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METRIC SYSTEM STUDY AUTHORIZATION

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HEARING BEFORE THE COMMITTEE ON SCIENCE AND ASTRONAUTICS U.S. HOUSE OF REPRESENTATIVES NINETY-FIRST CONGRESS FIRST SESSION ON

S. 1287

MAY 27, 1969

[No. 7]

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METRIC SYSTEM STUDY AUTHORIZATION

TUESDAY, MAY 27, 1969

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND ASTRONAUTICS,
Washington, D.C.

The committee met, pursuant to notice, at 10:50 a.m. in room 2318, Rayburn House Office Building, Hon. George P. Miller (chairman of the committee) presiding.

The CHAIRMAN. The committee will come to order.

And now, before I recognize our witness this morning, Dr. A. V. Astin, Director of the National Bureau of Standards, I would like to note that Dr. Astin will retire this summer. This morning is possibly the last appearance he will make before this committee as Director of the National Bureau of Standards.

I would like to say that I have never, in all my experience, known a more truly dedicated and conscientious public servant than Dr. Astin.

In May 1950 he was appointed Associate Director of the National Bureau of Standards and served in that capacity until June 1952, when he was appointed by the President as Director and confirmed by the Senate.

Dr. Astin has many achievements to his personal credit, as well as the achievements of the Bureau under his direction.

Dr. Astin has been recognized by the United States and Great Britain for his work on the radioproximity fuse used during World War II. His early work in the development of radiotelemetry techniques and instruments is useful today in studies of the upper atmosphere.

Under his leadership the National Bureau of Standards has broadened its area of service so as to meet the heavy demands placed upon it by the explosive growth of science and technology during the past two decades. Under him the farsighted planning for future requirements of the Bureau led to the new facility at Gaithersburg.

Dr. Astin's honors and awards include: Presidential Certificate of Merit; Gold Medal for Exceptional Service Award of the Department of Commerce; Navy Ordnance Award for Exceptional Service; Army Ordnance Award for Outstanding Service; honorary doctorates of science from Lehigh University, from George Washington University, and from New York University.

I have personally known and worked with Dr. Astin for a good many years, and it has been a personal privilege to have had this pleasure. I want to thank Dr. Astin for his splendid cooperation with the committee over the years, and I want to extend to him personal best wishes in his future endeavors.

(S. 1287 is as follows:)

[S. 1287, 91st Cong., first session]

AN ACT To authorize appropriations for fiscal years 1970, 1971, and 1972 to carry out the metric system study

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there are hereby authorized to be appropriated for the use of the Department of Commerce during fiscal years 1970, 1971, and 1972, such sums, not to exceed a total of \$2,500,000, as may be necessary to carry out the purposes of the Act of August 9, 1968 (82 Stat. 693; Public Law 90-472).

Passed the Senate May 14, 1969.

Attest:

FRANCIS R. VALEO,
Secretary.

The CHAIRMAN. Before proceeding with the hearing on S. 1287, I would like to make a few remarks on the background of this bill, both for the benefit of the new members of the committee and to refresh the recollection of the other members concerning the matter of funds for the metric study.

In setting out the jurisdiction of this committee, the House rules specifically include the metric system. Consequently, this committee has had before it several bills concerning the metric system, and in particular bills calling for a study to determine the impact that the increased use of the metric system throughout the world was having on the United States. In August 1968 such a study was finally enacted into law.

As early as 1965 this metric study bill carried an authorization figure of \$2.5 million to do the 3-year study. In January 1966 the committee reported out a bill containing an open-end authorization, with the limitation that no more than \$500,000 could be appropriated for the first year of the program.

Congress did not act on that legislation before adjournment, so in the following Congress the committee reported out H.R. 3136, providing for the same open-end authorization with the same \$500,000 first-year limitation.

On the floor of the House the bill was amended so as to require this first-year \$500,000 to be taken from funds previously authorized. The bill passed the House June 24, 1968, and the Senate on July 30. On August 9, 1968, it became public law.

Consequently, not having this item in the Department of Commerce budget, funds for the study that year were indeed limited, I am told. And so we have the bill before us authorizing funds for the study for the next ensuing 3 fiscal years in the amount of \$2,500,000.

Now, sir, we will be pleased to hear your statement. Dr. Astin.

STATEMENT OF DR. A. V. ASTIN, DIRECTOR, NATIONAL BUREAU OF STANDARDS, ACCOMPANIED BY A. G. McNISH, ASSISTANT TO THE DIRECTOR FOR METRIC STUDY

Dr. ASTIN. Thank you very much, Mr. Chairman, for your kind and generous remarks. It was quite unexpected. I am pleased to have this opportunity to appear before this committee and acquaint you with the steps that we have taken to initiate the comprehensive metric system study that was authorized by Public Law 90-472.

