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THE FUNCTIONS OF THE BUREAU OF STANDARDS.

Lecture

by

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INTRODUCTORY REMARKS - COLONEL I.J. CARR, S.C.

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Gentlemen:

We have just finished, as you know, the problem of "Specifications". We attempted in that problem to find out how the theory of standardization is intimately connected with our work and particularly how our production was held up during the last war by our failure to recognize standard and commercial practices not only in drawing up our specifications for our war production, but also in the resultant severe inspection of those products on their completion and acceptance by the Government. We found in many cases that our schedule was thrown out by some freak specification or some severe standard that was unnecessary and which, therefore, failed in its entire purpose.

We have in the Government agencies around Washington a tremendous source of information and we have already touched on some of those. Dr. Burgess is the Director of the Bureau of Standards, a member of the American Engineering Standards Committee, and is also ex-officio chairman of the Federal Specification Board. It seems that he and his Department probably have more information that touches intimately with our work than any other Department or Bureau in the Government. He has very kindly consented to come down here this morning and give us an informal talk on the general work of the Bureau of Standards, the work of the American Engineering Standards Committee and the work of the Federal Specifications Board. Dr. Burgess.

FUNCTIONS OF THE BUREAU OF STANDARDS.

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Colonel Carr, and Gentlemen:

The introduction of the Assistant Commandant reminds me a bit of the people visiting the Bureau of Standards. They come out and say they have an hour to spend and would like to see the Bureau of Standards.

This morning I want to tell you about the Federal Specification Board; also I want to take time to mention one or two other activities of a standardization nature.

Standardization is a recognized activity in this country; it is about as old as the Bureau of Standards - it is just over twenty-five years of age. The Bureau of Standards was established in 1901, in the same year with the American Society for Testing Materials which is concerned, as you probably know, with the formulation of specifications for engineering materials. They had a Standards Committee two or three years previous to 1901, but the Association was not formed until that time. The Society has grown and done a great deal of work. The Book of Standards has several hundred pages setting forth their standards which are used rather considerably in industry.

It is also interesting to know that the setting up and recognition of the use of standards is coincident with the development of research in the field of materials. The German laboratories

were started two or three years before ours and were working on the properties of materials and development of the instruments industry. I may say that the development of the industry, both in Germany and this country, has been largely facilitated by the facilities offered by the laboratories. The instrument field, of course, has a special field of its own and influences very highly developed technical types of apparatus in the electrical, optical, and other fields. There has been perhaps less standardization in the instrument field than one would expect. Nevertheless, it has seen a remarkable development.

I want to emphasize the fact that standardization and research go hand-in-hand. The first thing you are up against when you start writing your specifications for practically everything in the material field is that you immediately find you do not know what you want.

You may want to set limits for sulphur and phosphorous, for example, and are embarrassed by the fact that you do not have a sufficient scientific basis on one hand and technical information on the other. I might illustrate that by saying, for example, we have a Joint Committee on Limitations of Sulphur and Phosphorus in Steel, which is the result of a combination of research and standardization. In the past year the question of sulphur particularly became very acute and the specifications were arbitrarily raised. There was then set up a committee to determine experimentally from tests in laboratories the material manufactured in

commercial and industrial arts and to test the various grades of steel with varying carbon content to find out just what should be in the specifications of those various grades of steel, as well as the limitations of sulphur and phosphorus. The work on sulphur has been going on for about five years and we have already published a considerable amount of data and will practically finish within the next year or so.

That has been a rather expensive and laborious operation, the expense being borne by the parties doing the work. The steel is manufactured in the commercial plants and the testing work is being done in the laboratories in Annapolis and Watertown. I may say the amount of work done there has been stupendous in quantity. It has also been a beautiful illustration of how two independent laboratories check favorably on work of this kind. That has been done and is one of the satisfactory out comes of this particular undertaking. Take the railroads, for example. They are in a position of not daring to raise the limits of sulphur in certain types of steel or phosphorus, as the case may be, for the reason that tradition has limited them in the past and if they raised these limits arbitrarily and had a accident they are subject to indictment for manslaughter. Of course the same thing is also true from the government purchase point of view.

