which he unfortunately finds himself.

I venture to predict the day is not far distant when manufacturers of weighing and measuring apparatus, in a spirit of self-defense for the protection of their industries, which represent outlays of millions of dollars and the employment of thousands of workmen, will seek and have passed legislation of national character, giving Federal control of the products of their industry to some governmental authority of a kind similar to the one as proposed by the mayor's bureau of weights and measures of the city of New York. Such legislation will accrue to the benefit of the honest manufacturer and be of protection to the honest merchant and the purchasing public.

In the United States to-day the condition respecting the regulation of weighing and measuring apparatus is deplorable. Thousands and thousands of weighing and measuring apparatus of inferior grades are sold and used in the places of business of our merchants, which upon inspection and test by sealers of weights and measures are found in serious error, and are consequently seized and confiscated. The unsuspecting merchant, ignorant of the real cause for such

confiscation, by reason of the demands of his business compelled to replace the article taken away, forthwith makes purchase of an instrument, of perhaps a different make, but identical in type with the one confiscated.

Our system for the regulation of weighing and measuring apparatus is radically wrong. The fault lies with the sale of the weighing and measuring instrument, not with the merchant; the latter is not given adequate protection against the sale of devices of faulty construction.

To-day there is no semblance of uniform control. The whims, fancies, and desires of the individual official of weights and measures in the various parts of the United States prevail. Federal and central control and regulation of the subject, under the supervision of those qualified by reason of their knowledge, experience, and judgment, should obtain. The scientist, the man of technical parts versed in the application of scientific principles; the mechanician, the man possessing the practical knowledge of construction; the practitioner, the man expert from experience and knowledge of existing conditions —from types of this character composing a national board of examiners results could be obtained through Federal jurisdiction which would tend to produce weighing and measuring apparatus governed by intelligent, equitable, systematic, and honest selection.

On the question of scales, a salient feature of weighing and measuring apparatus, the lock nut, the dial, the chart, and other minor parts can be fairly dealt with by the lay mind without any corresponding injuries to the merits of the scale. The mechanical construction of scale and principles contained therein should be under the immediate supervision and control of the man possessed of those elements which make up the mechanical mind.

Federal regulation must come—the sooner the better. It will satisfy the manufacturer as well as the merchant and protect the purchasing public; it will be accepted by weight and measure officials, and go a considerable distance to uproot evils that are now causing hardship and injury.

Legislation should be encouraged, and weight and measure officials should cooperate for its accomplishment. I shall do my utmost to help and promote laws being enacted for the cause of honest weights and measures.

A law on the statute books of the Federal Government regulating and controlling weighing and measuring apparatus will bring forth simplicity of action and unity of performance.

Manufacturers will, under some procedure to be adopted, file with the national board of examiners a blue print of their products; application will be made for the approval of instrument, the article itself or parts thereof may be furnished; the Federal requirements being complied with, the instrument will be approved as to type, and the officials of weights and measures, through some form of announcement, will be notified, and they thereupon will follow, and can refuse to seal an instrument only in those instances where accuracy is a factor. The approval of the United States Government will extend into every section of the Nation and be accepted as governing.

The practicability of enforcing the law of regulation and supervision over this subject of weights and measures has been successfully demonstrated by the mayor's bureau of the city of New York. The

serialization section of the mechanical division of that bureau has not only serialized the great majority of the products of the manufacturers of weighing and measuring apparatus of this country, but has, in addition, by reason of such serialization, automatically regulated dry-capacity measures, scales, and weights in localities where supervision of weights and measures were practically unknown.

In conclusion, gentlemen, it will be granted by weight and measure officials of reasonable minds that the subject of weights and measures, while a component part of the uses of trade for hundreds of years, and in the United States of America a feature of the Constitution itself, and a subject for the consideration of public officials in every part of this Nation, yet with all that, having in consideration the rapid strides that the work and spirit of modern progress is making to-day and for some years to come, that subject, although of grave importance, is comparatively new and may now be termed as in its infant stage.

Scientific research, mechanical genius, the complexities which arise with the variety of our population, trade customs, secrets of merchants, and the multitude of things to be considered as in our sphere of activity require an understanding among us in the treatment to be accorded the subject that will be equitable to all that are concerned.