This act, which originated in your committee, was approved August 9, 1968, and shortly thereafter primary responsibility for conducting the study was assigned by the Secretary of Commerce to the National Bureau of Standards. I shall comment on the plan that has

been developed for the study and discuss briefly the cost estimates which provide the basis for the appropriation authorization bill that is before you today.

As you know, Public Law 90-472 did not authorize the appropriation of any funds to conduct the extensive study contemplated by that legislation. It did authorize the use of funds already appropriated to the Department of Commerce, not to exceed \$500,000 for the first year of the program.

Under these conditions, our initial efforts following approval of the act were limited to a continuation of the preparatory activities that had been started in February of 1968 in anticipation of enactment of the legislation. At that time, A. G. McNish, who was then Chief of the Bureau's Metrology Division, was asked to devote full time to the consideration of the problems which could arise if and when the proposed study was authorized.

With the assistance of one professional and a secretary he began to explore the major problems and to establish the cooperative arrangements needed for the study. Among our first efforts was the development of a system to assure cooperation and coordination of the study within the Government. On October 24, 1968, requests were directed to the heads of all departments and interested agencies asking that a liaison representative be designated to serve as the primary contact with the National Bureau of Standards in this important project.

Responses have been received to all the requests, and in every case a representative has been designated. In a number of cases, working groups have been formed within the agencies to coordinate their interests in the study, and more such groups are planned.

Particular significance is attached to active participation in the study by the Department of Defense. Not only is that Department the largest single customer for the products of our economy, but its special function in providing for the common defense must not be impaired.

At previous hearings concerning the metric system, a representative of that Department testified that it would be impractical for the military services to remain on the English system while the country changes to the metric system, or for the military to change measurement systems in a substantial degree while this country adheres to the English system.

While the National Bureau of Standards is conducting studies that will enable it to evaluate the costs and benefits of alternative courses of action which may be feasible for the United States regarding increased use of the metric system, it seems most fitting and advantageous for the military itself to study the effect of any such increased use on its capability to perform its mission.

With this in mind, contact was established at the working level during the early planning phases of the study. On September 27, even before the formal request for the cooperation of other Government departments and agencies, the Deputy Secretary of Defense, acting on behalf of the entire Department, sent a memorandum to the Secretaries of the military departments noting the significance of the national study being planned, and requesting that the Air Force assume leadership in developing the military input and participation in the study.

The Department of Defense has established a working group of about 20 people who have been devoting a part of their time to planning for the military aspects of the study, and our mutual cooperation has been continuous.

During this preliminary phase of the study, we also have established contacts with a large number of trade associations, professional societies, and some representative private firms. The cooperation of these groups is most important—both from their viewpoint and ours. They are anxious to have their particular interests considered, and we realize that the success of the study depends upon information and assistance which can be obtained only from such sources.

Time and manpower limitations have not permitted extension of these contacts to all interested sectors, but this will be done as rapidly as possible. Our experience to date indicates that there should be no difficulty in establishing a free flow of information from private companies, trade associations, labor organizations, and professional societies on all important matters to which they can contribute. The many offers of assistance which have been received from these sources have been very impressive.

Since January of 1969, we have been able to accelerate the planning and pilot study phase of the project appreciably. At that time in recognition of the importance which the Department of Commerce and the Bureau of the Budget associate with the metric system study, \$250,000 was made available for our use during the remainder of fiscal year 1969.

The metric study group was immediately expanded to a total of eight full-time employees, including five professionals. In addition, this financing has enabled us to obtain the part-time services of a number of individuals who are being loaned temporarily by other parts of the Bureau and of the Department of Commerce. While these temporary arrangements have not permitted optimum progress, we have moved ahead as vigorously as possible in planning for the major effort that lies ahead, and in development of the study techniques to be employed.

Other Government agencies have accepted assignments for special studies. These include analysis of metric influences in exports and imports, by the Business and Defense Services Administration and other economic agencies of the Commerce Department; assistance on preparation, distribution, and analysis of questionnaires and statistics by various agencies of the Commerce Department; and the analysis of military programs by the Department of Defense, which has already been mentioned.

To meet the requirement in the act for "appropriate participation by representatives of U.S. industry, science, engineering, and labor, and their associations, in the planning and conduct of the program," a Metric System Study Advisory Panel is being set up.

This panel is to be composed of over 40 persons selected to represent the broad spectrum of the whole economy. These members will act in an overview and advisory capacity as individuals rather than as representatives of specific companies.

Other valuable sources of guidance and assistance have been made available to us through the metric system committees that have been formed by the United States of America Standards Institute, the American Society of Mechanical Engineers, and other technical and professional groups.