The problem is partly a metallurgical one and everyone in the country is really interested in the amount of sulphur required in steel because the cost goes up as sulphur is decreased. I simply

cited sulphur-phosphorus work as an illustration of a combination of research and standardization or research leading to standardization.

Now a word regarding the Engineering Standards Committee. They issue a Yearbook which is readily obtainable from the Committee Headquarters. That Committee is the outgrowth of feeling on the part of the major engineering societies of the country, that is the mechanical engineers, mining engineers, electrical engineers, and the American Society for Testing Materials. The government came in some three years ago, first through the Departments of War, Navy and Commerce. Other Departments have been taken in since, particularly the Departments of Labor, Agriculture and Interior. From the fact that the Engineering Standards Committee was founded at a relatively late date, they find themselves with a considerable number of active standardization bodies in the country. The American Society for Testing Materials I have already mentioned. The Mechanical Engineers also have a considerable standardization activity. The American Society for Automotive Engineers is outstanding in their own field. The desire in setting up this Standard Committee is that it be not a standards making body but a standard approving body. Possibly for that reason, combined with others, the work has gone slowly. Also the procedure is rather cumbersome.

The procedure as set up is as follows: Each society belonging to the Committee has three representatives. The Government

contributes through the War, Navy and Commerce Departments in services of one kind and another. There have been added to the Standards Committee a considerable number of other national organizations and the tendency at the present time is to recognize more effectively than heretofore the trade associations. There are really two periods in this standardization movement in the country at the present time. The movement was inaugurated by the Government societies or Government laboratories and carried by them for some ten years or so and then the formulation of the trade associations occupying themselves with trade contracts and particularly with cutting costs and simplification in every product and standards of product. This second movement is right now in its upward swing and very active indeed.

The procedure under the Engineering Standards Committee is as follows: Each of the organizations represented sits on the committee. A project may be suggested for standardization and the scope of the project is agreed upon. That is then brought to the Standardization Committee with a recommendation for some one or more of the interested parties, I mean associations in this case, to be named as sponsor or sponsors. The preference is usually to have a single sponsor. The duty of the sponsor is to keep the project going and he also has veto on work under way.

A Sectional Committee is formed, on which I represent all those parties who should be so represented. There is a third set-up of the committee which is to frame the standards. When the

committee gets to work and dependent on the state of art on the one hand and the nature of the subject on the other, and the inertia of men to work on committees, it will take six months to a year for the committee to bring in a report which it does through the sponsor in the form of a specification of standard, agreed upon, if possible, unanimously. That is then presented to the Standards Committee for approval and is sent around to the members of the Standards Committee. The committee then votes on the approval of the standards.

The Standards Committee takes particular pains to see that all interested parties have been represented, that they have all had a say, and requires a ninety percent vote to adopt the standard. That procedure is rather long and cumbersome in practice but most effective in the work - not on commodity standards but on standards relating to electrical commodities, safety commodities, etc. The actual product of the Standards Committee to date has been ninety-one (91) of the standards approved, of which only twenty (20) are commodity standards, forty (40) goes to various kinds and thirty-one (31) relatings to test methods and technique. The Standards Committee, however, in spite of what may be considered its small production, has nevertheless been a very effective agency in the country in educating the public on the subject of standardization. I think perhaps that educational work has been its greatest asset and greatest accomplishment.

It is a peculiar situation that the component societies making up the membership of the committee are represented after

putting forward their own standards for approval.

There are many important societies who are members and yet do not submit any standards or practically none to the Standards Committee for approval. In other words, there is a tendency to go it alone. I think that will probably be overcome in time and also there will be a revision of the standards procedure to make it more effective and speedy. There is also another phase which the Committee is not yet ready to handle, namely, the effective cooperation with trade associations. The men making up the membership are technical men not responsible for production and the result is that the American standards of the Standardization Committee have not been sold to industry. I may also mention that there is another organization concerned with standards on a wide scale, namely, the International Electro Technical Commission, which is concerned with electrical standards.

