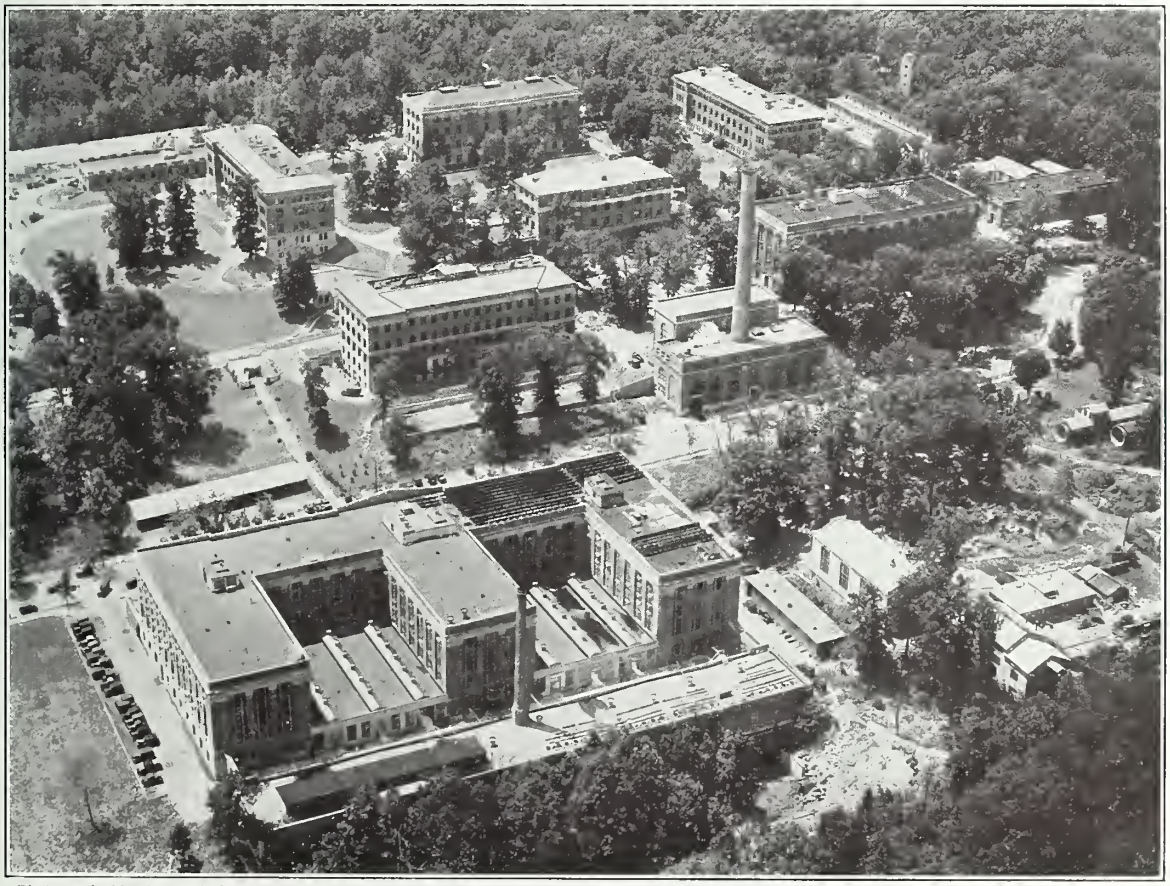
COMMERCIAL STANDARDS MONTHLY

A Review of Progress in Commercial Standardization and Simplification



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AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS (LOOKING SOUTH)

ISSUED BY THE BUREAU OF STANDARDS OF THE UNITED STATES DEPARTMENT OF COMMERCE, WASHINGTON, D. C., U. S. A.

Vol. 8, No. 7 JANUARY, 1932

U. S. DEPARTMENT OF COMMERCE
R. P. LAMONT, Secretary

BUREAU OF STANDARDS
GEORGE K. BURGESS, Director

COMMERCIAL STANDARDS MONTHLY, S. F. Tillman, Editor

The Commercial Standardization Group

DIVISION OF SIMPLIFIED PRACTICE

Edwin W. Ely

The division of simplified practice cooperates with industrial and commercial groups to reduce waste, usually through eliminating unnecessary variety of product, method, or practice. Its function is to bring together all parties interested in a project of this character, and to coordinate their work in developing a simplified practice recommendation. Such work includes surveys of current practice, formulation of a simplified practice program, and presentation of that program for action by a general conference representing all interests. The division then transmits to all concerned a full report of the general conference, with a request for written acceptance of the action taken. When the volume of acceptances is sufficient to indicate initial success, the Department of Commerce indorses the program and publishes the recommendation. The division thereafter cooperates with a standing committee appointed by the industry concerned, in conducting periodic surveys to determine the degree of adherence, to maintain and extend support of the recommendation, and to secure data for reaffirmation or revision. Simplified practice may be applied to any commodity or activity in which it will reduce waste. The division stands ready to render service in developing and making effective any application of simplified practice which will reduce waste, stabilize business, or extend commerce.

STANDARDIZATION
..IS..
A CONTINUING PROCESS
ITS AIM IS NOT FIXITY OR STAGNATION
..BUT..
TO ADD SERVICEABILITY AS OFTEN AS THE POTENTIAL GAIN MAKES IT WORTH WHILE

BUILDING AND HOUSING DIVISION

J. S. Taylor

The division of building and housing, formed in 1921, cooperates with business, technical, and professional groups in furthering construction activities. It works to modernize building codes and to encourage improved standards for the quality of building construction, and the practical application of the latest development in design and use of building materials.

It encourages home ownership through the development of an enlarged, steadier, more intelligent, and more discriminating demand for dwellings—the largest single class of buildings which the construction industries provide.

The division also cooperates with other governmental agencies and with many private business and professional groups in efforts to distribute building activity more evenly throughout the year and to secure less fluctuation from year to year.

The work on city planning and zoning has the broad objective of making buildings more useful through proper location with respect to other structures, stabilizing of land values and property uses, well coordinated thoroughfare systems, and well laid out public works.

DIVISION OF SPECIFICATIONS

A. S. McAllister

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. It ascertains the Standardization and specifications promoting activities of the associations and societies, and brings to their attention the work being done by the commercial standardization group. It brings the Federal specifications and commercial standards to the attention of the maximum number of producers and users of commodities complying with these standards and specifications. It compiles and distributes lists of sources of supply of materials guaranteed to comply with the standards and specifications. It shows both buyers and sellers the benefits from handling nationally specified, certified, and labeled commodities. The division prepares directories of governmental and nongovernmental testing laboratories and the Directory of Specifications, and is working on an encyclopedia of specifications, the first two volumes of which have been issued, namely, "Standards and Specifications in the Wood-Using Industries" and "Standards and Specifications for Nonmetallic Minerals and their Products." It also aids in preparing the Standards Yearbook.

DIVISION OF TRADE STANDARDS

I. J. Fairchild

The division of trade standards, on request, assists industrial and commercial groups in the voluntary establishment of standards covering grades, quality, dimensional interchangeability, or other acceptance criteria as a national basis for marketing manufactured commodities.

The detail criteria are selected or determined voluntarily by interested buyers or sellers, without any Government dictation or domination, and adjusted at a general conference of producers, distributors, and users so as to represent the composite views of all branches. The division functions chiefly as a neutral agency to see that all interested elements are given full opportunity to be heard and satisfied; to solicit and record acceptances; and to publish and promulgate the standard when a satisfactory majority of acceptances is obtained and provided there is no active opposition.

Industries are encouraged to apply self-certifying labels to products meeting the commercial standard requirements, as a means of protecting the consumer and the scrupulous seller from misrepresentation or unfair methods of marketing.

Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard in order that it may be kept constantly compatible with progress in the industry.

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SUBJECT ANALYSIS

AN INVITATION TO VISIT THE BUREAU OF STANDARDS

A cordial invitation is extended to all interested in scientific progress to visit the laboratories of the Bureau of Standards when in Washington. A personally conducted trip is organized at 2.15 p. m. daily except on holidays. Special trips for groups may be arranged at other times by writing to the bureau in advance. The bureau's illustrated Visitor's Manual may be had for the asking. This lists the work in progress and gives an airplane view of the ensemble and a brief statement of typical discoveries and inventions which have been notable, basis contributions to radio, aviation, and other modern arts and industries.

Many Groups Seek Aid in Untangling Conflicting Terms, Grades, Ratings, and Test Methods

THE rapid introduction of new materials, processes, and inventions has been accompanied by an increasing realization of the need for a better understanding between buyer and seller.

This is true not only when the buyer is the final user, but even more so, perhaps, when he purchases materials for remanufacture or for resale. The buyers and sellers want to know about commodities covered by their transactions: (1) The real significance of the terms employed to describe each commodity, (2) definitions or specifications for the various grades or ratings, (3) recognized methods of tests, (4) dimensional standards and tolerances to provide interchangeability or to prevent skimping, and (5) any other criteria for use by the consumer as a guide to acceptance or rejection of the commodity.

Industries are frequently confronted by a situation brought upon them by short-sighted manufacturers who produce inferior merchandise to sell at a low price. While this price may be lower than that required to purchase the standard quality, it is frequently high in relation to value. Dissatisfaction in the use of this inferior merchandise brings discredit to the whole industry and users are driven from the product in question to another competing product in spite of all the leaders of the industry may do to restore public confidence in their goods. Forward-looking groups of producers have therefore found it advisable to cooperate in the formulation and promulgation of specifications and methods of test sponsored by the industry as a whole as a basis for marketing.

Homemade specifications, used by an increasing number of contract buyers in an attempt to control quality, complicate the marketing situation. Manufacturers are forced to produce a multiplicity of varieties of their products to meet the whims of specification writers who may have no real knowledge of the commodity; mass production is interfered with.

The task of untangling the maze of conflicting terms, grades, ratings, test methods, arriving at a generally acceptable understanding thereof, and "putting it over" with the buying public, seems colossal to the manufacturers and beyond the range of possibility by means at their immediate disposal.

So it is but natural that many groups have sought the aid of the Bureau of Standards for this purpose.

PRESIDENT'S CONFERENCE ON HOME BUILDING AND HOME OWNERSHIP

Results and Objects as Summarized by Dr. Ray Lyman Wilbur, Secretary of the Interior, Cochairman of the Conference, on the Evening of December 4, 1931

By Dr. Ray Lyman Wilbur, *Secretary of the Interior. Cochairman of the President's Conference on Home Building and Home Ownership*

For the first time in the history of America, representatives of each of the many professional and commercial groups interested in one way or another in home building and home ownership, or any of the other aspects of the problems of housing and homemaking, have assembled to pool their wisdom and work out cooperatively their best suggestions for the solution of the problems which they face in common. Many of the 31 committees of the President's Conference on Home Building and Home Ownership have worked for a half year or more to arrive at the recommendations which they so carefully prepared and laid before the conference for discussion. Through our common deliberations on these problems, the solution of which is so urgent for the protection and development of American citizenship, certain fundamentals stand out which may properly be presented as the findings of the conference. These are outlined below.

1. *Each city and community should have a master plan.*—Since our contemporary problems have so largely grown out of lack of foresight and of proper regard for the public interest, the necessity of judicious and well-conceived planning of cities and of their outlying areas throughout the metropolitan region is indicated as a first essential for the correction of old evils and the prevention of new. Such planning involves a thorough understanding of human needs and of the nature of the public interests involved. It requires a knowledge of trends in urban developments and a vision of a city which will be a source of inspiration and pride to its citizens as well as an efficient center for interests of commercial, industrial, or civic nature. The layout of streets, blocks, lots, utilities, transit systems, parkways, playgrounds, and centers for business, industry, or civic affairs should be conceived in such a way as to render homes accessible to places of work or recreation on the one hand while protecting them from the confusion and bustle of industry and the dangers of through traffic on the other. Careful attention to planning and the layout of new subdivisions will make possible the most desirable type of setting and approach for each home and will at the same time make reasonable the charges for land, utilities, and other services which under haphazard development may prove too heavy for the home owner of modest means.

2. *Each city should be zoned.*—By zoning of new areas and the rezoning where necessary of old, it is possible to protect homes from undesirable neighbors and land values from instability. Areas for industry and commerce as well as for residence should be carefully delineated, but in a way which will make the neighborhood store accessible for service but not a neighborhood nuisance.

The free standing dwelling can be protected from the invasion of the multifamily dwelling or apartment house and the charm and integrity of each neighborhood unit may be preserved. Carefully drawn provisions for setback of homes and definite requirements of specific and adequate reservations of land about each dwelling may preserve a beauty in residential neighborhoods which otherwise would be lost under conditions of unwise and reckless land subdivision.

3. *All new homes, irrespective of the income of the family, can and should be of good design and sound construction.*—The further construction of flimsy houses of an uninteresting or even ugly design is not necessary. Beauty is not a veneer to be applied at added cost but lies rather in the lines of a house, its proportions, the relations of its parts one to another and of the whole to its setting. A one-room log cabin may be a thing of beauty. Professional pride and responsibility on the part of architects and carefully drawn programs to elicit by joint counsel the cooperation of contractors and builders, the manufacturers and distributors of material, the realtor and subdivider, may produce a radical change in the quality of the small home that is the result of mass production, while careful programs for the education of the taste of the home buyer may create an intelligent demand for good design and workmanship on the part of the home buyer. It is demonstrable that quality pays, both by endearing the home to the family and by the enhancement of property and community values.

4. *Soundly built homes can and should be rendered available to all home buyers.*—Through the use of proper materials and processes and through mass production, and stabilized, year-round construction, better homes may be produced at less cost than is at present paid for homes that rapidly deteriorate. The development of pride in workmanship and of high standards on the part of producers of materials and builders of homes can bring good new housing within the reach of a much larger buying public than is at present served and will at the same time serve all customers better.

5. *Home ownership should be a possibility at some time in the life of every thrifty family.*—The stability and safety of the Nation require the well-advised development of individually owned homes. The first necessity for the promotion of well-advised home ownership is a system of home financing, adequate in amount and operated in the public interest so as to permit thrifty people to secure for themselves such a home. It should be possible for every thrifty and honest family at the proper time, not only to own its home, but also to secure disinterested and competent advice on all matters relating to such ownership. Home information centers accessible to families in need of such advice and wise in their counsel are therefore desirable.

6. *An adequate system of credit for the financing of homes should be established.*—Any thrifty family in

city or country should be able to borrow money at a reasonable rate of interest with a reasonably long period of amortization under adequate protection from unreasonable foreclosure. The system for the financing of homes should be so organized that the interests of the home purchaser, the lender, and the general public will all be amply protected. Some device for the better mobilization of home financing credit and to render it more fluid, for the protection of lending institutions in times of depression, and to further facilitate sound home ownership at all times is clearly needed.

7. *Old homes should be brought up to standard.*—Since the majority of families are now living in old houses far from convenient or comfortable in their planning or equipment, and far from modern in their sanitation, it is necessary that such advice and skilled service should be available as to make it possible for each family to discover what should be the next steps in the improvement of its own home and the most efficient ways of going about its repair or extensive remodeling and modernizing. Since incomes limit the amount that may be expended on home improvement it should be borne in mind that no excuse lies therein for inaction. Landlords can be helped to see their responsibility and can contribute greatly to the quality of homes at relatively slight expenditure. Home owners and tenants whose incomes are small may still make improvements by their own personal labor during such moments as they may find free for this type of work and bit by bit bring about changes that rid the home, one by one, of its inconveniences and sources of irritation, and render it a wholesome and attractive environment and a source of family interest and pride.