A working plan for conducting the study has been formulated. It includes 21 major tasks that have now been identified and analyzed to determine an appropriate plan of action. A list of these tasks is attached to my statement. While all tasks do not necessarily have to be attacked in the sequence shown, they have been grouped for purposes of discussion into three broad phases of the study:

I. Organization of the study (tasks 1-4).

II. Background studies (tasks 5-11).

III. Factfinding and analysis (tasks 12-21).

The tasks of phase I, organization of the study, are rapidly moving toward completion. Our principal need in this area is for additional staffing of the study team (task 2) and this, of course, depends upon the availability of adequate funding.

We have started action to a limited extent on all of the background studies of phase II (tasks 5-11), but much work remains to be done in this area. Task 12, which is concerned with the identification and classification of industries whose operations, products, and services would be affected by increased use of the metric system, already has received considerable attention in view of its great significance to the study.

During fiscal year 1970 we plan to work on all of the other tasks of the plan with the exception of tasks 20 and 21 which pertain to the findings, analysis, and drafting of the formal report and recommendations. These will be deferred largely to fiscal year 1971 when the factfinding phase will be more complete.

Particular emphasis will be devoted during the coming year to task 13, which has to do with the effect of the metric system on international trade, and to task 16, concerned with identification of the advantages and disadvantages of metrication in representative firms and industries.

It should be understood that the plan which I have outlined may be changed and improved somewhat as the study proceeds, but we believe that it provides a valid basis for estimating the cost of this major endeavor.

Our preliminary studies have enabled us to develop a clearer understanding of the nature and magnitude of the problem before us. Before presenting estimates of the cost of the study, I should like to discuss briefly some of these findings.

These preliminary studies have included visits to the plants of various manufacturing firms to examine their problems, interviews with officials of trade associations and with experienced engineers engaged in production, and careful scrutiny of documents and data germane to the problem.

The economic impact of increasing metric usage can be studied most effectively by examining its impact on individual industries. The severity of the impact of increasing metric usage can vary greatly from one industry to another, as can the pattern of response.

The Standard Industrial Classification Manual lists 78 major industrial groups which are further broken down into several thousand more specialized industries. Many of these industries would be so little affected by the metric trend that they need not be studied in great detail.

On the other hand, major industries which would be strongly affected will require separate studies in great detail. Some industries could

adjust to the metric trend simply by changing the measurement language in which their products are described; others would find it necessary to change the size, shape, and design of important industrial products to take full advantage of increased metric use.

We have already developed a system of classifying industries according to the impact on them of increased metric use. These categories range from negligible impact, where little or nothing need be done, to severe impact, where a change in accepted standards and practices would be disastrous.

Although industries can be studied individually, it is also necessary to take into account the effects of industries on one another through interindustry relationships. That is, one industry which would in itself experience no significant direct impact from increasing metric usage would have demands placed upon it by another industry where the impact may be considerable and the need to change is manifest.

Those industries which would experience the greatest impact are those engaged in the manufacture of hardware items which must fit together precisely, and these are the ones which must be examined most intensively.

Similar considerations apply in studying the effects of metric or nonmetric usage on foreign trade in the products of these industries. We must not only estimate the extent to which increased metric usage would improve our export position, but also estimate the extent to which increased metric usage in the United States would lead to a damaging rise in imports.

Underlying all of the fact-finding and analysis activities in phase III of the study is the extremely complex problem of developing meaningful criteria for identifying and evaluating the potential advantages and disadvantages of increased metric system usage in our country.

Many of these advantages and disadvantages can be evaluated using the dollar value of costs and benefits projected over a foreseeable period of years. However, there are also many complex intangible factors which cannot readily be assigned a dollar value, but nonetheless are quite significant in assessing the overall effect of increasing metric usage in such areas as education, international cooperation, and our national image and prestige among the nations of the world.

As you see, gentlemen, the problem is a very large one. It requires that we bring to bear all the expertise we can assemble in many different fields because of the vital effect its solution will have on the future development of our country.

The current fiscal year has been devoted mainly to planning. The scope, complexity, and national importance of this study requires not only breaking much new ground—no study of comparable magnitude was ever made by other nations—but also requires careful and extensive actions to insure a meaningful and unbiased report to the Congress.

Our huge and diversified economy cannot be adequately covered by less than a comprehensive and systematic approach. This approach will be followed during the coming 2 fiscal years, including testing of techniques to assure their workability.

Fiscal year 1970 will be especially active with such testing, followed by wider application of data collection, and many contacts with and

visits to various organizations for personal discussions and on-site study.

Should our program in the above regards in fiscal year 1970 not be enough to assure meeting our report deadline, we may have to accelerate our efforts at additional cost in the following year. We hope to meet our goals on time, but the minimal staff and funds so far available have delayed our progress.

Accordingly, we are requesting at this time the authorization of the full amount that may be required to complete the study; namely, \$2.5 million. This action will preclude the need for any subsequent authorization action during the rest of this study.

I wish to make it clear that although we are requesting the authorization of \$2.5 million because of the numerous uncertainties in this endeavor, it is our sincere hope that the appropriations which we shall require to complete the study may not be this great.