As far as it can be undertaken there should be mutualization of the interests who have in common the advancement of the cause of honest weights and measures.

The United States having passed through its period of origin, followed by tense times of political, commercial, and financial periods, is now at the beginning of its scientific period. It is a scientific age, and the United States and its scientists are affected thereby. In the enthusiasm of the early times of this awakening from the lethargy from which our country has suffered, zealousness of the scientist is apt, although sincere and honest, to exact too immediate results from the mechanician and the manufacturer. Science will predominate in the last analysis; it must of necessity, for the furtherance of the industrial progress and prosperity of our Nation, be a little removed from the severity of its exactions and extend a leniency until that time, not far distant, when science, coupled with industry, will be just as profitable as industry has been without the strict application of scientific principles.

Customs and habits the outgrowth of scores of years can not be eliminated at a single stroke. If in the space of 10 years the subject of weights and measures is nearing a finished state, much will be accomplished.

Permit no occasion to arise that will discredit and discount the value of the scientist in relation to the manufacturer or the administrator; harmony of purpose should control all three interests on this subject. Unhappy disagreement and absence of mutuality will retard progress; it will delay for just so long reasonably complete protection to the purchasing public.

The manufacturer, his industry, his employees, his reputation, and the values represented by the outlay of financial capital is a paramount desideratum.

The administrator, the judge of conditions, the receiver of impressions, the observer, the director of the agencies at his command for the enforcement of the law, the arbitrator, the barometer of human conditions, possesses superior attainments from experience and

knowledge of conditions as they actually are to cooperate with the scientist and the manufacturer in the settlement of this matter and in the solution of the problem before us. Each to endeavor to discern the viewpoint of the other, each to have the vision of his associate, will accomplish much to alleviate the deplorable state of affairs existing on the subject of weights and measures without Federal regulation.

Let us have uniformity of action in the performance of the duties of weights and measures officials. Let us, in the absence of Federal laws on the subject, put our house in order and arrange in the interim between now and enactment of legislation for Federal control and regulation a plan and agree upon a program to unite upon the use of apparatus for weights and measures which, while only for guidance, will be the unwritten law until that day when it will be written into the statutes of the United States.

REPORT

By JOHN VIRDIN, *Supervisor of Weights and Measures of Philadelphia, Pa.*

Mr. Chairman, and gentlemen, the Philadelphia County Commissioners' Bureau of Weights and Measures is perhaps the youngest bureau in point of service represented at this convention. The delegates, therefore, have come here for information and enlightment upon the ramifications connected with the subjects of weights and measures.

Philadelphia has had no supervision over weights and measures since 1883, and the city has therefore been a dumping ground for weighing and measuring devices which were not permitted in other States which had effective weights and measures laws and ordinances. And so when the inspectors began their systematic inspection of the grocery stores, meat markets, dry goods stores, etc., much evidence of the great need of a systematic and periodical inspection was found.

It was found that the following conditions existed: linear measures, 58 per cent were short; dry measures, 92 per cent were short, not marked, etc.; groceries, 70 per cent short weighing; meat, 60 per cent short; coal, 8 out of 10 scales condemned; dry goods, 58 per cent short measure; candy, 60 per cent short measure; city markets, 60 per cent short weighing; gasoline, total number of gallons lost to consumers per year by use of short measures 1,824,270 or $273,640.50.

The County Commissioners' Bureau of Weights and Measures have 35 inspectors. These inspectors are detailed in crews, two men to each crew, and each crew is provided with a horse, wagon, and full inspecting equipment. The crews and wagons are lettered in alphabetical order and assigned to districts bearing these same letters. Special inspectors also work in pairs. The bureau is also equipped with an automobile and an automobile truck, together with all modern standards and equipment for any kind of a test requested.

This bureau began operations about March 1, 1914, and up to date more than 15,000 inspections have been made, and more than 4,000 pieces of weighing and measuring devices have been confiscated as illegal and not fit for repairs. More than 5,000 devices have been condemned for repairs.

Very few liquid and dry measures have thus far been found correct. Hereafter manufacturers of these measures must mark them

with their respective capacities and they must be of the proper number of cubic inches, etc., to pass inspection.