8. *Slums and blighted areas should be eliminated.*—Since public neglect and a variety of other causes have produced blighted areas and slums in our cities which have become an economic liability and where conditions of living have become a social menace, the need is clearly indicated for measures which go beyond the home dweller to the community and which may involve complete demolition in case reconditioning of individual dwellings should not prove feasible. Unless this problem can be met by private enterprise there should be public participation at least to the extent of the exercise of the power of eminent domain. If the interest of business groups can not be aroused to the point where they will work out a satisfactory solution of the problem through adequate measures for equity financing and large-scale operations, a further exercise of some form of governmental powers may be necessary in order to prevent these slums from resulting in serious detriment to the health and character of our citizens.

9. *Industry so far as practical should be decentralized.*—A basic evil in bad housing is land overcrowding. One of the most fundamental ways of reaching this problem is through broad policies for the decentralization of industry with provision for the rehousing of industrial laborers' families in the new industrial communities in individual private dwellings.

To accomplish this it is necessary to distinguish among the many industries and businesses those for which such relocation is most desirable and to see that those factors which now block such decentralization are brought properly under control. This may involve special study on the freight rate structure and special measures to eliminate the factors which now penalize desirable movement of industry.

But in new industrial villages as well as in new residential subdivisions special pains must be taken to prevent the repetition of the mistakes of the past. The relation of industrial and commercial districts to those that are residential needs most careful planning and so also does the layout of streets, blocks, and lots to facilitate the building of free-standing homes with ample and protected setting properly served by public utilities, and all this at a total cost within the reach of the industrial worker.

10. *Well-advised large-scale housing operations should be facilitated.*—In view of the economies which should be available to each dwelling unit in large-scale operations needless obstructions in the form of restrictive legislation, inappropriate taxation and difficulties in securing adequate financial underwriting should receive such attention by business groups and public agencies as will remove all needless handicaps upon the provision of good housing through mass production for the lower-income groups. It should be wholly possible to do this in a manner which will protect all public interests involved and at the same time release financial resources, business acumen, and social vision for housing operations of a type and quality that will attract sound, conservative investment into this field in which the human needs are so great. To this end the leading business groups of our cities making use of the best available advice and collective experience can make a contribution vastly greater than that which now characterizes business efforts in the field of housing for the lower-income groups.

11. *Homes should be freed from excessive burdens of taxation.*—Existing practices in the assessment of real property and in the levying of taxes upon dwellings, especially those of the single family house type, have resulted in such heavy and inequitable burdens that home ownership has been discouraged. The need is apparent for methods of assessment which will not penalize the small home owner in comparison with the apartment dweller or the business or industrial plant, and for forms of taxation which will not penalize or discourage improvement in homes already built. A program based upon thorough study of this subject is indicated as desirable in the large majority of our cities and States, as well as in rural districts, and alternative methods of raising public revenue should in each instance be considered with reference to their relative equity and their merit from the fiscal point of view.

12. *Beauty as well as utility should be made available within the home and in its surroundings.*—Furniture of good design and of sturdy, durable construction can be made available at prices not greater than are now paid for the ugly and flimsy furniture at present so widely sold. To solve the problem of making good furniture accessible to families of modest income there will be needed cooperation on the part of the various professional, manufacturing, and trade groups involved. They have an opportunity out of their professional knowledge, experience and resources to make a contribution which will have a marked effect upon the lives and happiness of millions of families.

Similarly the professions and trades involved in the landscape planning and planting of home yards and gardens and in the provision of the accessories for children's play have an opportunity through cooperative study and action to bring charm in residential neighborhoods and the joys of outdoor living within the reach of all families irrespective of their income.

13. *The conveniences, protection, and opportunities enjoyed by city dwellers should be rendered available as rapidly as possible to the residents of rural districts.*—Needless drudgery due to imperfect and inadequate equipment or to serious lack of equipment is found in the homes of millions of rural families. Though richly endowed in natural setting, the farm home may fail to enjoy some or all of the facilities which modern science and invention have brought within the reach of urban populations. Ignorance, imperfect trade organization, low incomes, and many other factors may contribute individually or collectively to this end. Systematic educational programs, universal provision of home demonstration services, general cooperation of civic leaders in rural communities in better-homes demonstrations, increase of facilities for extension training and demonstration of equipment and utilities appropriate to the rural home, and the cooperation of trade organizations and power companies and of public departments can be made rapidly to overcome these deficiencies and bring convenience, comfort, and safety within the reach of ever-expanding circles of rural life.

14. *Work centers for household operations should be efficiently planned and equipped.*—Needless fatigue and waste motion and restricted leisure are the result of haphazard or inappropriate planning and equipment of the work centers of the home. The cooperation of home economists, architects, and engineers is essential for more efficient planning which may result in the elimination of needless burdens. Better organization of household activities requires study and help from competent centers of advice and experimentation. The objectives of home and family life must be considered at every step in the process so that there will be a maximum opportunity for the fulfillment of interests and well-rounded development of each member of the household.

15. *There is need of better framed and better enforced legislation with regard to all types of housing for the protection of the home and the community.*—The present laws are often hampering to new types of construction. States and cities profit little by one another's experience. The effects of existing legislation and enforcement have been inadequately studied. Greater uniformity, once adequate standards and objectives for legislation have been devised, would be desirable with due reference to local adaptations where necessary. The factors which interfere with effective enforcement of well-framed legislation need constant study which should lead to constructive cooperation by the public's representatives with the officials charged with the enforcement of the law. No law is self-enforcing, and it is only through the exercise of the rights of citizenship that the most desirable types of administration can be achieved. Although a large part of the problem of housing is to be met by study and education, high minimum standards can be achieved only by legislation that is based upon scientific study free from inequities and discrimination and administered with a view to eliminating those evil factors in the home environment which may interfere in any way with individual development.

16. *The need of development of further research, information service, and public education.*—Experienced leaders in each field have pointed to the need of further study of the problems with which they were concerned. The best programs are based on adequate and accurate knowledge, which still is often not to be had. Much waste of time, energy, and resources can be avoided by the establishment of a well-endowed central agency for the correlation of past and present researches and the initiation of studies in those fields which are most fundamental to wise policy. Such a center might serve also for the dissemination of the findings of research and accurate information to individuals or agencies which seek it, and through it, or in cooperation with it, should be developed well thought out measures for public education in all branches of this subject.

Local home information centers, schools and colleges, and civic agencies for the improvement of homes should be able to secure from such an agency the help and advice which are necessary in the furtherance of their programs. The findings of laboratories working upon problems of fundamental equipment, utilities, construction, and more especially on tests of new inventions, processes, and technological developments, should through it be rendered available to those who should make use of them without needless lapse of time. By this means progress in the development of sound knowledge in the field of housing would be rendered much more rapid, and through the dissemination of such findings we would get rid of the present lag between discovery and availability for use.

17. *The promotion of home ownership and better homes in the prerogative of all civic leaders and of citizens.*—The interest and cooperation of public departments, business men, commercial and industrial organizations, professional and civic groups, should be available in the planning of well-judged measures and policies to remove influences that interfere with the universal provision of desirable conditions of housing and to provide as rapidly as possible for desirable conditions of living for all families irrespective of income, race, occupation, or other factors.

The conference opened up a number of questions of vital importance to the welfare of our Nation. The contributions from the various committees have been outstanding. The work of the conference has by no means been completed; in fact it is just well started. It is planned to have a continuation committee appointed which will not only further summarize the results of the conference, but will bring the reports of the committees and the findings to public attention in all parts of the country. It is hoped that in about a year, a second conference can be held. Some of the most important problems of housing associated with the slums and blighted areas of our cities need technical and financial solution. The promising reports that were placed before this conference indicate the probability of unusually satisfactory results if new conceptions and new methods can be put into practical application.

In Porto Rico cooperative efforts for the building of homes have been unusually successful when combined with small tracts of land for cultivation. Simi-

lar experiments need to be tried in various parts of the country.

Broadly speaking, proper housing is vital to wholesome living. Upon wholesome living depends the success of our democracy. Health, happiness, and good citizenship are furthered by proper housing. Unhappiness, delinquency, and crime are furthered by bad housing. We have still to determine the effect of our methods of housing upon our primary biological needs, but we can be sure that we can not change materially the essentials of human habitation without reacting biologically. We can learn from the birds. The shiftless, careless robins who pick poor places for their nests, who build poor nests, raise but few young who become full-fledged successful robins. We are endeavoring within a few decades to remold the mass through individual changes brought to us in an almost overwhelming manner by science and invention.

No matter how greatly our mobility has increased, our human needs for home with its joys and comforts and children remain unchanged. While electricity, the telephone, and the radio, and perhaps now television, bring the homes closer in contact with the world, they make it all the more important psychologically and physiologically to have a place of retreat and comfort that we can call "Home, sweet home."

AMERICAN STANDARDS ASSOCIATION

News of Associational Activities During Month of December

Current developments of the following standardization projects under the auspices and procedures of the American Standards Association have been furnished by that association:

Methods for screen testing of ores.—The final draft of the proposed standard on methods for screen testing of ores has been approved by the Milling Committee of the American Institute of Mining and Metallurgical Engineers, which has had charge of the preparation of the standard. The institute is proprietary sponsor for the project. It is expected that the standard will be presented to the institute in the near future for indorsement and transmission to the American Standards Association for approval.

Coal-mine tracks, signals, and switches.—Revision of this standard is going forward under the direction of several subcommittees, notably that on frogs and turnouts for coal-mine tracks, and that on wood mine ties. Plans for standardizing and simplifying frogs and turnouts for coal-mine tracks for both gathering and main-line haulage purposes have been discussed and specifications for certain details have already been prepared; these will shortly be published for general circulation and criticism.

Classification of coal.—A study of this subject, covering scientific classification, use classification, and marketing practice, is now going forward through subcommittees of the sectional committee. The studies undertaken include investigations to determine the adaptability of different coals to various uses, to study the occurrence of North American coals and their composition and origin, and to consider suggested systems of classification.

At the last meeting of the committee, held in Pittsburgh on November 10, the technical committee on use classification reported that several papers covering coal used in the cement, ceramics, and metallurgical industries have been completed. The committee also reported progress on studies of coal for domestic fuels. At the same meeting the technical committee on scientific classification presented a progress report covering studies of graphical presentation of data which may serve as a basis for classification of coals. A comprehensive study of all existing systems for classifying coals has been completed and a scheme has been worked out for comparing the position of the various coals in these systems by means of the Rose multibasic coal chart.

Reports and papers have already been published by the sectional committee and its subcommittees covering the nature, mode, and occurrence of coals; classification systems; physical and chemical characteristics; coal for gas and coke production; marketing practices in different sections of the country; railroad fuel; and coal for metallurgical purposes.

The project on classification of coals was inaugurated upon the request of the Coal Mining Institute of America, and the American Society for Testing Materials is sponsor for the project.

Mine timbering.—The organization of subcommittees of the sectional committee to develop timber specifications and recommendations for mine-timbering practice is now under way. Reports of these subcommittees will serve as a basis for the formulation of standards.

Although difficulties have been encountered in the organization of the sectional committee on mine timbering, a program outlining the project has been prepared. The earlier program has been revised and it is now proposed to handle the problem of mine timbering from a geographical as well as a subject standpoint. Several months ago a draft covering preservative treatment of mine timber was completed and was circulated for comment and criticism. Action on the draft has been held up, however, pending the complete organization of the sectional committee.

Safety rules for installing and using electrical equipment in metal mines.—The circulation to the sectional committee in charge of this project, of changes suggested in the third draft proposed for this standard has resulted in favorable comments from several members of the committee. A digest of these proposed changes was considered by the sectional committee at a meeting held in Washington on December 4. The draft of the standard is now considered practically complete, and letter ballot of the sectional committee will be taken shortly on the changes recently made, to supplement a previous letter ballot on the document.

TESTING OF MATERIALS

To Determine Value of a Material for a Given Purpose, Its Properties Must Be Measured

By Henry D. Hubbard, *Bureau of Standards*

To determine the value of any material for a given purpose, its properties must be measured, assuming of course that the properties upon which its use depends are known and are measurable. Again, these properties may have limiting values which must be regarded or the material may prove worthless, costly, or even harmful for the purpose intended. The testing of materials may prove a needless waste of time and money unless due consideration has been given to the nature of the tests to be applied, the conditions under which they are to be made, and the interpretation of results. It includes measurements of both quantity and quality. These may vary from a simple visual inspection to an investigation involving laboratory and technical work of the most difficult and precise nature.

The growing appreciation of the vast waste due to the use of defective materials and the misuse of good materials has raised the question of efficiency and made it the object of a searching inquiry in many different fields. In the industries, the solution of the problem has for its key the scientific testing of materials.

The Bureau of Standards circular (No. 45) entitled "The Testing of Materials" is now out of print. The introductory discussion of standards of quality and the measurement of quality are subjects of such interest that it is printed in full in this issue for the benefit of the readers of the Commercial Standards Monthly.

The testing of materials serves two important and distinct purposes; first, to ascertain whether or not they comply with specifications, and second, to add to the general fund of knowledge regarding them. When done with both objects in view it ceases to be of merely transient value for the immediate case in hand, important as this may be, but adds to the world's useful knowledge of the materials. Data accumulate rapidly in the regular work of the testing laboratory and when properly correlated will yield information of permanent value in the industries.

Classes of materials.—Materials may be classified in many different ways, for example: Chemically, physically, according to their technical applications, and likewise by any other aspect selected as a criterion. The fundamental classes of material, viewed chemically, are: (1) Elements which contain only similar atoms; for example, iron, mercury, hydrogen; (2) compounds, of which the molecule contains unlike atoms or groups of atoms, such as salts, water, or carbon dioxide; and (3) mixtures, such as coal, petroleum, or the atmosphere which contain unlike molecules. The physical classification into solids, liquids, and gases is technically important, since the methods of handling, measuring, weighing, and testing demanded by each are quite different.

Classification according to the use of the material is especially significant, since the testing of materials is primarily with a view to their efficient use. Special classes of materials grouped according to their use are, for example, electrical materials, refractories, lubricants, illuminants, colorants, abrasives, optical materials, and many others. There the materials within each group possess related properties useful for a specialized purpose. An important group, based upon use, is "structural materials," such as metals, stone, cement, brick, wood, protective coatings, paints, etc. Structural materials have for their practical function to maintain predetermined space relations of the parts of a structure under service conditions, or to protect a structure from the action of unfavorable agencies. Strength and rigidity usually characterize structural materials, since these qualities enable structures to resist deformation. In many cases rigidity alone would be detrimental, and here the material must be yielding under the combined stresses of high pressure and temperature.

Another group includes materials in which pliability or flexibility is a desirable quality. This class includes textiles, paper, rubber, leather, and similar materials. Here the practical function is to permit change of space relations of the parts of an article within desired ranges without rupture. For example, a leather shoe or a cloth garment should yield with bodily motion, a rubber tire should be resilient under shock, and paper flexible enough to be folded. Such materials, however, may be hardened where rigidity as well as elasticity is important. Thus paper may be made into car wheels, cloth into stiff collars, and hardened rubber into many articles in daily use.