Of the funds that you may authorize, we have requested that \$710,000 be appropriated for fiscal year 1970. That amount would provide about \$380,000 more than has been available during the current year, and would permit reasonable expansion of our activities.

The overall total of \$2.5 million would provide for expansion of the study staff to an eventual total of about 25. The total cost of this staff would be about \$1.18 million, of which \$410,000 will be required for fiscal year 1970.

An additional \$83,000 (including \$35,000 for fiscal year 1970) would be utilized for the extensive travel by the staff that the study requires. A total of \$45,000 will be needed for the travel and per diem expenses of the metric system study advisory panel. Of this amount about \$20,000 will be spent in fiscal year 1970.

A total of \$129,000 (including \$30,000 in fiscal year 1970) would be used for the specialized assistance of other technical divisions and groups within the National Bureau of Standards. To obtain the expert assistance of other agencies of the Commerce Department in the economic evaluation and data collection portions of the study, \$575,000 (including \$215,000 for fiscal year 1970) would be needed.

Later in the study, \$250,000 would be used to assist in special studies conducted by other departments and agencies of the Government—for example, those at the Departments of Defense and Transportation.

Finally, we plan to let certain small contracts totaling about \$25,000 with private organizations. An example might be a contract to a university to study problems in adult education in the metric system.

The figures I have mentioned total \$2,285,000, somewhat less than the authorization requested. The balance of the authorized amount would be available for any salary increases that may be approved and for unforeseen additional work that may become necessary as the study progresses.

In closing, I should like to note that we of the Department of Commerce share with your committee a deep interest in this study of the effects of increased use of the metric system, and that our exploratory efforts have further convinced us of the vital importance of this study to the Nation.

(The list appended to Dr. Astin's presentation follows:)

TASKS

I. ORGANIZATION OF THE STUDY

Task 1—Develop a plan for the conduct of the Study.

Task 2—Staff and organize the Study Team.

Task 3—Establish liaison within the Federal Government, with State and local governments, and with foreign governments.

Task 4—Establish a Department of Commerce Metric Study Advisory Panel to assure continuing review of the Metric Study plans and progress by experts from a broad cross section of U.S. industry, labor and the public.

II. BACKGROUND STUDIES

Task 5—Examine the experiences of other countries in conversion to, and use of, the Metric System.

Task 6—Determine the present extent of Metric System usage in the United States.

Task 7—Determine the extent of worldwide use of metric and U.S. engineering standards, and compare existing metric standards with those in use in the United States.

Task 8—Survey laws and regulations which would relate to increased metric usage.

Task 9—Study past United States legislative history on adoption of the Metric System.

Task 10—Compare the metric and customary systems of measurement.

Task 11—Develop a hypothetical list of feasible alternative courses of action which may be taken by the Federal Government and private industry against which the fact finding and analysis may be evaluated.

III. FACT FINDING AND ANALYSIS

Task 12—Identify and classify industries whose operations, products, and services would be affected by increased use of the Metric System.

Task 13—Determine the effects on the United States in international trade and commerce of increased use of the Metric System.

Task 14—Determine the non-trade international implications for the United States of increased use of the Metric System.

Task 15—Determine the effects of metrication on U.S. military operations and alliances.

Task 16—Determine the advantages and disadvantages of metrication on the individual firms and industries, etc.

Task 17—Determine the effects of increased use of the Metric System on labor.

Task 18—Determine the effects on metrication on education and training at all levels.

Task 19—Determine the effects of possible increased metric use on the consumer.

Task 20—Analyze the results of all feasible tasks and formulate conclusions on the national impact of alternative Federal actions with respect to use of the Metric System.

Task 21—Draft the formal study report and recommend appropriate Federal actions and suggest voluntary private sector actions.

The CHAIRMAN. Doctor, the last time you were before us I believe there were only three principal nations of the world which were not on the metric system. Those were the United States, Canada, and Australia. Is that not true?

And now Canada, I believe, is in the process of going on the metric system.

Dr. ASTIN. I think Canada is in the same status we are, studying the problem.

The CHAIRMAN. That leaves, then, Australia and the United States.

Dr. ASTIN. The Australians have completed a study which recommended their conversion to a metric system. As far as I know, though, that recommendation has not been acted upon.

The CHAIRMAN. But they have recommended it?

Dr. ASTIN. That is correct.

The CHAIRMAN. Australia went through the birth pains of changing her money 4 years ago, just as England is now planning.

Dr. ASTIN. Yes, sir.

The CHAIRMAN. Some years ago there was vigorous resistance to any thought of increased metric uses. Has there been any recent change in attitude?

Dr. ASTIN. Yes, sir. One of the things that has impressed us most during this study phase has been the increased acceptance by industrial associations of the possible need for change toward the metric system. Many think it is inevitable, and are interested in helping us to bring it about.