Many large wagon scales upon which coal, hay, straw, etc., are weighed, have been condemned. Many of these scales were found to be short weighing 30 to 40 pounds to every wagon load. A large number of these scales have been replaced with new scales by the owners.

The cheap, round-bearing scales were found to be universally used by the smaller merchants, and were likewise found in a large number of chain grocery stores throughout the city. These were regulated in such manner that this type of scale can not be manipulated by the shifting of weights and pressure against the weight pan.

In the large dry goods stores, customs in vogue for at least 30 years were corrected. Yardsticks were found in these stores which were cut and round at the ends, sticks with indistinguishable figures and graduations, advertising sticks, warped sticks, short sticks, etc. The rulings of this bureau required that the defective measuring sticks be replaced with metal-tipped sticks which would pass the standard inspections. The importance of these corrections is apparent when it is known that with these defective yardsticks, counter tacks, and short-measuring devices, high-priced laces and silks selling from $3 to $15 per yard were measured. The custom of selling goods by the fold instead of by the standard yard was abolished in this city.

It is estimated by the bureau that approximately 3,000,000 milk bottles and jars are daily used in the city of Philadelphia. Very few of these bottles and jars are in accordance with the weights and measures laws. Investigations show the average shortage to be 4 drams, and then if the bottles or jars are not filled to the cap or stopple a greater shortage is received by the consumer. Manufacturers of milk bottles and 85 per cent of the milk dealers in Philadelphia have been in conferences with officials of this bureau and important corrections in the manufacture and distribution of these milk bottles are under way. These corrections it is estimated will save at least $27,000 per week to the consumers in Philadelphia.

So far, the work of the county commissioners' bureau of weights and measures has been of a corrective nature, realizing that because no supervision or inspection had been made for so many years, the incorrect or defective scales, weights, and measures were not even thought of or if given any consideration as to their accuracy, were allowed to remain in defective condition because there was no one, except the customer, to check up their accuracy.

Violations have been filed against every person, firm, or corporation, from whom the inspectors confiscated weighing and measuring devices, but no arrests so far have been made. But if upon another visit to the individual, firm, or corporation by the inspector similar conditions are found, then additional violations will be filed against him and arrest will be made upon all violations and fines imposed.

Philadelphia has almost 130 square miles area, all sections being thickly dotted with tradesmen affected by the weights and measures laws. The task is big and interesting, but the results are so important in the saving of hundreds of thousands of dollars per year to the merchants and consumers of the city that all are cooperating with the inspectors and the previous astounding conditions are being corrected as quickly and accurately as can be.

The press as a unit have given many columns to our work, and this has been of the utmost importance in getting the cooperation of householders, merchants, trade bodies, and all classes of associations.

The bureau has issued 60,000 pamphlets with which it is endeavoring to educate the public as to the buying and selling of commodities, etc.

Philadelphia desires to go on record as firmly approving national specifications for the various types of scales, and the regulation and marking of commodities.

There are too many conflicting State laws governing weighing and measuring apparatus; too many unfair city, county, and State rulings concerning what shall and what shall not pass inspection.

Political party changes in the various States likewise change the heads of weights and measure departments, and in every such instance new and radical specifications and rulings are made, so that to-day there does not appear to have been much serious effort made toward uniformity of interstate legislation, the adoption of sane rulings, or the concentration of ideas leading up to national specifications and regulations which would permit the manufacturer to market his product in any city or State in the United States and not be compelled to expend large sums of money upon unnecessary devices, or be compelled to manufacture a different style or type of instrument for each State in the United States.

DISCUSSION AS TO PLACE OF NEXT MEETING.

The SECRETARY. Mr. Chairman, we have not a great deal of time left. Everything has been disposed of except one very important matter, and it seems to me we ought to get that out of the way and then devote what time we have to any other business that comes up. That is in regard to the place of meeting. I do not think that the executive committee wants to have the responsibility of fixing that without first obtaining some idea as to what is desired by the members. I have a number of letters here—invitations, all of them—from Ohio; one from the governor and one from the Columbus Convention and Publicity Association. Also some of the members from the West have a desire that the next meeting shall be held in a Western State, and I think that we ought to discuss that before we take up any other question.