Another group consists of materials which form the surface upon other materials by adhesion or absorption. These include, for example, protective coatings, such as metallic coatings and paints, of which ornament—usually incidental—is often the main purpose; inks, used to impress, design, or print upon paper and other materials; stains and dyes, which may incidentally penetrate the materials; oils and varnishes, which may serve to protect as well as beautify.

Many other groupings might be mentioned as examples, since the modes of classifying materials found in nature or in the industries are practically numberless. The varieties of their uses are equally limitless. The utility of materials depends upon the nature, magnitude, and stability of their properties. To determine these is the object of the testing of materials.

Properties of materials.—The properties of materials are displayed in their behavior under varied conditions and relations. Among primary properties may be cited extension, impenetrability, porosity, divisibility, cohesion, expansion, and adhesion. The properties of matter are, however, as numerous and varied as the relations or aspects of matter and energy. The modes of classifying these properties are again very numerous. Geometrical properties relate to form, size,

and spatial relations; physical properties may involve also mass, time, and energy; chemical properties, molecular structure and reactions, and so on. The groups of properties usually considered for any one application are, however, not numerous.

For a complete study of the properties of a material all of its properties would have to be studied through all ranges of conditions. Considerations of economy generally make such full tests impracticable, although the conviction is growing that the systematic study of the properties of materials would be a most effective means of technical progress.

The economic value of any given property depends upon its relative effect upon the net efficiency of the material for a given purpose. For some uses a property may be of great value, while for others the same property may make the material useless or even dangerous. The close correlation of property with use is, then, the main problem in the modern testing of materials.

Determination of the properties of materials.—An adequate measure of a given property is possible when (1) the property can be defined with sufficient exactness, (2) the material is of known composition or purity, (3) the attending conditions are standard or are known, (4) the experimental methods are theoretically correct, (5) the observations and their reductions are made with due care, and (6) the order of accuracy of the result is known.

This ideal is rarely if ever reached, but as it is striven for the results pass from the qualitative to the quantitative stage and are called "constants" because redeterminations will not yield sensibly different results. Approximate results are improved upon steadily as more precise instruments and methods are devised.

The degree of accuracy to be sought becomes a very practical matter in a testing laboratory. The time and labor involved in such tests increase out of proportion as the limits of attainable accuracy are approached. For the determination of physical constants or fundamental properties of materials the degree of accuracy sought may be the maximum possible. For example, a minute may suffice to determine the density of alcohol for commercial purposes by means of a hydrometer. Months, however, may be well spent in a precise determination of its density as a physical constant of great technical importance. In general, the degree of accuracy striven for should be that which is strictly good enough for the purpose in hand—whether the work be routine testing or scientific research. The selection of the degree of accuracy to be sought for in each case requires the experience and judgment of the specialist.

The measure of quality.—Quality in the sense here used is that which fits a material for a given use. A material is not simply good—it is good for a certain purpose, and the word quality is meaningless apart from the use in view. Good quality means good for a definite use. The test of the material is to determine how good for that use. This measure may be made directly by a service test, indirectly by a test under simulated service conditions, or still less directly by a laboratory test of separate properties upon which the quality is known or assumed to depend.

As the scientific method is applied to the study of materials, the quality is found to be not a vague characteristic which could only be judged by experienced users, but rather as the utility aspect of a material in terms of a property or group of properties, each of which is measurable. The variation in these constituent properties causes differences in quality. Personal opinion as to a quality may differ widely. Intelligent judgment, even, has no sure foundation until measured data are available with sufficient fullness to practically determine the conclusion. The personal factor is eliminated in direct ratio as a true measure of quality is developed. When this is complete, quality may be graded numerically as utility efficiency in terms of some ideal standard selected. The quality of coal is specified and measured for a given use whether for direct combustion or gas production by finding the net utility per pound for the purpose in view. The heat efficiency depends directly upon the combustible matter and is expressed in heat units per pound of fuel. Many qualities of materials are already placed more or less definitely upon such a measurable basis. The ultimate aim is to define all qualities in terms of units of measure.

It is also known that there is usually a certain magnitude for each property which is best for a given use and which may be ascertained by investigation or service experience. To obtain in practice this best magnitude of each pertinent property is the object of technical specifications. Such specifications usually fall short of the ideal owing to obvious limitations—economy of production, sources of materials, and other conditions which can not be ignored. These considerations necessitate the fixing of suitable limits for each property within which it may vary. The maximum and minimum to be set become the subject of experiment in order to assign limits of tolerance to restrict the properties within acceptable ranges. These correspond to the size limits allowed in making machine parts where such variation in size of each part as conduces to economy in manufacturing the machine without unduly impairing the efficiency of the assembled machine. In fixing these limits of tolerance for material, care must be exercised to avoid too narrow ranges on the one hand and too wide variations or poor quality on the other. These limits often involve safety and generally involve durability and efficiency.

Too much stress can not be laid upon the economic value of testing the quality of materials before their use. The integrity of steel used for rails is of great importance in the railroad and steel industries, and a study of the effects of slight additions of other metals or change in heat treatment or mode of making may be of great economic advantage to the railroads. On the other hand, the failure of a rail due to brittleness may involve more than merely the cost of a new rail. Serious accidents with great loss of life may be avoided if the properties which determine the reliability of the rail are known and if the rails are tested for such properties. The length of service of the rail could then be restricted by the limits of safety exactly as it is now restricted of necessity by the wearing down of the rail in service. In other words, a failure of material may in some cases merely require replacement and the expense for the new material—a loss which must not be ignored—but far more serious are those cases which involve human life or where the replacement is only a small part of the damage caused. Needless risk of life should not be incurred by the waiving of any essential requirement.

The time has passed when the strength of materials can be left to guesswork or even to intelligent opinion alone. With the rapid increase in the height of buildings, length of span for bridges, and speed of transportation, new problems in safety and efficiency arise. The measure of the quality of structural materials in advance of their use thus becomes a matter of supreme importance, for the safety of buildings, bridges, railroads, dams, car wheels, and similar constructions must not depend upon merely estimated strength and durability. They must be guaranteed by specification and test; for example, an engineer assumes a stated strength of the structural materials called for in his design. The testing laboratory, however, can test these materials by sample in advance of their use, and by means of the strain gage can determine the net strain of the structure during its construction and after erection or assembling. The strength of the material may be ample in certain cases, but through fault of construction or design undue strain may be introduced which leaves but slight margin for the working load. The steel in a locomotive driving tire may be amply strong, but if the fit on the wheel center is so snug as to require excessive heating to expand it sufficiently to go in place internal strains may be developed which may cause failure in service. Suitable tests during and after construction might be prescribed in building or inspection regulations and made part of the original specification in all cases. Under these circumstances the responsibility for failure of structures must rest with those who knowingly omit adequate tests where such are available.

Specifications or standards of quality.—While the testing of materials in the modern sense is now a most important factor in the industries, such testing is still in its initial stage with respect to the establishment of rigorous standards of quality. Standards of quality can be developed only by research with the aim of correlating the properties of the material with specific qualities or utilities which they determine. The relation of the properties of a material to its use, which is so apparent in the simpler cases, must be ascertained for the more complex cases if quality is to be measured or determined. The measure of quality has not yet attained the higher position of simpler kinds of measure, because material testing has been so largely limited to separate properties or to experimental trial under simulated service conditions.

A specification is in a sense a working standard of quality—at least for purchase and sale—and indicates the quality desired and the conditions needed to insure it. A specification is too often not a real standard of quality at all. It may be narrow and exclude efficient material or so loose as to admit material of poor quality. To specify a particular composition for a bearing metal might exclude even the best on the market, and to simply specify "Babbitt metal" may admit the poorest. A specification, too, may require tests which do not gage any desirable property and yet omit tests of vital importance; for example, a paint specification may limit the ratio of hydrate of lead to carbonate of lead and yet omit any test of optical covering power—a property of utmost importance. Defect may be due to lack of knowledge or, too often, to an effort merely to duplicate material once found satisfactory. This is done by prescribing a special brand and adding the words "or equal" or by minutely describing the properties of the acceptable brand. Both methods are used in place of specifying the use required of the material—a practical recourse where a definite standard is still impracticable.

Defective specifications, whether due to compromise of quality for economy or through lack of data, should be replaced by those in which the best magnitude of each property involved is so specified as to predetermine the definite quality best meeting the need. This is strictly analogous to specifying the dimensions of a bridge member. Each dimension called for in the design must be met by the part submitted. The quality specification should be just as definite to suit the conditions of use which it must meet. Each essential dimension, whether of size or quality, must be correct within certain limits or the article is unsatisfactory or useless for the purpose.

An ideal specification for material regards both economy and efficiency and does not ignore depreciation, replacement, repair, and service, which equally with the first cost enter into the net cost per unit of utility. For example, in judging rubber tires for automobiles a "tire-mile" might be viewed as a unit of utility. If the cost of the tires is reduced to the cost per "tire-mile," a comparison is then possible. If first cost alone governs, inefficiency is almost certain, whereas if economic quality is the criterion the ideal specification and the true standard of quality coincide. High cost may make the best material for a given purpose impracticable, but, as the lowest price is often associated with the poorest quality, a compromise may be necessary for economic reasons. It is as false economy, however, to require too good as too poor a quality; that is, the materials which are strictly "good enough" should compete for selection on the basis of net cost per unit of utility. Mature judgment is needed to decide the relative stress to be placed upon economy and upon efficiency, since one may be lost by undue emphasis upon the other.

Improvement of specifications.—The basis of specifications should be made the subject of constant study, and changes should be made as soon as new technical knowledge necessitates. In such work standardizing institutions, technical societies, individual investigators, and industrial laboratories cooperate, with the result that the ideal specification is becoming a truer standard of quality. As this result is gained and methods of test are perfected, the testing of materials becomes a real test of fitness. With the active cooperation of manufacturer, seller, user, and technical testing laboratory, the specification becomes a means of steady progress in the industry concerned, and combined with service experience facilitates the more efficient adaptation of materials to their uses. Service experience, viewed in the light of the laboratory test, must, however, be the criterion for judging the adequacy of the specifications themselves.

Ideal standards of quality in most cases are still impracticable through lack of data, and the practical step has been the tentative specification. The specification is designed to obtain the quality best suited to the case in hand, and usually reflects the status of knowledge upon the subject. To the extent that it embodies the results of experience, it is the best that can be done until rigorous standards of quality are developed. Inflexible specifications retard technical progress; but if allowed to advance apace with new technical knowledge, the specification becomes a distinct aid to such progress.

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THE DANISH STANDARDS COUNCIL

Brief Outline of the Standardization Work, as Carried Out in Denmark, Given by Secretary of Dansk Standardiseringsraad

By H. E. Glahn, *Secretary, Dansk Standardiseringsraad*

In Denmark the national organization for standardization is known as the Dansk Standardiseringsraad, or, as one would say in English, the Danish Standards Council. Its organization was preceded by four years of activity on the part of technical and trade associations in developing the need for standardization, and deciding the best manner in which such an organization could function. Fortified by facts, a petition for the creation of the Dansk Standardiseringsraad was presented by the Federation of Danish Industries and the Danish Engineering Association, to the Ministry for Trade and Industry, which was approved in January, 1926.

At the present time the council consists of 24 members appointed by the Ministry for Trade and Industry, of which number six represent Government departments, while the rest are representative of the technical, industrial, and trade bodies. The ministry appoints the secretary and the council appoints an engineer whose function is that of technical secretary and who has immediate charge of its activities.

The council is financed half by the Government and half by private industrial and technical associations. The members of the council and the committee serve without pay. In procedure, the proposed standards are developed by committees and subcommittees, and then published for criticism for two months. After this the standards are returned to the respective committee or subcommittee, for further study. Upon recommendation of the responsible committee the project may be adopted as a "Dansk Standard" by two-thirds vote of the council. So far the council has approved 93 standards and there are now 150 proposals in the hands of the various committees. The approved standards may be divided into the following groups or classification: General, mechanical engineering, electrical engineering, civil engineering, ferrous metallurgy, textile industry, agriculture, paper industry, and miscellaneous.

The proposals now in the hands of the committees include: Symbols for drawings (architective, mechanical, and electrotechnical drawings, and drawings for sanitary installations, railways and streets, building materials, and reinforced concrete); technical drawings (special rules for statement of dimensions and measurements on drawings of the country); stamp of original of the property in a drawing; tolerances for width across flats; threaded lengths of bolts with one and two nuts; threaded lengths of the short end of studs and minimum depths of threaded bottom holes; split pins, completed screws, and bolts; keys and shafts; heights of axes, shaft ends, and flange couplings; gas stop cocks; water cocks; gas-meter screws; Edison screw threads; tiles; steel and iron; oils for technical purposes; textiles for hospitals; rings for rollers; ploughs; paper sizes; and marks of correction.

In addition to its annual report, which contains the report of the proceedings of the council for the year, all standards approved by the council are published in various forms immediately upon being made available.

INTERNATIONAL STANDARDIZATION OF PETROLEUM TEST METHODS PLANNED

National standardizing bodies of 21 industrial countries have been invited to take part in efforts to attain greater uniformity in methods of testing petroleum products and lubricants under the auspices of the International Standards Association.

Invitations have been forwarded to the foreign standardizing agencies asking for the appointment of petroleum technologists as official representatives on an international committee to deal with the subject. The nomenclature of petroleum products will also be studied by the committee. The American Standards Association is doing the secretarial work in connection with the proposed international action.

The widespread commerce between nations in gasolines and lubricating and fuel oils has made the need for international uniformity in nomenclature and in methods of determining physical and chemical properties increasingly important during the last few years.

Invitations have been issued to these nations: Australia, Austria, Belgium, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Great Britain, Holland, Hungary, Italy, Japan, Norway, Poland, Rumania, Sweden, Switzerland, Union of Socialist Soviet Republics (Russia), and the United States of America.

Austria, France, Germany, Japan, Holland, Hungary, Switzerland, Russia, and United States, have already unofficially indicated a desire to participate in the work. The national standardizing bodies of most of these nations are, together with the American Standards Association, members of the International Standards Association, which has its headquarters at Basle, Switzerland.

Dr. R. P. Anderson, of the American Petroleum Institute, has been appointed as the American representative on the international committee. Doctor Anderson is also secretary of the American technical committee on nomenclature and methods of testing petroleum products and lubricants, which has been working on national standards under the auspices of the American Standards Association. The American Society for Testing Materials has been directing the technical work of the committee.

SIMPLIFIED PRACTICE IN CONTAINER FIELD

Great Need Exists for Simplification and Standardization of Containers

By R. L. Lockwood, *Bureau of Standards*

From 30 to 40 per cent of the freight handled in this country is of a character classified by the railroads as "merchandise," or "miscellaneous commodity freight." Practically 100 per cent of this vast quantity of goods must be packed in some form of container. In a normal year approximately 20,000,000 carloads, or about 500,000,000 tons, of this class of freight are carried on our railroads. A considerable additional quantity travels by water or highway. A survey of the whole field of physical distribution of such goods discloses the startling fact that there are only three nationally recognized standards of size, and even these do not apply directly to containers as ordinarily defined.