Right now the question of international standardization is up in a rather acute form and how it shall be handled in this country is, so to speak, a very live question on the docket at present. The International Technical Commission feels that its organization should be extended and adapted to handle international problems and feels that it should be recognized in international fields. I may say in regard to the claim of the American Engineering Standards Committee for further recognition that coincident almost and following the formation of the Engineering Standards Committee, have been the organization of other national

standardization bodies. The British have a very strong engineering standards association and when you speak of a British standard you mean just one thing - whether in Africa or Great Britian. They have unified standards, particularly for export service. International standardization has a field on this side of the water due to the fact that we are trying to bring together the requirements of the Latin American countries on the standardization program. There was a meeting in Lima last year and one to be held in this country this Fall on the subject. It is a problem which, to the point of view of business, is probably of great importance. Of course they produce mainly raw materials and we send to them mainly manufactured materials. Nevertheless it is highly desirable that those two groups of commodities be standardized from the point of view of commerce and trade and when they speak of American standards and United States standards they will have something definite to go by and we will have something definite to go by also. This will probably proceed very slowly, however. By and large, the international problem is only about ten percent of the problem in this country.

We had a very interesting meeting in New York the other day in which the subject was discussed from the point of view of a national program of standardization. I anticipate there will be a conference here in Washington within the next few weeks, to see if order cannot be brought out of the chaos now existing in the standards procedure in this country in the adoption of unified standards.

There are now twenty-seven thousand (27,000) specifications actually in existence in this country, covering seventeen hundred (1,700) commodities. There are actually in this country today two hundred (200) or more standardization agencies at work, each giving out its own standards. The Department of Commerce is also trying to do what it can in simplifying standardization.

It seemed to Mr. Hoover that the fact that the Simplified Practice Division had been so successful in aiding industry to limit its varieties of manufacture made it evident that the time was ripe for applying the same principle to specifications. It is our hope that if now is the time it will be possible, following the conference which I told you we expect to hold, to make a start toward cutting down the enormous number of unnecessary specifications which are now rampant throughout the country.

Next I wish to speak of the Federal Specifications Board. The Government itself was no exception to the rule of a diversity of specifications for a single commodity. Each purchasing office of the Government, up to the establishment of the Federal Specifications Board, was a law unto itself for the setting up of specifications. Sometimes there was no adequate help for writing specifications and the result was that the manufacturers of the country might get in one day twenty-five (25) or thirty (30) requests for a given commodity to be manufactured under twenty-five (25) different specifications. They might overlap in certain particulars but were different. The attitude of the average manu-

facturer toward government business was anything but healthy. The Federal Specifications Board was set up under the Bureau of the Budget in 1921, with the Director of the Bureau of Standards ex-officio chairman and each department and separate establishment had a representative on the Board. The large departments made up the working committee and some of the smaller establishments did not sit in the actual executive committee at all. The executive committee was the working body of the Board and was composed of fifteen (15) men. We laid down the principle that the specifications of material strictly for military purposes (I do not mean purchases by military departments, but guns, gun mounts, etc., purchased specifically for military purposes) would not be handled by the Board except as asked by the military departments to so handle. The procedure of the Board is to set up committees covering the various classes of materials that the government purchases. I might add that the Government has the largest business of the country as it has a purchase requirement of about one quarter of a billion dollars a year and has a dominating position in the market; its specifications are biased specifications. Nevertheless we laid down two rules. First, that the specifications promulgated should be satisfactory not only to the Government but also be commercial from the manufacturer's point of view. In other words, the Government was not in the business of buying at special rates when it could buy at current rates. To use one example, if structural steel is satisfactory as being sold under American Society for Testing Materials' specifications, the duty

of the Committee on Metals is to take that specification, if satisfactory to the Government, and adopt it. In other words we are laying down as few specifications as possible, taking specifications where we can and where they are recognized as satisfactory. Of course it is an interesting fact that men getting together in the same room, men from the various departments of the government,,and working on a unified program, was a new thing in Government practice. It has, however, worked out very well.

(Stenographic notes incomplete for the remainder of the lecture, due to sudden change of personnel).