Mr. REICHMANN. Mr. Chairman, I think that can be disposed of very rapidly. I think there is only one place to hold this meeting, as I think most of the delegates will agree, and that is in Washington. I think it would be a matter of the constitution that it should be held in Washington, for a very practical reason, namely, that if any official of a State, city, or county gets a letter from an official bureau of the Government in Washington announcing a meeting to be held in Washington, that sounds good to him, and he says, "We will appropriate the money; we will appoint a delegate." If it is held in any other place, they will immediately say, "That is another junket trip." Mr. Chairman, I move that the next meeting be held in Washington.

(The motion was seconded.)

Mr. ORT. Mr. Chairman, I represent Columbus, Ohio. Last year the city council would not allow me to come to the city of Washing-

ton to attend the conference of the sealers of weights and measures, for the reason that they did not take enough interest in it. I want to say to you that we need you fellows down there. Columbus is centrally located, more than two-thirds of the population of the country is within 500-mile radius, and almost any remote point can be touched within one night's ride. There are many reasons why we should have the convention out there, or in some other locality. In the first place, do you not think, if the officers should send that invitation to have this national convention in Columbus, Milwaukee, or some other place, that the call would be answered just the same as if it were Washington? I go on record as saying that we have offered all inducements possible. Now, the other night we all enjoyed our little banquet, but we do not ask the boys when they come to Columbus town to put up for the banquet. As to street car service, we guarantee that if the men come down there, even if there are a thousand delegates, they will all have their transportation free of charge while in our city. As to hotel service, if it is $5 a day it will be cut in half to accommodate the boys first, so that the boys can be centrally located. Moreover, all the material that is necessary, that we have seen here, will be there, with the exception of the great big 2,000,000-pound test outfit. We have not enough trains to pull that over, but we are affiliated to a certain extent with the Pennsylvania Railroad and others, and with the assistance of the national body I am satisfied they would meet us half way on the other tests. Now, I have no object personally in suggesting a change, because if I am city sealer next year I surely would like to come here again, because I have enjoyed myself and have been greatly helped, but I am only asking this: If the convention is ever taken away from Washington, Columbus would like to be considered first.

Mr. Richardson, of Virginia. Mr. Chairman and gentlemen of the conference, I feel that I would be derelict in my duty to the capital city of my State were I not to extend to you an invitation to hold the next conference in the city of Richmond. I have by them been requested to extend to you that invitation, which I now do; and I want to state in that connection that we have as fine hotel facilities in Richmond as any city south of Mason and Dixon's line. We can give you reasonable rates. We have large auditoriums in three of our hotels there; larger than this, and well equipped, which we will give you free for an audience room. We will furnish you low rates, and we can assure you more points of historic interest than any other city in the United States, and we will be very glad to have you come down there. If you should accept our invitation, and any of the members wanted to come up to Washington and shake hands with the President, or see their Congressmen, it is only a little run from there up here. They can come up on their way home from the conference or on their way to the conference. We extend you a hearty invitation.

Mr. Sherman. Mr. Chairman, as representing the Washington delegation here, I would like also to offer one or two arguments in extending an invitation to the conference to meet in Washington next year. Aside from the fact that the Bureau of Standards can give better facilities for scientific demonstration, and so forth, and also that we are more accessible to our Congressmen here, I would add that Washington will offer you one other advantage that will

more than counterbalance the various advantages suggested for Columbus and Richmond, and, I imagine, other towns that may be suggested, in that Washington will give you a crack, bang-up good baseball game.

NEW BUSINESS.

Mr. HARTIGAN. Mr. Chairman, I would like to offer a resolution touching upon the metric system:

Resolved, That a committee of five be appointed by the president, to be called the committee on the metric system, the committee to report back at the next conference and to take up all matters bearing upon the question of the metric system.

(The motion was seconded and agreed to.)

The PRESIDING OFFICER. Is there any further new business?

The SECRETARY. Mr. Chairman, it is not exactly new business, but I have one matter that I would like to bring before the conference. I would like to call attention to the fact that the committee on tolerances and specifications is minus a member. Mr. Palmer used to be a member of that committee, and his place has never been filled, so that the only members of that committee at the present time are Mr. Connors and myself, and I would like to make a motion, or have someone else make a motion, to the effect that the president be authorized to complete that committee or appoint a new one if he sees fit.