The first "standard" is that of the inside width of railway box cars, set at 102 inches by the American Railway Association. Even this standard is not universal, although it is a minimum for some 90 per cent of cars now in main line freight service. One standard of length, 36 feet applies to about 41 per cent of cars, and about 35 per cent more are 40 feet 6 inches long. The other 24 per cent of cars range all the way from 34 to 50 feet in length. The next standard, which is fairly well established, is that of the so-called "l. c. l. container," approximately 8 feet 6 inches by 7 feet on the base and about 7 feet high. Six of these containers are carried on a "container car," which is a low-sided gondola car. A special size of l. c. l. container, used to carry loose brick and stone, has one base dimension equal to one-half that of the full-size container, hence 12 "brick containers" are carried on a container car. The third standard is that covering skid platforms used to carry goods in transit. Manufacturers and users have agreed on two sizes—the "freight skid," 42 by 60 inches, and the "stores skid," 32 by 33 by 54 inches.

Standard freight cars are used by all standard-gage railroads. Standard l. c. l. containers are used by three or four large railroad systems for carrying certain kinds of high-class freight, and are also used to some extent by freight forwarding companies to handle consolidated shipments. Brick containers are principally used by one eastern railroad, to handle loose brick and similar commodities over its lines. Skid platforms have been used to carry goods in transit for about six years, but only within the past two or three years has there been any noticeable extension of their use. Such extension was retarded because of the lack of any standards which would permit interchangeability in use. A number of large railroads have lately adopted or extended the use of the smaller size of skid platform for handling railway material, stores, and supplies, particularly during the past three years. There has so far been no general effort to stimulate the use of freight skids for general merchandise freight service on a national scale, although their use by individual shippers has steadily increased.

With few exceptions, merchandise carried in or on box cars, l. c. l. containers or skid platforms, is packed in some form of box, crate, barrel, carton, sack, or other form of package. In referring hereafter to "containers," it will be understood that this does not mean the l. c. l. container above mentioned. The container that directly interests transportation people is generally known as the "shipping container." Probably the most common form is that of the wooden packing box or crate. In some classes of commodities where units are large there is no other container, but in most commodities there is at least one other, a smaller container, several of which are packed in the shipping container. In a very large proportion of merchandise there is a third container, still smaller, into which the actual goods are packed.

For purposes of definition the latter type will be designated as a "primary" container. Examples of primary containers are familiar to everyone; as for instance, tubes containing tooth paste and similar products, cans for fruits, vegetables, etc., numerous glass containers for food and drug products, and paper and pasteboard boxes for hundreds of different kinds of goods. The primary container is almost always the "consumers unit"; the form in which the final purchaser gets the commodity. Small articles in primary containers are usually packed in varying quantities into a "secondary container," which is usually the "retail unit"; in other words, the quantity or unit package bought by the retailer, containing one dozen, or one gross, or some other standard quantity of goods packed in primary containers. In some cases, particularly where primary units are of medium size, the secondary container may also be the shipping container, and as such will be not only the retailer unit but the wholesaler unit. In an enormous number of cases however, the shipping container above mentioned is also required, and it is the wholesaler's unit and the shipping container.

While certain industries, and a great number of individual firms, have established standards for all three types of containers for their own products, there has been practically no standardization or simplification of similar containers used for different products. Generally speaking the whole container situation is chaotic from the point of view of standardization. Recent studies of the cost of physical distribution, and the wastes inherent in present methods, indicate clearly the great need for establishing standards in this field, and for doing a nation-wide job of simplification, meaning reduction in variety. There is no sound reason why a shipping container carrying a large quantity of tooth paste in tubes should differ in size and shape from a container carrying a similar quantity of shaving cream or any other commodity of similar kind and weight. The same applies to thousands of other every-day commodities sold at retail, such as food products, drugs, and hundreds of articles sold in department stores. A study of the proper method of approach to this problem immediately develops the difficulty of establishing any sort of uniform standards, or of undertaking simplifi-

cation, on shipping containers, until primary and secondary containers have been thoroughly studied and a certain number of standards put into effect.

A start has been made along these lines by industry, with the cooperation of the division of simplified practice, and a number of recommendations have been developed. Each recommendation provides for the smallest possible number of sizes, selected from among all so-called standard sizes existing at the time. The selection in each case was based on commercial considerations, usually those of demand, or percentage of use. The development of a simplified practice recommendation on any type of container necessarily draws attention to the necessity for proper technical design and for proper methods and materials used for packing goods. Consequently each completed recommendation represents not only the best thought of the entire industry regarding the number of sizes required, but also as a rule represents the best technical development in packaging the particular commodity. The division recently completed one project which may be regarded as typical. It covers wrapping and packing of goods sold in department stores, and was initiated by the National Retail Dry Goods Association. Literally hundreds of cases were found in which a negligible change in box dimensions would permit the use of boxes identical in size for carrying quite dissimilar articles. Not only did each store have its own separate "standards" for wrapping and packing each article, but even in a single store there were many unnecessary differences in box dimensions which could easily be eliminated. Since this industry alone spends some $23,000,000 a year for boxes and wrapping materials, the possibilities for saving money through simplification are obvious.

In addition to the project mentioned above, the division has cooperated with the industries concerned in developing simplified practice recommendations covering packaging of overhead electric railway material, dental plaster, flash-light batteries, carriage, machine and lag bolts, razor blades, insecticides and fungicides, and salt. Some of these apply to primary containers and some to shipping containers. In the field of primary container dimensions, recommendations have been developed covering milk and cream bottles, carbonated beverage bottles, glass containers for preserves, butter tubs, cottage cheese and sour cream jars, fruit and vegetable cans, and ice cream cups. Projects on shipping containers include steel barrels and drums, wooden barrels and kegs, and paper board shipping cases for canned fruits and vegetables. Recommendations have also been developed for ice cream brick molds, cartons, grocers' paper bags, notion and millinery paper bags, glassine bags, and thicknesses of box board.

Numerous other projects on primary containers are under consideration at present, together with a few projects on secondary containers which have resulted directly from work already done on primary containers for the same commodity. A tremendous interest has developed in this work, particularly within the past year, as more and more industries and individual firms begin to recognize the possibilities of simplification and standardization. The general consensus of opinion among those best informed is that there is still a tremendous quantity of work to be done on primary and secondary containers before any satisfactory progress can be made on shipping containers. The wide acceptance of the skid platform recommendation is important as indicating a general desire among shippers and carriers to develop some sort of national standards, but it is of even more importance in establishing a set of recognized dimensions on which shipping container standards can be based.

The size of the freight skid, for example, was determined only after exhaustive studies of handling cost, equipment cost, accessory equipment required, economical stowage in railway cars and highway trucks, and suitability for handling in buildings, through doorways, aisles, and passages. Experiments have shown that a large proportion of shipping containers can be made of such size and shape that they will stow economically on a standard skid. The railroad car itself, and even the large l. c. l. container, is too large a unit to serve as a guide for container standardization in general. Some smaller unit is essential, and the consensus of opinion among shippers and carriers indicates that the skid platform will meet that requirement.

With such a recognized unit, neither too small nor too large, capable of being used throughout a manufacturing plant as well as for handling, storing, and transporting goods, it is possible to work independently in many commodity fields. Each project will be of benefit in its particular field, and yet can be coordinated at the proper time with similar projects in other fields. The ultimate objective is thorough "integration" and coordination of standards adopted for every item used in packing, handling, and transporting commodities, from the small primary container to the railroad car.

COTTAGE-CHEESE AND SOUR-CREAM JARS

The simplified-practice recommendation covering cottage-cheese and sour-cream jars, recently modified at the joint meeting of the standardization committee of the International Association of Milk Dealers and members of the Glass Container Association of America, has been submitted by the Bureau of Standards to all interests for their consideration and written approval.

This recommendation was originally approved by a general conference of representatives of the industry in Cleveland, Ohio, on October 23, 1930. In circularizing the industry for acceptance, it was found that, with regard to some of the containers, the heights shown in the initial recommendation were not satisfactory. For this reason the recommendation did not receive the required degree of support. The joint committee, therefore, has recommended that the heights of the 12 and 16 ounce bottles be increased.

The recommendation covers dimensions of the base diameter, height of bottle, height of finish or roll, diameter of cap seat, and over-all diameter of finish roll of the 8, 12, and 16 ounce bottles used as containers in marketing cottage cheese and sour cream. It will be effective one month after the date of the bureau's general announcement that the necessary volume of acceptance has been received.

COMMUNICATION SYSTEM OF RAILWAYS

American Railroads Have Achieved a High Degree of Standardization in Their Use of Signaling Equipment

By W. P. Borland[1]

Various methods are in use for the communication of information between those responsible for the safe operation of railway trains in the United States. The two methods most commonly used consist of the display of fixed or movable signals of some sort, or the sounding of some form of audible signal, indicating the nature of the information which is to be imparted. The usual form of transmitting information from one place to another is by means of the telephone or telegraph.

Fixed signals.—Fixed signals are signals located at a definite location, indicating conditions affecting the movement of a train. They may be of different types for different purposes, but their indications have been largely standardized through the cooperation of the organizations of the various railroads, and their meaning is uniformly the same throughout the country.

Block signals are one of the important means of conveying information to enginemen for the operation of trains. Several types are in common use to-day. One of these types is the semaphore signal, which consists of a semaphore blade mounted on a signal mast and operated either by hand or by some motor-driven device. This signal displays its indication by the position of the blade by day, and in addition by colored lights at night. Some years ago the blade was commonly operated in the lower quadrants, but upper quadrant signals have come into general use within the last 15 years and are gradually replacing the lower quadrant signals. The fundamental positions of the upper quadrant signals are horizontal for stop, diagonal (45°) for caution, and vertical (90°) for proceed. The usual colors displayed by night are red, yellow, and green for stop, approach, and proceed, respectively. Various combinations of positions of two or more blades and colors of lights are used for displaying aspects governing movements of a restricted character.

With the advent of higher speeds and heavier equipment it has been found that with the usual spacing of signals on the roadway the information imparted by the signals to the engineman was not always given at a point which would permit the train to be stopped before reaching the stop signal. This gave rise to a fourth indication known as approach medium (diagonal over vertical), which is used in connection with the three indications previously described. These 4-indication signal systems are used quite extensively on railroads where the speed and traffic density require the extra indication. On roads of lesser density three-position signal systems are generally used.

Another type of block signal in extensive use is the color-light signal, which has come into general use throughout the country; one advantage being the absence of moving parts. Light signals have been used for many years in tunnels and subways, and following the development of special lenses and lamps, their use has been extended so that now they are extensively used in the open country. The same color-indication scheme is used as with the semaphore signals; the lamps, reflectors, lenses, and hoods being specially designed so as to permit the indications to be discerned as well by day as by night.

A third type, known as the position-light signal, is coming into use in some portions of the country. It consists of a row or beam of amber-colored lights indicating by position, similar to the semaphore signal, the condition of the block. This signal was designed to prevent the possibility of enginemen mistaking the color indication due to color blindness. The indications in general are the same as with semaphore signals. A limited amount of color-position-light signals are in use with colored lights in the various positions.

In general, with all types of signals, except the position-light type, red, yellow, and green, are used for stop, approach, and proceed, respectively, corresponding with the horizontal, diagonal, and vertical positions of the blade in semaphore signals.

Other types of fixed signals in common use on railways consist of (*a*) crossing signals at highway crossings, marking the location of crossings; (*b*) crossing signals, indicating to highway travelers the approach of trains, such as bells, flashing lights, wigwags, and gates, the aspects of which are standardized; (*c*) clearance signs at points where the clearance between moving trains and structures is limited, for the safety of employees; (*d*) speed-restriction signs indicating to the enginemen speed restrictions in effect at various points; (*e*) yard-limit signs indicating to operating crews the extent of a yard; (*f*) stop signs at non-interlocked railroad grade crossings; and various other signs imparting information as to the operation of the railroad or for the protection of the public.

Movable signals.—Principal among the various movable signals used on the railroads are flags and lamps. Flags of different colors are used by day and lamps by night to indicate various conditions.

Green flags are used by switchmen in signaling enginemen relative to the movement of trains over hand-operated switches. They are also used on locomotives to indicate a following section, or on the roadway as resume-speed signals. Yellow flags are used under some conditions as rear-end markers of a train, slow-speed signals over sections of track or at other points where caution is to be observed in the operation of a train. Red flags are used for flagging approaching trains or under any conditions which involve danger in the movement of trains; also as markers on the rear end for trains on main tracks; and stop signals at block stations for the delivery of train orders. White flags are generally used on extra trains to indicate their classification. Blue flags are used in and around yards to indicate men working on cars and to provide for their safety while so engaged. Lamps of similar color are used by night in lieu of flags by day and have the same meaning.

[1] Director, Bureau of Safety, Interstate Commerce Commission.

Train orders.—Two standard forms of written orders are in general use for the purpose of transmitting information governing the movement, meeting, and passing of trains. One of these forms (Form 19) does not require the signature of train crews, and is generally used when an order does not restrict the rights of the train receiving it; when the rights of trains as conferred by time-table or class are restricted, Form 31 is used, and this requires the train crew to sign for its delivery. Train orders are written in multiple, and in order that everybody concerned may have the same information and interpretation, standardized forms of wording, Forms A to S, are in common use. The matter contained in these forms is short, concise, and clear as to how the movement is to be executed.

Clearance cards of two standard forms (Forms A and B) usually accompany the train orders, and indicate their numbers and reason for their issuance, thus insuring that all copies are delivered. Like the train orders, their working is standard and they are universally used throughout the country.

Whistle signal.—Engine whistle signals of standardized code are employed for indicating to employees, other trains, or the public certain conditions arising in connection with the operation of trains. They are used either with the train standing or running, and their meanings under these conditions are in accordance with codes printed in the rule book of each railroad company.

Communicating signals are employed for communication between the train crews and engine crews, each having a separate meaning as to the operation of the train, brakes, station stops, emergency stop, meeting points, and other similar conditions. Like the engine-whistle signals, these are standardized on all railroads.

Telephone and telegraph.—These devices have been in general use for many years for the transmission of train orders for train dispatching, transmitting messages and orders, and other information. The telephone has to a considerable extent supplanted the telegraph for transmission of train orders, more than 60 per cent of the orders now being transmitted by telephone.

LIGHTHOUSE COMMUNICATION

Simplified System of Radiobeacon Signals Aids Navigator

The principal work of standardization encountered in the Lighthouse Service is the maintenance of a uniform system of buoyage upon all the coasts of the United States.

Entering port, the navigator knows that the black buoys with odd numbers should be kept on his left hand and the red buoys with even numbers on his right; and that all ports and channels under United States jurisdiction are marked in the same manner. This standard for the coloring of buoys, to indicate the right and left hand sides of channels, established by act of Congress in 1850, has proved of great value to shipping. Additions to the buoyage system as they become necessary are made to conform to the same system. With the introduction of lighted buoys there arose the question of color of the lights. The lighting of buoys is not so fully standardized, but red lights are used only on the right sides of channels entering, and green lights only on the left sides, with white lights on either side.