However, we do not know which course of action is best for us. We are still trying to be objective about studying the advantages and disadvantages. I would like to have Mr. McNish, who is heading the study, tell us a little bit more about these trends.

Mr. McNISH. In the past, as you have mentioned, we have had unreasonable opposition to even considering a trend. I think the change has taken place largely through the wording of the bill which this committee considered, which recognizes that we may have to go to increased metric usage, but we don't necessarily have to go into this in all fields of our activities.

We are getting splendid cooperation from the technical societies, such as the Society of Mechanical Engineers which was strongly opposed to any increase in metric usage a few years ago.

The CHAIRMAN. I could cite you one case in my own district with which I am familiar. It is a company that makes rather sophisticated machinery, and they have developed and trained people for their jobs and they found themselves called upon to furnish their cranes in Europe.

The manager of this firm, who is a very good friend of mine, was never very enthusiastic about the metric system, and he called me one day, and he said, "For God's sake get that metric bill passed. It cost us \$40,000 to convert our plants to the metric systems." Well they did change over and they have been building these cranes in Naples, Amsterdam, and Scandinavian countries ever since.

And they found the metric system was pretty good.

Doctor, are you cooperating with Canada in this study, since our two countries seem to be so closely associated in so many activities?

Dr. ASTIN. Yes, we are.

Mr. McNISH. Incidentally, the day after this bill was passed by the House, I met with the Joint Canadian Committee, and they were quite happy to know that we were looking at this seriously. They have an interdepartmental committee in Canada for studying the metric problem.

The CHAIRMAN. Well, I have found from my own experience that this has extended beyond Canada. I remember when we first started this I happened to be on the plane with a very distinguished Englishman going down to Houston, and he said, if you people will only start, we will be very happy to follow.

I think they are ahead of us now. Mr. Fulton, you have been very interested in this. Any questions?

Mr. FULTON. Yes, I do.

I have a series of amendments. I believe that the authorization should be for 1 year or at most 2 years, not 3 years, because I believe Dr. Astin should come before this committee and justify how you are developing the staff, and let us take a look at it again. Do you have any objection of coming before this committee each of 3 years and asking us to authorize your money amounts?

Dr. ASTIN. I have no personal objection, nor do the Bureau people. In fact, we welcome opportunities to appear before this committee. The problem is primarily with the budget officials of the Department of Commerce and in the Bureau of the Budget who take a dim view of separate authorizations within the appropriations structure. That is, as far as I can see, the primary objection to this.

Mr. FULTON. But if you were given, for example, the money for the 1970 coming year, then that would satisfy the needs of your staff which I understand is to be 25 persons, and it would be an amount of about \$410,000 required for the fiscal year 1970?

Dr. ASTIN. No, sir. Our request to the Appropriations Committee of the Congress is for \$710,000 for fiscal year 1970. However, we know that there will be a pay raise in effect on July 1, and that appropriation request does not encompass a pay raise.

The budget procedure is such that these pay raise costs go in through a separate channel. It would be necessary for us to have an authorization for at least \$750,000 in order to cover the program that our \$710,000 current request before the Congress is intended to handle.

Mr. FULTON. Well, I would refer you to page 10 of your statement, where you say that overall costs of \$2.5 million would—the total cost of this staff would be about \$1.18 million, of which \$410,000 would be required for 1970.

That would seem to me to be the cost of your staff. You have \$250,000 for study in other departments. For the life of me I can't see why you are taking on the cost of other departments, and on page 11 the figures you mentioned total \$2,285,000, somewhat less than the authorization requested when you itemize the figures in the overall request, and you then say the balance of the authorized amount will be available for any salary increases that may be approved for any unforeseen additional work.

We are in a tight budget situation, so that when you come in and ask for \$380,000 more than what was available during the current year with \$500,000 being available to you through the Department of Commerce in the fiscal year 1969, you then are asking, really, for about 40—more than that, about a 60-percent increase in budget, which is very hard to come by in these particular times.

The CHAIRMAN. I have just been reminded that this is an administration-approved and Senate-passed measure.

Mr. FULTON. Well, we are to look the administration request over, that is why we are here, and we are to make sure that the funds are necessary, and that is why we asked for the authorizing process—

The CHAIRMAN. I merely pointed this out because you spoke of a tight budget, and the administration knew what a tight budget was, when they sent the bill up here.

Mr. FULTON. I would say in a good many things they are proceeding in that direction, but I think a little assistance from the Congress would help, too. For example, it turns out the Bureau of the Budget

itself is asking for a large increase over its present 1969 budget. Did you know that? That is like finding your favorite seat in the local pub already taken.

Dr. ASTIN. May I respond to your question on this need for fiscal year 1970?

Mr. FULTON. I am speaking now of your staff, the need for the staff based upon your \$410,000 figure. Not on the needs for travel money or for per diem for a group of businessmen who may be on an advisory committee. Nor for the \$250,000 for other departments. I want to limit the question.