Mr. REICHMANN. Mr. Chairman, I move that the Chair appoint a third member of that committee or a new committee if he deems it desirable.

(The motion was duly seconded and agreed to.)

Mr. MIKESELL. Mr. Chairman, do I understand that the Chair has any information from the Committee on Coinage, Weights, and Measures as to the Tuttle bill? They were to give a final decision this morning. I understand that Mr. Parry has been in communication with some one at the Capitol who informed him that the committee has decided to report the bill out.

The SECRETARY. I might also add that the bill that we had hoped to have a hearing on has been introduced. I have not seen a copy of it, and I do not know its number, but it is the bill to give the bureau authority to pass on types. Just as soon as we can get copies of that bill every member will be supplied with one.

Mr. MIKESELL. Mr. Chairman, if it is in order, I would like to offer a resolution extending a vote of thanks to Dr. Stratton, Mr. Fischer, and all the members of the bureau who have aided us and shown us so many courtesies during our short stay in Washington.

(The motion was duly seconded, and was carried unanimously by a rising vote.)

The PRESIDENT. Gentlemen, I want to say, on behalf of my associates and myself, that we appreciate very much your meeting here and the good advice you have given us. The results of this meeting are growing very rapidly. It is becoming an exceedingly important convention. We are accomplishing results in a short time that would take a very long time without an organization of this kind.

I want to say one word more, and that is that you do not feel that you are going out of your way if you sometimes give advice or put people right in weights and measures of a different kind—standards

of all kinds. At the bureau we are handling a great many different kinds of standards, standards of measurement, standards of quality of material, and so on; and you, in the performance of your local duties, come in contact especially with your city governments. Now, there is the greatest need in the world for education on the part of the city officials as to correct standards in other things besides weights and measures, and I want to assure you that the bureau stands ready to help your city officials in all of the lines with which it deals. I want you to feel perfectly free at any time to call upon the bureau to help your city government in any of its various fields of activity; or, in case you come in contact yourselves with questions pertaining to the other fields of measurement, which you do not feel that you can answer yourselves, submit the question to the bureau and we will gladly help you.

Mr. ROYLANCE. Mr. Chairman, in behalf of the Western Fruit Jobbers' Association, I want to thank Dr. Stratton and Mr. Fischer for the excellent work they have done in connection with us and for us with reference to the passage of the Tuttle bill and the other bill that is now pending on the standard apple box, both of which, I understand, will be reported out this morning favorably. We maintain an organization with a secretary and headquarters at Denver, Colo., at an expense to our association of about $1,000 a month. We are represented in about 28 States of the Union, and have an organization so complete that when we undertake to do anything we work, as suggested by the gentleman from Indiana, through our Congressmen. We want to offer the service of our office to all the members of this organization, and will help you to do anything that will advance the interests of lessening the cost of handling the product from the producer to the consumer and that will give the consumer what he thinks he is getting. If it is a quart of strawberries, we want it to be a quart; if it is a pint, we want it to be a pint; if it is a pound of onions or a pound of potatoes, we want it to be full weight; and we want to offer the services of the offices of the Western Fruit Jobbers' Association to all your members and ask you also to send a delegate, if possible, to our convention, which meets at Los Angeles in 1915, about the middle of February. We would like to have a delegate or representation at that convention from this organization. Mr. Fischer has done us the honor of appearing before our convention at St. Louis two years ago, and has given us an able paper from time to time, and we expect to have either Dr. Stratton or Mr. Fischer with us this coming February.

Mr. REICHMANN. Mr. Chairman, just a word. I know it is late, so I will be very brief, though I could talk for hours upon the subject which I want to speak about. Weights and measures ought to mean efficiency if it means anything; and the most efficient man in any weights and measures conference that we have ever had—and he has been a very valuable man to this conference—is the man who takes down everything that is said. I understand that Mr. Lewis F. Caswell is about to leave the public service. It certainly has been a great pleasure and a great profit to every member of the conference to have known him and to have read the reports that he has taken down for us, and we know that the Government service will lose a very valuable man, and that wherever he goes he will meet with great success.