In the rapid development of the radiobeacon, which has taken place during the past 10 years, considerable standardization has been attained. Originally developed as an aid to navigation during periods of fogs, and, therefore, to be operated only at irregular intervals, the radiobeacon soon proved to be of value in clear weather as well, and they are now generally operated on an hourly schedule in clear weather as well as during fog.

Particular care has also been taken to devise a system of radiobeacon signals which would distinguish each radiobeacon from others near by and still preserve uniformity throughout the system which would differentiate this type of signal from all other radio transmissions. This has been accomplished by using a single Morse character for each station, and repeating this signal so long as the station is broadcasting. Hearing this repetition of a Morse code letter, the navigator knows that he is listening to a United States radiobeacon, and by identifying the particular signal he is informed of the exact station which is sending. This simplification of signals and hourly operation has aided in creating confidence in the radiobeacon system as a whole.

While the primary need of most aids to navigation is a means of distinguishing one signal from another, much standardization of equipment has still been possible. Standard types of buoys have been developed—illuminating apparatus is now purchased or manufactured in a comparatively small number of types and sizes. Lanterns and lenses, particularly the smaller sizes, have been well standardized at a considerable reduction in cost, and many other items entering into the maintenance of lights and buoys so designed that they are applicable to conditions in all parts of the country.

As the United States Lighthouse Service has operating bases scattered along the entire coast line of the country and upon the Great Lakes, there is of necessity much purchasing of supplies and materials locally, but the tendency has been toward the preparation of standard specifications and for the purchasing, whenever practicable, to be done through a central depot.

The service also maintains a few shops for the manufacture of certain special items. Standardization has simplified the work of ordering items so manufactured and eliminated the need for special drawings and specifications. It has also effected great savings in both time and expense in the many emergency replacements which must be made because of storm and similar damage.

The bureau is represented on several committees of the Federal Specifications Board, and a representative of the bureau is serving on the executive committee of the board as a Commerce Department representative.

THE SPECIFICATION WRITER'S JOB

The Part Played by Specification Writers in Economical Concrete Construction an Important One

By J. P. H. Perry [1]

The specification writer should reflect on the use to which specifications are to be put. Broadly speaking, building specifications have three major functions, at least from the viewpoint of the contractor or builder. These are (*a*) as a basis for estimating or bidding the job, (*b*) as a guide to the operating or construction forces in building the work, and (*c*) as a basis of paying for the work and for settling any disputes.

There is never much time allowed for estimating work. When the specifications are poor there results unsound bidding. This usually results further in someone getting the work and losing money or skimping the job in an effort to avoid losing money. The really capable builder frequently loses the job and the owner is thereby a further loser in that he may have to fight all the time, which results in excessive inspection or administrative costs or in ultimately the owner accepting faulty work with consequent higher maintenance expenses or even greater losses. All of this is a direct economic loss.

Granting, however, that a satisfactory builder can be secured as a result of competition held on satisfactory specifications, we still face the economic advantage or disadvantage of good or bad specifications growing out of the erection of the building. Unquestionably better workmanship, more orderly progress, and lower costs result from sound, clear, orderly, intelligent specifications that are accurate and definite than can ever result from loose, unfair, verbose, tricky specifications. Nothing takes the morale out of a building job more than indefiniteness as to what is to be done. When a superintendent has to keep calling up his general superintendent, the latter in turn bothering the architect or the owner for interpretation, something is wrong.

Assuming the job can be let and be built from unsatisfactory specifications there is the further economic advantage or disadvantage in settling up and paying for the job and the possibility of having to settle disputes. If the specifications are clear and good these potentialities are minimized.

To-day there should be no excuse for anything but good specifications, so far as concrete and reinforced concrete are concerned. The concrete industry has set up well-established sources of information readily available to any consumer so that proper specifications may be written. Builders, to-day, are increasingly willing to cooperate with owners and architects in the writing of specifications in an effort to see that they are consistent with economy as well as with current practice, good workmanship, and good quality of materials. To-day, by requiring that the standard specifications of the Portland Cement Association, the American Concrete Institute, American Society for Testing Materials, and the Report of the Joint Committee on Concrete and Reinforced Concrete, should be followed, the consumer can purchase satisfactory concrete.

[1] Vice president, Turner Construction Co., New York, N. Y.

The vast majority of specifications for concrete buildings and for buildings in general would be greatly improved if they were about one-fifth their present length and fundamentally referred to the standard specifications of the four institutions just named.

The foregoing gives a general outline of the ideal good specifications. It might not be inappropriate to mention some specific things that the building industry so frequently finds in specifications for concrete buildings, which to-day cause unnecessary difficulty in executing work.

Sufficient attention is not paid to the size and grading of aggregates economically available in a given locality. It is quite customary for architects and engineers to specify in detail the size of gravel or crushed stone which should be used without considering just what is available. Then there is a tendency to keep the size of coarse aggregates too small. There is no use in specifying a ¾-inch maximum size when, say, 1¼ inches would be satisfactory, for which certain limits the coarser aggregates will yield a more economical concrete. We still find that the old volume proportions, for example, a mix of 1:2:4, are given, in addition to specifying strength and water-cement ratio. This is confusing and costly. Code requirements may make it necessary to adhere to the old volumetric proportions. If so, specify them only.

In regard to admixtures, such as waterproofing compounds, specifications are not clear. It is not quite fair that an architect or engineer should specify that concrete shall be waterproofed or made watertight by the admixture of a "satisfactory waterproofing compound." The specifications should state that the concrete should be made more impervious by the addition of a "definite waterproofing compound." Take time to specify definitely the material you want used.

Consider carefully the time of mixing specified. It is not necessary for the regular run of concrete work to call for more than a minute mixing; at times three-fourths of a minute is enough. However, if some particular concrete must meet a particular condition, be sure to specify clearly just how long it shall be mixed.

For large and important work in outlying districts, where producers generally do not have definite information on available aggregates, it would be advisable for the architect or engineer to examine and test these available aggregates and specify the proportions to be used, together with the water-cement ratio. This will result in savings to the consumer. If this information is not available, the producer has to guess on the safe side, or go to the expense of making these tests, which time does not usually permit of his doing.

We still find a lot of unnecessary detail limiting the making of forms, the time to be allowed for stripping, etc. For instance, a specification just received states that "forms shall not be removed until directed by the architect," and then the next section states

that " forms may be removed under certain conditions within 24 hours," without specifying the conditions. Just how shall the producer proceed to evaluate this item? A great deal more might properly be said on the way specifications are usually written, covering the placing and removal of forms and the length of time they must remain in place. On private work the writer would like to suggest to specification writers of the future that they go as far as specific administrative conditions will permit them in leaving it entirely up to the contractor as to how he shall erect his forms, how long a period they shall remain in place, and how they shall be taken down, inserting clear language definitely placing upon the contractor the responsibilty for the safety of the structure. On public work and on some private jobs this latitude perhaps can not be given. This is especially true in all situations where unlimited competition has to be received.

In regard to finishing and curing concrete, give some real thought to describing this. It is fairly expensive and important and it is not clearly covered in a great majority of specifications. As, for example, the writer recalls as though it were yesterday a case on a half-million-dollar bakery building. The architect, in the following language, attempted to describe how the concrete was to be finished:

> The finish of all concrete work exposed to view, namely, ceilings, lintels, beams, girders, columns, and partitions, shall be extra smooth and even. As soon as the forms are removed and the concrete is still green, small defects shall be patched up. All uneven surfaces and other defects shall be scoured away with carborundum stone so that the entire surface is perfectly level and of even color.

Note the frequent use of the words " all," " even," and " perfectly." Interpreting this specification literally added $30,000, to one of the bids which the architect received. It so happened that that contractor was favorably considered by the owner and the architect and his estimate was discussed with him. After wasting a lot of words in trying to reach a meeting of minds as to what kind of exposed surfaces the owners and architect really wanted, a visit to one of the other bakeries of the owner was made. The language in the specification was changed so that all that was said about surface treatment of exposed concrete was that the workmanship and appearance should be equal to that of the building visited. The $30,000 item was eliminated and as a matter of fact the allowance which the contractor would have normally included in his estimate was partly saved.

In regard to reinforcing steel, this is almost always shown on the drawings, and specifications are usually quite clear. However, we do find specifications calling for excessive tying of reinforcing steel. This is expensive and oftentimes not necessary.

If a great deal of work is to be built monolithic with concrete, some note should be made of this in the concrete specifications, because it affects greatly the cost of placing concrete and sometimes makes necessary the building of more form work to provide additional working space for the different trades. There are certain noted concerns in this country who use the word " level," or " perfectly straight," or " absolutely true," and mean what they say—mathematically and legally, as distinct from what 99 out of 100 interpreters of specifications would expect. The writer can recall cases where inserts set in concrete floors or curb angles set on shipping platforms have been lined up with the transit as though they would be used for some astronomical observations. Specification language is a serious thing.

In testing concrete we find that job test cylinders very seldom give the correct indication of strength of the concrete in the structure; in fact, core samples from a structure usually test stronger than the job or laboratory test cylinders. This observation might be worthy of the average specification writer's further consideration as to whether he might not modify the present-day requirements.

We have been speaking as if specifications existed alone; on the contrary they usually are used in conjunction with drawings and are dependent upon inspection with its great variable of the human equation. One of the most frequent defects in specifications is that they are not properly coordinated with the drawings and that they overlook the nature of the inspection. These are both serious and should be allowed for. Let us prepare our specifications seriously. They really put the breath of life into a set of drawings and make them real; and the drawings and specifications determine the cost of the work. The first impression an estimator forms in going through a set of drawings and specifications determines to a marked degree the kind of unit prices he applies to his quantities.

Be fair; place responsibility where it belongs. The writer of a specification should assume the responsibility for the proper choice of materials and not duck out under general conditions, catch-all clauses, and " hide-in-the-dark " phrases. He knows just what the consumer expects and the producer should only be responsible for making the thing required. Arrange specifications systematically; keep things of a kind together; do not specify concrete work under some other part of the specifications or mix other classes of work in with concrete; take account of local trade practices and bear in mind the function of the subcontractor in practically all modern building work. The part subcontractors play on large buildings is apparently often not in the mind of the specification writer. The average big building is done from 80 to 90 per cent by subcontract work. The work to be done by each of these subcontractors should be absolutely segregated and specified completely together. Use the knowledge, experience, and data of the industry so easily available to those interested in preparing specifications. If possible, have close cooperation between consumer and producer in the preparation of a specification. It will save money for all concerned.

Consider the practical limitations of the material being specified. Do not expect concrete to look like cut stone—accept board marks and discolorations unless you want to go to the expense of special form linings and even then you still have the concrete as concrete but with a slightly different texture. Consider the degree of accuracy with which it can be economically wrought or used. Do not call for limits of accuracy or control which are not practical. The cost of this runs high and is wasteful. Do not expect granolithic finished concrete trade tolerances as applying to concrete as much as they do to machine design.

Do not specify the results you want, and then specify in every little detail each step in the producing of the results, unless you want to pay more than is

necessary for it and then often not get it. Finally, any piece of work worthy of a good complete set of specifications is worthy of intelligent inspection by a competent inspector thoroughly familiar with the work. Nobody realizes the tremendous cost to a producer of poor, unintelligent inspection. It is a direct economic waste. The reputable, competent producer on the other hand welcomes competent inspection.

Above all be brief; say things once and only once. Have courage to take responsibility.

STANDARDIZATION AIDS HOME BUILDING

Grade Marking of Items Purchased for Use in the Home Strongly Recommended by President's Conference on Home Building and Home Ownership

Reduction in costs of construction of small homes may be brought about by more accurate estimating and cost accounting, by the use of standardized quality materials, by proper use of labor-saving devices and equipment, and by proper job organization, the committee on construction reported to the President's Conference on Home Building and Home Ownership, held in Washington, December 2 to 5, 1931.

The committee's report stated that at present houses are not produced as efficiently as automobiles, and that the building industry may learn a lesson in the reorganization of its processes by a study of the automotive industry. In its survey of building practice, materials, codes, and construction organization, the committee recommended a large number of steps calculated to increase the efficiency of the building industry.

Under the heading of building practice the committee listed a number of failures in construction details, such as cracked plaster and leaky roofs, and the variety of causes to which such failures can be traced. It found that comparatively few builders use regular standardized forms for detailed estimating contracts, cost accounting, and job scheduling. It recommended, therefore, the use of complete standardized forms.

The committee further pointed out in its report that grade marking, trade-marking, and other means of identifying good grades of materials are of commercial value to both buyers and sellers, and that excellent progress has been made during recent years in developing standards of quality and quantity. When these principles are more widely adopted, stated the committee, they will constitute an important factor in insuring quality construction at reduced cost. The use of nationally-known material and equipment increases the prestige of homes and is an outstanding factor in promoting their sale. Many products and installations are identified by licensed trade-marks which are either stamped on the material itself or attached to the structure in which installations are made. These products include lumber, brick, hollow tile, and wall paper, also such installations as electrical wiring and piping. The report made reference to the fact that certificates are furnished by recognized organizations, indicating that the installation conforms to standard specifications. The Bureau of Standards was mentioned in the report as having contributed largely to the progress in these fields, and the cooperation of all research groups in the building industry in the work of the bureau was strongly recommended.

Uniform building codes are both desirable and possible in the main, the committee reported, and uniformity of presentation of code requirements would tend to better observance of regulations. "Building regulations can be a hampering influence upon architectural and engineering design, through the perpetuation of requirements which have lagged behind developments in engineering knowledge. This delay in progress involves an unnecessary cost to the public."

The buying policies of the household, rather than the income, are often the determining factor in the ability of a family to provide adequately for its house, whether it be buying or renting. Because of the amazing array of goods now on the market, the committee on household management informed the conference that the selection of commodities has become increasingly difficult for the home maker. The buyer is also confused by some misrepresentation and adulteration on the part of the producers. This difficulty of selection causes sometimes a dissipation of family income, in the opinion of the committee, which makes owning or renting a satisfactory home impossible. For this reason, the committee recommended, among other steps, that whenever practicable, quality specifications be set up for consumers' goods by the industries concerned and that advertising of consumers' goods emphasize facts regarding constituent materials, construction, and performance of commodity advertised.

On the theory that the heating, plumbing, lighting, and refrigerating equipment are among the principal mechanical factors in transforming a house into a comfortable home, the committee on fundamental equipment presented to the conference what is probably the most inclusive body of data on types and costs of such equipment suitably for small homes that has ever been assembled. The reports makes available to the home owner in any part of the country the disinterested advice of experts on the standards of fundamental equipment he should insist upon for his home, how to secure equipment meeting those standards, and how to maintain it after being installed.

The value of good insulating was emphasized in the report by figures showing that it will save about 30 per cent of the cost of the heating system and from 20 to 30 per cent of the cost of fuel in colder climates.

The committee's subcommittee on electrical lighting and wiring reported that—

> in schools, offices, and factories, there has been an awakening to the importance of proper light and the conservation of vision, but these matters have scarcely caught the attention of the home maker. A great improvement can be made merely by increasing the amount of light used, by placing the lighting equipment in proper position with respect to the work areas, and by eliminating unshaded lamps, for they are chief causes of glare. Economically, it is difficult to produce the condition of too much light. Out of doors on a dull overcast day the intensities of light are easily 100 times as great as those found in our best light offices.