Dr. ASTIN. All right. We do not need the amount indicated just to pay the salaries of the staff that we have. We do need it, though, if we are to provide for these other activities, and in my judgment, if we don't provide for them, it will be impossible to complete the study in the allotted time.

Mr. FULTON. You are saying that no other nation has made as large a study as the United States proposes. I assume that most of these other nations have completed their studies so we have the benefit of their experience.

Dr. ASTIN. No other nation has as difficult a problem in conversion as this Nation. We are the most technologically sophisticated Nation in the world. We have a system of measuring tools based on the English system, and these investments make it essential that we have a sound plan if we choose to accelerate conversion to the metric system.

The CHAIRMAN. We speak of other nations. The only other nations you can point to now are Australia and Canada. But they are following us. I shouldn't have to point out that the nations in Europe have been on the metric system for quite a number of years.

Mr. FULTON. As you know, I have a bill that we adopt the metric system, and then from time to time to lay out methods how the various industries will approach this policy. Now, I put the cart before the horse in your estimation, and you put the cart before the horse in mine, and I would have the study done as we go to the various industries, having once made the decision that the metric system will be used in this country.

I have heard criticism that we are really doing these studies trying to find out what we already know, what we are going to have to do, and I am really surprised to find Dr. Astin saying we don't know what course is best for us. Don't you think the metric system is best, basically?

Dr. ASTIN. There is no question in my judgment that the metric system is a superior measurement system, but we do not know that it is the best system for us.

Mr. FULTON. Then the first thing to do is to develop that.

Dr. ASTIN. Our first task is to find out how industry will react to that metric system. It is my view, Mr. Fulton, we will get out of this study exactly the type of information you suggest. That is, we will come up with an optimum plan of reacting to the worldwide usage of the metric system.

Mr. FULTON. Well, my point of it is this. If we had the Congress approve the adoption of the metric system, with the approval of the President, then the various agencies within their own field could set the period as to the changeover.

I, too, believe that the metric system is by far superior, but the question is: Are we trying to put in the systems for adopting the metric system before we have the policy? And my answer to that is yes.

Dr. ASTIN. We relate to that problem, but the Department of Commerce, to whom this program was assigned, has the responsibility for developing international trade and commerce. It is our intent, and we have already begun, to make use of those parts of the Department of Commerce that are skilled in this area. The Bureau of International Commerce, the Business and Defense Services Administration, the Office of Business Economics, are all competent in the Department of Commerce in these problems, and we have been using them on the planning of this study.

Mr. FULTON. Why is this metric system policy question not one of the major policies and programs of the U.S. Department of Commerce, and therefore should be in its regular budget? And the same with the various Government departments, such as the Department of Defense, why are not these studies within these various departments in their regular budgets?

Dr. ASTIN. Well, it is customary in most of the departments, I believe (and I am sure it is customary in the Department of Commerce) for the operation of programs to be assigned to bureaus. The Office of the Secretary is primarily a policy-planning, guiding office, and the operating agencies are the bureaus. The Secretary of Commerce has decided to give us this problem with the understanding that we utilize the other parts of the Department where they are relevant.

Mr. FULTON. How much have you done on the studies to date, on the amount of subsidies? What figures have you considered that various industries would have to receive in general amounts because of the adoption of the U.S. metric system in their participating in the export-import trade in this country?

Dr. ASTIN. We have no conclusions or facts at this time to lead us to believe there will be any need for subsidies.

Mr. FULTON. So there is not any question, then, that would be an effect on the U.S. Treasury with the adoption of the U.S. metric system?

Dr. ASTIN. Certainly it is our hope that we can find a way of reacting to the increased use of the metric system in a way that will have minimum impact on the U.S. Treasury. This would be one of the dominant goals of the study.

Mr. FULTON. On the panel that you have spoken about, called Metric System Study Panel, are these people not outstanding people in the industry, professions, and universities? Why do we have to finance at the U.S. Government level the activities and expenses of people such as this when it is to the benefit of their own industry, their own scientific discipline, their own professional business, and their own profits?

Dr. ASTIN. It is customary for all such advisory committees to have their expenses paid. If we were not in a position to pay their expenses, we would have a biased committee consisting only of people from organizations able and willing to finance their expenses.

It would mean that we would have to exclude people from small business firms, because, in general, we would find that they would not be willing to pay their expenses. We would have to exclude people

from universities and educational institutions, and we would end up with a very biased committee unless we were able to pay travel expenses.

Mr. FULTON. On page 8 in the third paragraph, we must estimate the extent to which increased metric uses in the United States would **lead to a damaging rise in imports**. I happen to be in the school that feels that the most trade back and forth between reciprocal trade agreements is the best business, so I am not at all in the school that I am going to say that the metric system is wrong if it increases international trade and business.

I believe that is just what the United States should be working for, not the reverse.