RADIO ENGINEERING

Institute of Radio Engineers Actively Engaged in Standardizing Definitions, Symbols, Etc.

By J. W. Horton [1]

Standardization, in the field of radio engineering, is as old as the Institute of Radio Engineers, for the first committee on standardization was appointed in 1912 " for the express purpose of studying the terms and symbols used in the art, selecting and defining suitable terms, and eliminating the remainder." The Committee on Standardization for 1912–13 had only six members, but as a result of a number of meetings and informal discussions, presented the " Preliminary Report of the Committee on Standardization " as a supplement to volume 1 of the Proceedings of the Institute of Radio Engineers.

This " Preliminary Report of the Committee on Standardization " contained 13 pages of definitions of terms in which 136 terms were defined, 4 pages of literal symbols in which 109 mathematical symbols were given, together with their recognized meaning, 2 pages of graphical symbols containing the drawings of 32 symbols for use on schematic wiring diagrams, and 1½ pages of tests and ratings of transmitting equipment. The entire preliminary report therefore consisted of 23 pages of radio standards intended primarily for the engineer.

The work started by the six members of the committee on standardization in 1912 has been continued from year to year. The Institute of Radio Engineers has always maintained a committee on standardization, and has issued succeeding standards reports in 1915, 1922, 1926, 1928, and 1931.

By 1930 the institute's committee on standardization had increased from 6 to 46 members, and its work had become so involved and specialized that it was found impracticable for one committee to assume the responsibility for the institute's standards reports. Accordingly, four technical committees were organized, each headed by a specialist in his particular field, to prepare the detailed definitions and individual reports. Under the chairmanship of Dr. J. H. Dellinger, of the Bureau of Standards, the committee on standardization left to the technical committees the work of organizing new material, and acted primarily in the capacity of supervising the activities of the technical committees, establishing policies, and coordinating and approving the definitions, symbols, abbreviations, and other reports originated by the technical committees.

As a result of 31 meetings of the committee on standardization and its four technical committees, the institute published its " 1931 Report of the Committee on Standardization " in March, 1931. In contrast with the original preliminary report, this report contained 334 definitions of radio terms under 9 principal headings, 13 pages of mathematical and graphical symbols, a 22-page report on " Tentative Suggested Methods of Testing and Rating Transmitters and Antennæ," a 23-page report on " Standard Methods of Testing Broadcast Radio Receivers," a 33-page report on " Standard Methods of Testing Vacuum Tubes," a 15-page report on " Performance Indexes and Tests of Electro-Acoustic Devices," and 2 pages of safety standards regarding the " Provisions for Safety of Operating Personnel in Relation to Radio Transmitting Equipment."

During the early part of 1931 the committee on standardization was reorganized and an additional technical committee was appointed. At the present time these five technical committees are engaged in a revision of the 1931 report and are adding a considerable amount of new material. It is anticipated that the next report of the committee on standardization can be made available during the early part of 1933.

The National Electrical Manufacturers Association has also been actively interested in standardization in the radio field and has published a reference work of practical information concerning the manufacture, test, and performance of radio products. Whereas the Institute of Radio Engineers standardization reports are of interest primarily to engineers, the National Electrical Manufacturers Association report is very largely concerned with standards and specifications which are of primary interest to the manufacturer of radio equipment.

Realizing that standardization by manufacturing groups has greatly benefited industry, the Radio Manufacturers Association has been active in standardization matters since its inception. In setting up its own standards, the Radio Manufacturers Association recognized the work done by the National Radio Manufacturers Association and has adopted a number of National Radio Manufacturers Association standards as its own. The Radio Manufacturers Association standards cover such items as markings, ratings, limits, and tolerances of radio products, testing methods and instructions, and certain definitions applying to radio receivers.

There are now two organizations actively engaged in radio standardization. The standardization activities of both the Institute of Radio Engineers and the Radio Manufacturers Association naturally overlap somewhat although, in general, the Institute of Radio Engineers is concerned with engineering standards, whereas the Radio Manufacturers Association deals with manufacturing problems. Duplication of effort in radio standardization matters is avoided by complete cooperation between the standardizing committees of the Institute of Radio Engineers and the Radio Manufacturers Association.

Together with the American Institute of Electrical Engineers, the institute has been joint sponsor of the sectional committee on radio of the American Standards Association, and became a member body of the American Standards Association in October, 1930. At the present time the sectional committee on radio has prepared a 44-page report covering definitions, dimensions of vacuum tube bases and sockets, test methods, and manufacturing standards, most of which have been taken from the Institute of Radio Engineers

[1] Chairman Standardization Committee, Institute of Radio Engineers.

and Radio Manufacturers Association standards reports. It is anticipated that this report may be presented to the American Standards Association for adoption as American standards before the end of the year 1931.

Although considerable progress has already been made in setting up standards not only for the engineer but for the manufacturer as well, the need for standardization in the radio industry is one of increasing importance. Electrical interference, both natural and man made, is still a source of considerable annoyance and expense. Fortunately, it is possible to reduce greatly the amount of man-made interference by the proper design not only of the broadcast receiver but of such pieces of electrical equipment as motors, violet-ray equipment, vacuum cleaners, heating pads, elevators, and the like which are the cause of most "manufactured" electrical interference.

Television, which we have been told for so long is "just around the corner," will present standardization problems of its own when this method of communication finally emerges from the laboratory, but it is not too soon to give serious thought to the problems which television will occasion. The television receiver will be a much more complicated piece of equipment than the ordinary broadcast receiver, and unless efforts are made through standardization to provide for some unified system of scanning it is not only possible but highly probable that a receiver designed to pick up a picture made up of, let us say, 3,600 elements per frame with 20 frames per second, will not be able to reproduce pictures of 4,000 elements per frame with 24 frames per second. Standardization is thus essential to insure that a single television receiver will be designed to receive all pictures broadcast just as the modern broadcast receiver can pick up any broadcast program by merely turning the tuning-control knob.

In the field of comparatively new developments, the phototube is one of the objects requiring standardization in the near future if maximum benefit is to be derived from this important electrical tool. At the present time phototubes are being manufactured in all sizes, shapes, and characteristics. The result of this lack of standardization is that commercial applications are difficult to make and one can not be sure that a tube purchased for replacement purposes will operate in the same manner as the unit it replaces. Standard methods of measuring and rating phototubes, as well as setting up specifications and characteristics which are recognized as standard will assist in making the most out of commercial applications, will increase the number of commercial applications, and will reduce to a minimum the number of types of tubes which will be necessary.

Standard tests have already been originated by the Institute of Radio Engineers for the measurement of characteristics of broadcast receivers, but the importance of the frequencies above the broadcast band makes the adoption of test methods of high frequency receivers a necessity. Related to this problem is one dealing with the proper design of high frequency signal generators.

Standard methods for measuring frequency, for making accurate and rapid surveys of field intensity, and for mounting and operating quartz crystal resonators are other problems which require standardization in the near future. The Institute of Radio Engineers realizes that the need for standardization in the radio field is more acute than it has ever been before, and is already attacking some of the problems mentioned above.

PLANNED RESEARCH NECESSARY FOR STANDARDIZATION IN RUSSIA[1]

Technical Leadership Associated with Scientific Research, Says Soviet Union Publication

In the present state of socialist construction in the Soviet Union, scientific research must play a very large rôle. The rebuilding of the entire system of research institutes in accordance with production is the logical prerequisite.

Standardization represents that form of technical leadership of our economic life in which the idea of scientific research can and must have a decisive say. We can progress, particularly in standardization, only with the assistance of scientific research.

We have little experience from the past and even from western Europe and the United States on which to proceed. Their conditions and ours are too different to allow us to borrow directly from them. Moreover, it is almost impossible to learn the actual results of foreign experience in industry since they are concealed by the groups of opposed interests which exist between separate countries and separate firms in the same country. The selection alone of the best foreign standards makes it necessary to carry on research of different types of production, and this may be successfully carried out only under scientific direction.

If we find it necessary to adapt foreign standards to our production and consumption conditions, the importance of drawing in our scientific research organizations to work on standardization and typification becomes so much clearer.

The summer of 1930 when the All-Union Committee on Standardization discussed the question of participation by the scientific research institutes in standardization was not very favorable for this work. New industrial centers taking the form of combinations lost their standardization units at the time of their reorganization. The Supreme Economic Council remaining without local standardization agency, found it necessary to give up their own central agency of standardization. The All-Union Committee on Standardization was forced to enter into direct relations with the industrial combinations, which the Supreme Economic Council has always previously opposed.

Under these conditions the All-Union Committee on Standardization began to carry out its idea, marking a new era in standardization. At first the committee met with indifference on the part of the industrial

[1] English translation of a discussion appearing Apr. 15, 1931, by the editor of the Bulletin of Standardization, published in Moscow.

combinations. In answer to the proposal of the committee on standardization to group separately in the standardization planes for each object, those questions which require preliminary working over and to persuade the necessary institutions to include these questions in the plan of their work for 1931, the industrial combinations formally executing this suggestion, presented plans for scientific research work, connected with standardization, indicating those institutes where they would be carried out.

However, in checking up, the committee on standardization found that no agreement had been reached with many of the institutes as to the work. Thus it was clear that the industrial combinations did not carry on the necessary preliminary organizational work in the institutes; then the committee on standardization itself shouldered this work. Now we may state that the Supreme Economic Council, Narkomsnab (People's Commissariat of Supplies), and Narkomput (People's Commissariat of Transportation), with which the majority of the institutes are attached, apparently have understood the full importance of the situation and are ready to build a basis of scientific research for the work of standardization.

At the present time the committee on standardization has connections in 180 institutes and 60 industrial combinations along the line of research work. The majority of trusts and institutes influenced by continual reminders from the committee began seriously to connect their standardization plans with plans of research, and the results are beginning to come into the committee, as yet it is true. in insufficient number.

The question arises whether standardization can not advance without preliminary scientific research. Let us take a current example. The committee received a project in the old plan, without scientific preparation—" cast-iron water pipes." It was shown that the thickness of the sides of these pipes was twice that of the same German pipes, and this in spite of our lack of metal and the well-known governmental and party decrees on economy of metal. This project, it was obvious, issued from the old kinds of pipes used in the nineties of the last century and still produced by us. In order that the thickness of the sides be decreased, it was necessary to have preliminary research in laboratory and shop conditions (and perhaps in actual conditions of use), and particularly to examine the composition of German pipes as well as their mechanical nature; to examine the castings of different combinations of minerals from our cast iron to find the one most advantageous under our conditions, guiding ourselves by the thickness of the German pipe, to examine the various production processes, and on the basis of the results, to arrange work so as to achieve the necessary results required of the pipes with the minimum thickness of their sides.

Such work has been done nowhere and under such conditions, and the committee faces the necessity either of rejecting this standard or of perpetuating our backwardness in this direction for several years to come.

NEW FOOD STANDARDS FOR PENNSYLVANIA

Standards of a Number of Products Are Revised and Definitions Changed by State Department

New standards and definitions for a number of food products and several new rules for uniform procedure in the enforcement of food laws have been adopted by the Pennsylvania department of agriculture upon recommendations by the consulting chemists of the bureau of foods and chemistry.

The use of the word " health " in connection with the trade or brand name of food products, as for example, " health milk " or " health food," is declared to be an improper method of branding.

Consideration has been given to so-called " imitation " ice creams which have been found to be low in butterfat. Such products, when containing less than 10 per cent of butterfat, are declared to be unlawful.

In the case of those so-called " double strength vanilla extracts " it was decided that this type of extract could not be designated as being 150 per cent strength.

Medicated chewing gums, namely, gums which included certain substances designed to act as antiseptics and also those containing laxative substances, are declared to be unlawfully sold unless they were distinctly labeled and sold as medicated products.

The following new standards and definitions have been adopted by the chemists:

Wafers, waffle wafers, ice cream wafers shall be free from any added color and they shall also be free from saccharin or other artificial sweeteners.

The addition of pumpkin, squash, carrots, or other highly colored ingredients, regardless of labeling, to bakery products, which may give the fictitious appearance of egg richness, is unlawful.

Sherbet is a frozen product made from milk products and including ice cream mix, approved sweetening material, and fruit flavoring material, with or without stabilizers, frozen to the consistency of ice cream and containing not more than 5 per cent of milk solids.

Ice is a frozen product made from water, approved sweetening material, and fruit flavoring material, with or without stabilizers, frozen to the consistency of ice cream, and containing no milk solids whatever.

Chocolate drink is a beverage made from chocolate sirup, milk, either whole or skimmed, and potable water, plain or carbonated. It contains not less than 8 per cent of sucrose.

Cereal beverage is a beverage derived wholly or in part from cereals or substituted therefor. For example, as wheat, oats, rye, barley, buckwheat, corn, rice, or any other cereal or substitute therefore, produced by a process by which beer, ale, or porter is produced, or by any arrested fermentation process, and containing less than one-half of 1 per cent of alcohol by volume.

Lime-lithia bottled beverages shall contain not less than 100 grains of lithium salt, expressed as lithium carbonate, in each gallon of the finished beverage, which is approximately equivalent to 5 grains for each 6-ounce bottle.

Revisions are reported in 15 standards and definitions previously adopted. The products included in these revisions are: Ice cream cones, ice cream, fruit ice cream, nut ice cream, mayonnaise salad dressing, catsup, Chili sauce, sarsaparilla, root beer, root-beer flavor, birch beer, birch-beer flavor, cream soda water, and cream soda-water flavor.

A pamphlet carrying the full details is being published as a supplement to general bulletin No. 485, which gives the standards and definitions for hundreds of food products.

COMMUNICATION AT SEA

International Standards Have Been Adopted for Communication Aids Between Ships at Sea and to or from Shore

By T. V. O'Connor[1]

Communication aids to navigation involve a source, or sending station, and a receiving station. In marine navigation the ship is the receiving station. In some cases the sending station is also on a ship. This article considers principally the ship and the means of communicating information and receiving it on the ship, as an aid to her safe navigation.

Before the coming of radiotelegraphy the available means of communication between ships at sea, and to or from the shore, could span but a short distance. They are all based on sight or on sound and are inefficient at best. Under some conditions of frequent occurrence they are uncertain, unreliable, or they fail altogether. Radio communication, and the systems of position finding combined with radio, are the greatest known aids to marine navigation and to increased safety at sea. This is worth remembering when a broadcast program is cut off, in order to render service to a ship at sea in distress and for the saving of the ship and human life. Radio communication for this purpose, and for communication with and between vessels at sea, was developed, and was in regular use before the days of broadcasts. There is no known substitute that can render the same service to ships.

Visual communication systems that may be used and are used at times as aids to marine navigation include flag signals, semaphore signals, shape distant signals, and flash signals.

Flag signals have no doubt been used since very early times. A number of sets of flags and corresponding code books for communication with ships were devised and issued privately during the first half of the nineteenth century. Some of these were used generally by the ships of different nations. These flags and codes were superseded by an improved code issued by the British Board of Trade in 1857, which in turn was replaced by the International Signal Code adopted by the conference in Washington, in 1889. That code was not completed and issued until about 1897.

The last revision of the international signal flags and code was made by the International Radio Conference, held in Washington in 1927. It is not expected that its code can be issued and brought into use before 1934. This revision is a great advance in that it provides for 40 signal flags, for a greatly increased number of signals, for code books in seven languages that are being worked out to be truly international, and for standard forms of messages and call letters generally in conformity with the rules for radio communication.

This last revision will abolish distant signals made with shapes instead of flags, also fixed semaphore signals, as no longer necessary with radio communication available. Semaphore signals with small flags in the hands of the signal man are retained for communication over short distances. The international Morse code is used.

[1] Chairman U. S. Shipping Board.

Flash signals are made, day or night, with a beam of light. Signal lamps serve for short distances; signal searchlights for longer distances. The international Morse code is used for these signals.

Another class of visual aids to navigation is lighthouses, lightships, beacons, and buoys. While no message is transmitted, the mere sighting of one of these objects and its identification on the chart, provide a fixed point that may be used to plot or to judge the position of the ship. Lighthouses and lightships, also many beacons and buoys, are lighted at night. They are thus useful aids whenever the visibility is good enough for them to be seen. The marking and the character of the lights are arranged for identification.

Sound signals include whistles, sirens, foghorns, bells, gongs, oscillators, and other apparatus for producing sound. Lighthouses and lightships are fitted to sound definite sound-in-air fog signals. Some lightships, in addition, give fog signals on submarine bells or oscillators for producing under-water sound signals.

Submarine or under-water sound signals are sound vibrations produced under water by bells, or by an oscillator. The latter has a much greater range than the bell, and both have greater ranges and greater reliability than the sound-in-air signals. The receiving apparatus now installed on the vessel requires trials on different headings to determine the bearing of a submarine signal when heard.

Radio aids to navigation include, in addition to the information furnished by messages, other services, such as radiocompasses, radio beacons, and synchronized radio and submarine signals. A synchronized radio and sound-in-air signal has also been developed.

Radio compass stations are direction-finder stations permanently established on shore, either singly or connected in groups of two or more. Standard procedure is established for a vessel to ask by radio for bearings and to receive from the control compass station her bearing from each of the stations able to observe.

Radiobeacons are stations on shore or on lightships that broadcast signals. The ship determines her position by taking the bearing of two or more radiobeacons by means of a direction finder; that is to say, a radiocompass installed on the vessel. The position may be found from two bearings on the same beacon and the course and distance run between bearings, the same as from visual bearings for lighthouse or other object in a known position.

The synchronized radio and under-water sound signal enables the distance of the vessel, from the known position of the oscillator producing the submarine signal, to be determined at the same time and with the same radio signal that is used to determine the bearing of the radiobeacon by means of the direction finder. This gives at once the position of the ship within the accuracy of the apparatus.

There is another modern aid to navigation that, while not depending on communication from without

the ship, is so important in itself, and in conjunction with the visual aids and the radio aids, that its mention should not be omitted. It is the fathometer, an apparatus for echo depth finding. This instrument measures the depth of the water under the vessel and thus gives the sounding to compare with the soundings on the chart and, in conjunction with the other methods, shows the ship's position. Its usefulness is increased by the readiness with which it can be used, even to show the depth continuously and without reducing speed to take soundings.

Distress signals as used by all classes of vessels may utilize the means of communication already described or may be peculiar to the purpose. Thus flames, as from a burning tar barrel on deck, a gun fired at frequent intervals, a rapidly flashing light, rockets, or roman candles are all used as distress signals, and are universally understood to mean that the vessel requires immediate assistance. An interesting form of distress signal recently placed on the market is particularly valuable on power boats and small yachts, many of which have their decks but a few feet above the water and are not equipped with radio sending apparatus. This consists of a pistol which fires a brilliant flare attached to a small parachute. By shooting vertically upward the flare is suspended at a great height above the boat, and lasts for a minute or more. The chance that such a flare will be seen on shore, even at a distance of several miles, is much greater, of course, than if it were burned on the deck of the boat.

Standardization of the apparatus used in connection with communication aids to marine navigation has not been attempted, and is not now advisable. General requirements as to characteristics affecting the service that the apparatus gives are enforced by most maritime countries. Many of the newer aids are still being developed and improved. The demand for efficient service, together with the interchange of information between countries, has kept the apparatus and the character of service sufficiently uniform.

International standards have been adopted for many of the communication aids and for messages concerning navigation. As already indicated, visual signals and codes were adopted by the International Marine Conference, held at Washington in 1889, and were further perfected by the International Radiotelegraph Convention in 1927. The former dealt also with the Rules to Prevent Collisions, including lights to be carried by vessels under way and at anchor, fog signals, sound signals for vessels in sight of one another, and distress signals. The International Convention on Safety of Life at Sea, London, 1929, recommended some additions that have not yet come into effect.

Great progress has been made in adopting international standards for radio messages. At first when but few vessels had radio installations, and when there were but a few shore stations, no regulation was needed. As installations multiplied, various operators, finding some regulations and standards necessary, devised and adopted them voluntarily. International wireless telegraphic conferences were held in Berlin in 1903 and in 1906. The third conference, the International Radiotelegraphic Conference, held in London in 1912, and the Safety of Life at Sea International Conference, held in London 1913–14, adopted many standards that did come into effect internationally, or are embodied in national legislation. Some others were adopted without legislation. These standards were further considered by the International Radiotelegraphic Conference, held in Washington in 1927, and the second Safety of Life at Sea Conference, London, 1929. This has resulted in standards for time signals, danger signals, including reports of ice, derelicts and tropical storms, also standards for meteorological messages, including the collection and dissemination of weather information and storm warnings, and for the safety signal and the alarm distress and urgency signal. The Washington convention also deals with radio-compass stations and with radiobeacon service.

The many conditions under which ships must be navigated in various seas and seasons, and especially in a fog or with low visibility, introduce an element of uncertainty in all methods known and used for position finding at sea. Some methods are better under one set of conditions, and others are better under different conditions. Safety requires that the position, by whatever method obtained, be checked preferably by another method. Experience in the use and comparison of results with the different systems alone can tell which combinations are the better. Hence, the present necessity to take advantage of and to gain experience with every system that is an aid to navigation.

Evidently the codes and rules, the standards for messages, calls, reports and warnings, also the uniform time for their transmission, have been the means that have made such international communication practicable.

SIMPLIFICATION IN THE DENTAL FIELD

At a general conference of the industry held in Chicago, in November, in conjunction with the annual meeting of the dealers' section of the American Dental Trade Association, two simplified practice recommendations were approved. These are for dental mouth mirrors and dental rubbers.

The program for mouth mirrors establishes for stock purposes four diameters in the cone socket type, to replace the many heretofore stocked. It was determined by the simplification and standardization committee of the association that these four sizes would satisfy the normal demands of the trade.

The program for dental rubbers covers the colors and packaging of veneering and base rubber. Three shades of pink are approved for veneering rubbers, and eight colors for base rubbers. Packages of 1 pound are provided for laboratories, and one-half pound for dentists, for both descriptions. As in the case of mirrors, the simplification and standardization committee of the association determined that the recommended colors and package sizes would meet the normal requirements of the trade.

Both programs, if approved, will be of material assistance in carrying out the industry's simplification plan, which will eventually cover many items of supplies and equipment. Copies of the programs will be sent to manufacturers, distributors, and users in the near future for acceptance; and if approved, they will be printed and issued as part of the waste elimination series.

NAVY'S ACHIEVEMENTS IN RADIO STANDARDIZATION

Navy Department Insists that Component Units of Its Radio Apparatus be Standardized

By Rear Admiral Samuel M. Robinson, *U. S. Navy*[1]

Standardization is the life blood of the matériel end of the naval radio communication system. In fact, it is considered of such importance as in general to be secondary only to the item of operating efficiency and reliability of equipment and is often given precedence over these factors. This arises from the fact that the naval communication system must function reliably 24 hours a day under conditions of long periods of absence and great distances from a source of supply and subjected to rigors far greater than any met with in normal commercial practice.

Because of the conditions under which naval radio equipment must function and to which it is subjected, among them the extreme temperatures, excessive humidity and extreme vibration and shock, the percentage of failures of many component parts is inherently rather high. This occurs in spite of every effort to incorporate in all component units of naval radio apparatus as high factors of safety as are compatible with the space and weight limitations imposed, and the most rigorous requirements in all specifications under which radio apparatus and its component parts are purchased.

In order that the very minimum number of replacements parts need be carried in stock, the Bureau of Engineering of the Navy Department has been most insistent that, in so far as the progress of the art permits, only component parts previously standardized by the Navy be employed in its equipment.

The policy of standardization is also necessary from a naval point of view for two important reasons; one military and the other commercial. From a military point of view, the best interests of national defense demand that, wherever practicable, all consumable items should be obtainable from as many sources of supply as possible. This obviously predicates the necessity that the outputs of such sources of supply shall be standardized to a point of electrical and mechanical interchangeability. From a commercial point of view, it is desirable and, in a sense, necessary that as many manufacturers as possible be encouraged to bid on proposals for such consumable supplies. This is not only a legal requirement but tends toward the encouragement of commercial enterprise which, in turn, builds up additional sources of supply, thus aiding in the military effectiveness stated above.

Concrete evidence of what has been accomplished in the interests of standardization by the radio division of the Bureau of Engineering, will be found in consideration of some of the smaller but very important items connected with the manufacture and maintenance of radio equipment. As an example, a few years ago, the products of different manufacturers of vitreous enameled resistors differed in mechanical dimensions, electrical ratings, ferrule sizes, etc. At the present time, it is possible to obtain from not less than six manufacturers of vitreous enameled resistors, units entirely similar electrically and mechanically, and hence entirely interchangeable in the apparatus in which they are used. Vacuum tubes have similarly become standardized, due in a great part to the Navy's insistence that all tubes of similar types obtained on its specifications be entirely interchangeable and function with equal efficiency in any of its equipments. Radio insulators have likewise been standardized to the point where a high percentage of the Navy standard insulators may be obtained from many manufacturers working in three or more different materials but all meeting the requirements and specifications of the Navy.

The list of the Navy's achievements in the field of radio standardization is so formidable that the above represent but a small part of it. As the art develops, so do the possibilities of standardization, and it is evident, from the necessity for such action as just outlined, that no effort should be spared in arriving as near the goal as possible.

[1] Chief, Bureau of Engineering, Navy Department, Washington, D. C.

REAFFIRMATION OF BRASS PIPE NIPPLES

On November 30, 1931, the Commercial Standard for Brass Pipe Nipples, CS10–29, was reaffirmed without change for the second annual period since it became effective for general use on July 1, 1929. Surveys on adherence to commercial standards are undertaken annually in order that these standards may be kept abreast of current industrial developments. All manufacturers of brass pipe nipples were requested to send any comments or suggestions for the improvement of this standard, as well as to report briefly on the use that had been made of the standard during the past year, with resultant benefits, if any.

Nineteen replies were received, giving the information desired, and very little deviation from the requirements of the commercial standard were reported. The average production of commercial standard brass pipe nipples was reported to be 99.7 per cent of individual production. It was not practical, however, from the information given to weight the figures. An average of 16 replies computed in a similar manner indicated 94.2 per cent conforming to recommended stock lengths and sizes.

Variations from the standard were all attributed to demands from customers for special material. Eight replies indicated that actual direct benefits had been experienced which were attributed to the establishment of the standard. No suggestions for the improvement of the standard were offered. Further details are available in the report.

TOKYO INDUSTRIAL INSTITUTE

Unique Facilities for Research

The Tokyo Industrial Institute was established in 1900 and is under the control of the Minister of Commerce and Industry of the Japanese Government. Its director is Dr. Fusajiro Kodera. Its staff of research workers and assistant investigators numbers over 100. The institute is engaged in solving various industrial and technological problems, and deals with the analysis, testing of material, and consultation in order to promote the progress of Japanese industries. In cooperation with several organizations, such as the Portland Cement Association, the Society of Chemical Industry, Bureau of Rationalization of Industry, Department of Commerce and Industry, the institute is engaged in standardization activities and accomplishment. The headquarters of the institute are located at Yoyohata, near Tokyo. It maintains a branch at Meguro, near Tokyo.

In addition to its administrative activities, the work of the institute is carried on by six scientific and technical groups as follows: (1) General analysis, examinations; (2) consultations pertaining to fats, waxes, oils, soaps, petroleums, chemicals, paints, lacquers, papers, rayon, saccharides, proteins, etc.; (3) work relating to examinations, and consultations pertaining to coal tar, dyestuffs, and mordants, etc.; (5) examinations and testing in the field of electrochemistry, electrometallurgy, and high voltage electricity, and the testing of porcelain, cement, iron, and several other materials; (6) investigations pertaining to synthetic chemistry.

When an experimental research has been completed in the research laboratory, the results are examined on a semiindustrial scale with a view to further development and improvement of methods and materials for industrial use.

Laboratory space is made available to the general public for experimental work, and research workers are supplied with an amount of chemical reagents and experimental equipment and are permitted to utilize the library of the institute, and to use its precise measuring instruments. The regular staff is available on request to give aid for consultation purposes.

A schedule of fees is published covering the analysis or examination of material and consultation.

The results of the investigations and researches conducted by the institute are published in a pamphlet with the title " Tokyo Kogyo Shinkenjo Hohoku " or in well-known journals in Japan. Several hundred technological papers have been issued to date.

The institute participates in the work of the Japanese Engineering Standards Committee, and in cooperation with that committee the following specifications in the number indicated were completed during the past six months covering the indicated items: Petroleum products, 19; pigments, 7; analyses of commercial metals, 3. In addition, its laboratory conducts a great variety of tests to prove whether or not the items submitted to the committee comply with specifications.

SPECIFICATIONS FOR FREE-WHEELING LUBRICANTS BEING DRAFTED

Tentative standard specification for a satisfactory oil for lubricating the free-wheeling devices now used on a large number of automobiles was drawn up in a cooperative meeting between oil and automotive technologists during the American Petroleum Institute meeting held November 12, 1931, in Chicago.

This action is the outgrowth of a large amount of study by both oil technologists and automotive engineers, urged on by difficulties encountered in the proper lubrication of these new devices. It has proved difficult to obtain generally over the country a satisfactory lubricant for the purpose on account of the newness of the contrivance and lack of understanding by car users, car servicers, and lubricant manufacturers, even the car manufacturers themselves, of the properties of the lubricant required for the purpose.

Considerable dissatisfaction has been expressed by users because of unsatisfactory operation of free wheeling, who have found that improper lubricants prevent its functioning. " When the viscosity of the lubricant reaches 100,000 seconds or thereabouts, the car is neither free nor wheeling," one engineer remarked in discussing the problem during the conference.

The requirements for a suitable lubricant for the purpose have, however, been definitely determined, and the manufacture of this lubricant offers no difficulties. It requires that the viscosity referred to above be not exceeded under the most adverse operating conditions encountered, according to one statement.

As early as last spring automotive engineers began an intensive study of the problem. After considerable individual work, these engineers met in Detroit, on November 10, and agreed on a tentative specification satisfactory for the purpose. Representatives of this group met in Chicago with oil technologists at the meeting of the American Petroleum Institute, Thursday, November 12, and discussed the specification. The final details are now being studied by engineers and chemists.

It is understood that the product of manufacturers meeting the requirements of the specification will be placed on a " satisfactory " or accredited list by motor manufacturers and that users will be directed to purchase from this list. When a lubricant maker's product fails to meet the specification, his name will be removed from the list until the specification is met.