Dr. ASTIN. Well, it is my understanding, sir, that it is administrative policy to promote foreign trade. I know it is certainly the objective of the present Secretary of Commerce, Mr. Maurice Stans. But the Government is also deeply concerned about the gold balance, and a favorable trade balance.

I think we could argue for accelerated use of the metric system if we could show it would have a good effect on the dollar-balance problem, but if it did not, we would have a different situation.

Mr. FULTON. You also say no study of comparable magnitude has been made by any other nation. Would you give us information concerning the studies conducted by other nations and their conclusions for the record?

Dr. ASTIN. We would be pleased to furnish that material for the record.

(Information requested is as follows:)

METRIC CONVERSION STUDIES BY OTHER COUNTRIES

The experiences of other countries regarding metric conversion are being followed with great interest by the Study. Several countries have conducted studies; India, Ireland, South Africa, Australia, and New Zealand. Information on these studies is given below.

1. INDIA

The Planning Commission, Government of India decided to conduct a brief study on August 31, 1954. This Commission, in conjunction with the Indian Standards Institute, conducted the study which resulted in a report, dated March 7, 1955, which stated:

"There is general unanimity on the need for putting an end to the prevailing confusion in our weights and measures and the many disadvantages that the lack of any common, unified system of weights and measures give rise to are acknowledged. Standardization is urged as a clear necessity.

"As to what system should be adopted conclusive evidence has been presented that it can be no other than the metric system, which is already the language of measurement of three-fourths of the world's population, comprising all races and people in various stages of economic development and the only countries left out are the USA and the countries of the Commonwealth. There is no scope for national improvisations in this field and when the international system happens to be a perfect system also, the choice of system is easily determined.

"As to the question of the timing of the reform, the view urged that because difficulties involved in changeover, the reform may be held over for the next generation cannot be sustained by any reason; and the time for decision is now. If a change has to be made, the sooner the manner of it decided upon the better. Delay will aggravate difficulties and as time passes the increased costs and dislocations involved may make the change itself highly inconvenient, if not impracticable."

This report was accepted by the Government, and in 1956 the Standard Weights and Measures Act was adopted. This Act directed that effective April 1963 all units other than Metric units were declared illegal.

2. IRELAND

In February of 1953, the Minister for Industry and Commerce appointed a committee to consider the desirability of adopting the metric system and decimal coinage. This Committee, reporting on November 25, 1959, advocated the adoption of the metric system stating:

"... we came to the conclusion that the metric system of weights and measures is intrinsically superior to the imperial system and that its superiority for all purposes is sufficient to justify the inconveniences and expense incidental to its adoption. We recommend therefore, that the metric system be adopted at the earliest practicable date as the sole statutory system of weights and measures for use in the country."

However, concerning the "earliest practicable date", it also stated:

"In view of the extent of our external transactions and their diversity, we are of the opinion that a change by this State alone would give rise to difficulties in relation to foreign trade in all its aspects which, on balance, would outweigh any benefits to be derived in matters of a purely internal nature. . . . we do not favour a change in either system (Measurement or Coinage) except in conjunction with Britain. . . ."

Following the announced intention of Britain in 1965 of adoption of the metric system, the Irish Government, on January 12, 1968, issued the following statement:

"The Government have had under consideration the question of the more general use in the economy of the metric system of weights and measures. They note that in Great Britain, the policy of conversion which it is expected will be largely implemented by 1975. The Government welcome indications that some sectors of Irish industry are anxious to prepare for the general introduction of the metric system and urge on all sectors that they should plan for orderly conversion. The Government would expect that the greater part of Irish industry will have converted to the metric system by 1975.

"The Government propose, as the move towards the use of the metric system develops, to promote the move by seeking tenders in metric terms and encouraging other public authorities to do likewise. Regulations involving reference to weight or measure (for instance in regard to retail trade or transport regulations) will in due course be expressed in metric terms. The giving of greater emphasis to the use of the metric system in education will be encouraged. Standards declared by the Institute for Industrial Research and Standards will be progressively recast in metric terms. Legislation will be examined and where necessary amended. It will be the aim of the Government to so time their moves as to encourage conversion whilst at the same time avoiding unnecessary difficulties for industry, the distributive sector or the public generally."

3. SOUTH AFRICA

Early in the 1960's, the South African Bureau of Standards was requested by the Minister of Economic Affairs "to carry out an investigation and report on the practicability and full implications, including those due to inter-relationships of costs with planning and programming, of the adoption of weights and measures in the Republic".

The Metric System Committee of the Bureau issued its report in April of 1965. The report came out strongly in favor of the adoption of the metric system on the grounds of cost and efficiency to the economy as a whole and for international trade reasons.

In September 1966, the Government announced its acceptance of the proposal to convert, and in September 1967, it announced its detailed plan for the change which it anticipated would take place over a period of 10 years. The first Governmental action to assist in this conversion was taken on January 17, 1969, when new regulations requiring many prepackaged consumer goods to show their weight or volume in metric terms effective January 1, 1970.

4. AUSTRALIA

On April 11, 1967, a Select Senate Committee on the Metric System of Weights and Measures was appointed to:

"Inquire into and determine the practicability of the early adoption by Australia of the Metric System of Weights and Measures. . . ."

This Committee consisting of eight Senators, held twenty-eight open hearings between April 1967, and May 1968. As a result of the testimony heard during these hearings, the Committee, on May 29, 1968, issued a report which recommended:

"That the use of imperial units of measurement be discontinued over a period and that at the end of that period the metric system of units become the sole Commonwealth legal units of measurement.

"That the metric system to be adopted be that recommended by the General Conference of the International Bureau of Weights and Measures and known as the International System of Units (SI).

"That an opportunity be given to the community, industry and commerce to prepare for such a change and accordingly the Government make an early announcement of its intention to convert.

"That legislation be introduced to provide for the conversion to the metric system and, in particular, to empower a Minister of the Commonwealth to facilitate and co-ordinate this conversion."

The Australian Senate and the Government have yet to act on this report.

5. NEW ZEALAND

A Cabinet decision of October 9, 1967, authorized the Minister of Industries and Commerce to "form a committee to inquire into and report upon the need for New Zealand to adopt the metric system of weights and measures". A Working Committee made up of six members of the Government was established.

On October 30, 1968, this Committee submitted its first report to the Cabinet, based upon information assembled at six private meetings held during the year. This report recommended that the Government make a policy statement that "The Government accepts the necessity of assisting metrication in New Zealand. . . ."

Following the suggestions of the Committee, on February 24, 1969, the Minister of Industries and Commerce of New Zealand announced that "conversion to the metric system is a logical step for New Zealand. . . . The Government accepts the necessity of assisting metrication in New Zealand, and . . . it accepts the recommendations of officials that an . . . advisory board be set up to encourage, assist, and advise on the progressive voluntary adoption . . . of the metric system."

Mr. FULTON. Now, the figure you have overall of \$2.5 million; actually on line item totals it is \$2,285,000; is that correct?

Dr. ASTIN. That is correct.

Mr. FULTON. The other is unknown contingencies and possibilities.

Dr. ASTIN. That is correct.

Mr. FULTON. Would an amount between \$500,000 and \$600,000 for the first year, instead of \$710,000, cause you great harm in studying the programs? Would it destroy the studies? Could it be in an area of reference, in an order of magnitude that you could adequately operate, or would it be more on the economizing level that you could live with?

Dr. ASTIN. The most serious impact of curtailing the level of this study below the amount we have requested for 1970 would be to make it most unlikely that we could complete the study in the 3 years that the law prescribes. Further, it is my judgment that if we should end up recommending that the United States use the metric system, it will be because of the potential benefits to this country, and we can ill afford to delay such benefits.

We can make progress at a lesser amount, but we will not, in my judgment, be able to complete the study on time with any less money.

Mr. FULTON. I would then be giving you, if we came up with that amount, \$410,000 as requested by you for your study group staff for the fiscal year 1970, but you would then have to cut back on the \$45,000 for travel and per diem expenses of the metric system study advisory panel, of which \$20,000 would be allocated for fiscal year 1970, and

you would then have to economize on other items in the National Bureau of Standards, and probably take out of the regular budget of the Department of Commerce the \$30,000 required in fiscal year 1970 under the total of \$129,000 for the technical assistance of divisions in the Bureau of Standards.

Likewise, you would have to make each department in the Government take their own share of the cost of these studies so you would then have to economize on the \$250,000 which you say at the bottom of page 10 of your statement would be used to assist in special studies conducted by other departments and agencies in the Government including Department of Defense.

Would you starve to death on a \$600,000 operation for this study fiscal year 1970?

Dr. ASTIN. I can't say that we would starve to death. I would say, however, again, that I don't think the Congress will get a report on time. We would probably have to come back for an extension on the 3-year time imposed by the law. I think that is a reasonable time scale, and it is important not to delay it.

Mr. FULTON. Well, you remember my amendment last year on the House floor cut out the whole \$2.5 million, and if I am trying to come to some moderate basis, possibly a barebones amount at this time in order to proceed, could we not compromise?

Dr. ASTIN. Well, it is my judgment, sir, that the \$710,000 appropriation that we have requested of the Congress represents the barebones approach to this problem. Any amount less than this will severely jeopardize our plans for the study to be finished on time.

Mr. FULTON. That is all the questions I have.

The CHAIRMAN. That concludes the hearing this morning. I want to thank you gentlemen for coming up and assisting us with your testimony.

The committee is adjourned.

(Whereupon, at 11:55 a.m., the committee was adjourned to await the call of the chair.)



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