It should be noted that this specification deals only with the viscosity of the oil and not at all with its qualities in other respects. Thus, it is similar to the Society of Automotive Engineers' viscosity number system as applied to crank-case oils and probably will be included as a number or numbers in this system applying to oils for free-wheeling transmission.

STANDARD MEANS OF COMMUNICATION FOR THE DEAF

Lip Reading Now Used by Educators in Training the Deaf

By Josephine B. Timberlake [1]

The means of communication in use among the deaf depends to a considerable extent upon whether their educators permit them to remain mutes. Earlier generations, in the belief that speech was impossible for them, taught them to transmit ideas in signs, and thus developed a sort of language, crude and incomplete, but very useful among the few who understood it.

This sign language does not follow the order of words of any spoken language, but is rather a series of pictures, usually supplemented by words spelled on the fingers. At one time all schools for the deaf in this country taught it, but now it has been discarded as a means of instruction, and many schools prohibit its use entirely for the reason that the use of a language of gestures tends, like the use of slang, to restriction of the vocabulary and inability to express ideas with discrimination. It is still widely used for conversation, however, especially among the older deaf persons, and before audiences so large as to render lip reading difficult or impossible.

By the use of finer spelling, words in any language may be communicated. In this country, and for the most part in Canada, the one-hand alphabet is that most commonly used, but in Europe a two-hand alphabet is preferred. Either is readily learned, and practice enables the user to attain considerable speed, not greatly inferior to the speed of average speech. In many schools for the deaf a few classes, made up of children who have not progressed satisfactorily in the use of speech and lip reading, are taught by means of finger spelling. These children, of course, remain mute all their lives.

The oral method, which uses speech and lip reading as the means of communication, is the leading method employed for the deaf by modern educators. Many schools depend upon it entirely, and all but two or three give it classroom preference. Modern opinion holds, therefore, that the standard means of communication for a deaf person is the language of the country in which he lives. If he has been well taught from an early age, he can probably speak it intelligibly, and can understand those about him by reading their lips. Or, if he fails in these, he can communicate readily with the help of pencil and paper.

Contacts, not only with his relatives and friends, but also with employers and fellow workmen, are thus much easier for him. He is not restricted to the companionship of those who have learned a manual alphabet or the sign language. The best lip reader in the world, however, can not understand a speaker who mumbles, or speaks with a rigid jaw, or distorts the motions of his lips. The best way of completely standardizing his means of communication, therefore, is to promote a standard of clear, pleasant, intelligible speech throughout our population.

[1] Superintendent, the Volta Bureau, Washington, D. C.

STANDARD RECOMMENDED FOR CENTER-TO-FACE DIMENSIONS FOR FERROUS FLANGED VALVES

The center-to-face dimensions for ferrous flanged valves recently developed and approved by the Manufacturers Standardization Society of the Valve and Fittings Industry as standard practice have been tentatively recommended for adoption as an American standard by subcommittee No. 5 of the American Standards Association sectional committee on the standardization of pipe flanges and fittings.

This proposal sets forth the center-to-face dimensions of cast iron and steel flanged valves of the wedge gate, globe, and angle types, several pressures and over a considerable range of sizes. When adopted, this standard should be of real value to industry, as it will facilitate considerably the replacement of valves in existing piping systems.

This tentative proposal is now being distributed by the American Society of Mechanical Engineers to a large number of interested firms and individuals for criticism and comment. After receipt of these comments the subcommittee will formulate a definite recommendation for submittal to the sectional committee.

FEDERAL SPECIFICATIONS

Twelve specifications were acted on by the Federal Specifications Board during the month of December. Of this number 11 were submitted for revision and 1 for consideration as proposed specification. Copies of these specifications (in mimeographed form) and further information can be obtained from the Federal Specifications Board, Bureau of Standards, Washington, D. C.

New designation	Specifications to be revised	F. S. B. No.
QQ-B-701	Bronze, ingots	290a
QQ-B-731	Bronze, manganese, ingots (for remelting)	89
QQ-C-521	Copper, ingots	120
QQ-C-571	Copper, phosphor	118
QQ-C-581	Copper, silicon	119
QQ-M-151	Metals, general specification for inspection of	339a
QQ-N-301	Nickel (for), remelting	371
QQ-T-351	Tin, phosphor	116
QQ-T-371	Tin, pig	90
QQ-Z-351	Zinc, slab (Spelter)	91a
GGG-B-101	Bars; chisel, crow, pinch, and ripping	434
	Specification proposed	
WW-T-788	Tubing; aluminum alloy (aluminum-manganese) seamless.	----

LABELED CORDS FOR PORTABLE ELECTRICAL APPLIANCES

Standard Cord Inspected and Labeled by Underwriters' Laboratories May Be Identified by a Zinc Identification "Five-Foot Label"

By M. G. Lloyd, *Bureau of Standards*

Permanent electrical installations in buildings in most parts of the United States are, as a rule, inspected by either State or municipal inspectors or by the inspectors of the fire-insurance bureaus. Control of such installations can thereby be accomplished so that in general they are made to comply with established standards. These standards apply both to the materials which are used and to the workmanship involved in their installation. Portable appliances and extension lamps are, however, usually added after an installation has been inspected and put into service, and these items are consequently not subject to similar control. The result is that much substandard cord and many inferior appliances have been placed upon the market, leading to fires and fatal casualties.

Of all low-voltage fatalities, portable cords have achieved the record of being the largest contributor.[1] In the report of the fire-insurance underwriters for New York City for the year 1930 it is shown that electrical fires due to defective cord represented a total loss of $313,000.

One remedy for this situation is the use of standard cord which meets the specifications of Underwriters' Laboratories.

Reputable manufacturers market cords of this quality, but it is difficult for the ultimate consumer who purchases cord at retail stores or purchases appliances with short lengths of cord already attached, to identify standard cord and distinguish it from inferior makes. The Underwriters' Laboratories are prepared to inspect and label cord which is of standard construction, but their labels appear only upon the original spools as they leave the factory. This is not sufficient identification for the purchaser of a short length.

In 1930, of the 2,500,000,000 feet of the cords manufactured in this country, less than 15 per cent carried the labels of Underwriters' Laboratories. A large fraction of the table lamps, floor lamps, and other portable lamps and electrical appliances were equipped with cords of substandard make and were purchased by the public in entire ignorance of the fact that they were not receiving standard materials of a quality which could be depended upon to give satisfactory service. A poor quality of cord may soon be worn through so as to expose the conductors or it may develop other defects of insulation which result in overheating, short circuits, and possibly fires.

A remedy for this situation has now been announced by the cord trade extension group of the National Electrical Manufacturers Association. A new scheme for marking and identifying portable cords has been developed, and 18 manufacturers producing about 90 per cent of the cords now approved by Underwriters' Laboratories have agreed to market their cords according to the new method. This method is one which will permit the ultimate consumer to identify even a short length of cord, whether it is purchased separately at a retail store, or whether it is already made up for use by attachment to portable lamps or portable appliances.

The new identification consists of what is designated as a "5-foot label." This label will be made of zinc and will be attached to the cord at intervals of about 5 feet, so that even the shortest length in general use will contain at least one such label which will permit its identification by the purchaser. The label will be, however, easily removable so that after its final purchase it need not be retained upon the cord. This zinc label will have an identifying color and will carry the name of Underwriters' Laboratories, indicating that the cord is an inspected and approved material. For ordinary flexible cords the label will be yellow or bronze in color. For the heater cords, which are used with heating appliances, the color will be red or greenish blue. This narrow flat band of zinc will be tightly applied to the cords at the factory, but can easily be removed by the purchaser if he so desires.

When the cord which is labeled in the new way is available at the retail stores, consumers should insist upon getting it and accept none other, since this label will be their assurance of standard quality. Until such time as the retail stores are supplied with this material the purchaser should take pains to inquire of the merchant whether the cord which he is selling has received the approval of Underwriters' Laboratories. Cords which have not received such approval can not be depended upon as being of standard quality, and their purchase and use by consumers involve a hazard of both fire and electric shock.

Cords which bear this identifying label will cost no more than cords which have previously been approved by Underwriters' Laboratories, but were identified only by a paper label upon the ends of spools carrying long lengths of cord. They will cost but a trifle more than inferior cords which subject the user to an unwarranted hazard. The difference in cost is so small that it would not be an item of influence to the ultimate purchaser, but it has in the past been an item to the manufacturer of large quantities of portable lamps and has frequently induced him to equip his product with the inferior article. It is on this account that the purchaser of such lamps and appliances must protect himself by demanding cord which carries the label.

[1] Commercial Standards Monthly, p. 252; February, 1931.

TELEGRAPH COMMUNICATION

Constant Effort to Improve Accuracy and Increase Speed Resulted in Standardization of Equipment and Operating Practices

By C. E. Davies [1]

In telegraph communication service, standardization of equipment and operating practices has come because of constant effort to improve accuracy and increase speed. Reduction of expense has, of course, followed as a natural consequence.

Within the past few years the average time required to handle telegrams has been greatly reduced. This has been accomplished by decreasing the standard time limits established for each operation and by intense supervision of thoroughly trained employees, who work with greatly improved apparatus. Improved standard forms of transmission and routines for handling corrections have also been responsible for faster speed of service.

Inspection of several modern telegraph offices would impress an observer with the fact that the apparatus and general arrangement in all offices is essentially uniform, and that the employees all follow the same general procedure in the performance of their respective tasks. This is the result of painstaking research to discover and apply the simplest, most efficient methods of handling telegrams, and to provide equipment and office layouts that eliminate as many unnecessary operations as possible.

One of the major factors in improving the speed of service has been the rapid development and standardization of the printing telegraph. Replacing the Morse method of telegraphy, it has not only increased transmission speeds, but has considerably reduced the uncertain human factor that is inherent in Morse operation. This change has, moreover, done much to place the business on a basis where speed is subject to engineering development, and has made it possible to look with confidence to still further improvements, which will permit the maximum speed attainable by the highest type of operators to be utilized.

It is possible to determine the maximum speed attainable by operators at any given time, and while the standard thus set will undoubtedly improve as time goes on, the rate of increase will be slower and slower as perfection is approached. However, standards of equipment and operating practices which now exist or will be developed in the near future, will take care of the probable increase in operating efficiency for years to come. This state of affairs, which has existed only in recent years, has resulted from engineering research, which has met the economic need for apparatus and circuits that work at higher speeds than were even dreamed of a few years ago. Standards that were entirely satisfactory then are no longer sufficient to meet to-day's requirements, and they have passed into disuse as new standards are developed. The present goal in apparatus and line speeds is the removal of all mechanical and electrical limitations to operators productivity. Development of the ultimate in operating personnel is now going forward under increased effort as it becomes apparent that the maximum of efficiency is a definitely measurable quantity.

Another major factor in the advance of telegraphic communication has been the standardization of the printing telegraph as a means of speeding up the pick up and delivery of messages to large users at terminal cities. Supplementing messenger handling, it has, in many cases, provided a means of exchanging messages between customer and telegraph company much more quickly than would be possible in any other way. This development necessitated standardization of equipment, both in customers' offices and in the telegraph company's operating rooms. In the latter, concentration units, specially designed for the work have, by means of signal lights that flash the instant a call is received, facilitated the prompt answering of patrons who wish to send telegrams. Operators are able to connect their machines to any of a large number of circuits without moving from their positions. The number of idle operators is indicated by lights, thus permitting better assignment of forces and lowering costs.

Intraoffice belt conveyors and pneumatic tube carrier systems operating at almost double their former speeds have been adopted as the standard methods of moving messages from circuits on which they are received to those on which they are sent. High-speed tubes are also standard for use to nearby branch telegraph offices where conditions are such as to permit their installation.

Dissemination of market quotations over ticker circuits has been speeded up by the development and standardization of high-speed tickers that operate at 500 letters a minute, as compared to a maximum of 300 letters to a minute on older types of equipment. The new speed greatly reduces delays to market quotations during periods of intense trading activity at the New York Stock Exchange.

There are, of course, hundreds of minor ways in which standardization has served the telegraph business with excellent results. Standards of illumination that increase efficiency, standard unit switchboards, universal repeaters, tables, signs, blanks, etc., are a few of the many examples that might be mentioned. Naturally, rapid advance in the telegraph business have, up to now, caused many standards to assume a status of semipermanence. They have, however, served their purpose, and as long as they continue to be replaced by higher ones, the country is assured of having the best possible telegraphic services.

[1] General commercial engineer, Western Union Telegraph Co., New York, N. Y.

ACTIVITIES OF AMERICAN STANDARDS ASSOCIATION DURING 1931

A review of the standardization work carried on during 1931 by the American Standards Association is contained in the report rendered by Cloyd M. Chapman, chairman of the standards council. The approval of these standards has been recorded month-by-month in COMMERCIAL STANDARDS MONTHLY.

The chairman pointed out that after the council approves a standard the task is not completely rounded out until the standard is brought to the attention of industry and followed by it. It was because of this fact that a committee of the council was appointed during the year to consider ways and means of promoting the introduction of American standards into practice.

Touching on the work of the American Standards Association in the field of safety codes, the chairman's report pointed out that a definite policy has now been established by the insurance groups which will bring the insurance schedules into line with the American standard safety codes.

The program for putting this policy into effect is at present about 90 per cent complete. Furthermore, said report, the action taken in 1930 by the Association of Governmental Labor Officials in Industry, approving and indorsing the recommendations made to that association by a special committee proposing the use of the American standard safety codes as the basis of State regulations has resulted in the development of an intense interest during 1931 on the part of individual regulatory bodies in the safety code program of the American Standards Association. Arrangements have been made for the interchange of information on the development of safety codes and the results obtained from putting into effect the provisions of these codes in the several States. There now remains the actual application of the codes within the States which, of necessity, must be a gradual process, brought about by revisions of existing State codes and a realization of the necessity for developing new codes.

In the mining field, a fairly comprehensive program was outlined some years ago under the direction of the Mining Standardization Correlating Committee, covering explosives, drainage, rock dusting, transportation, and other phases of coal mining operation. Progress in the work pertaining to metal mines has been slower than on projects in the coal mining field, because it has been difficult to enlist the enthusiastic support of engineers in the metal mining program. This has undoubtedly been partly due to the trying conditions during the last few years, but there are definite signs that this inertia is becoming less pronounced. In general, the coal mining interests have progressed further in realizing the necessity for standardization, largely because mechanical methods which are more susceptible to standardization, are rapidly supplanting hand methods. Then, too, the economic necessity of producing coal more cheaply and the unquestioned desirability of providing greater protection for the health and safety of the worker have emphasized the paramount importance of setting up standard practices that will favorably influence both of these factors.

The organization during the year of the electrical standards committee foreshadows increased activity in the formulation of electrical standards, the report of the chairman stated in touching on the work done in that field. Up to the present time the electrical industry has carried its standardization work further than any other industry, except the automotive. The American Standards Association has to date approved 25 electrical standards including safety codes, specifications, definitions, methods of test, etc., for devices and materials used in all phases of electrical work. "It has been stated that the savings affected by the solution under American Standards Association procedure of the problems involved in either of the two American standard electrical codes has amounted to more than the entire cost of the association since it was organized."

STANDARDS FOR THE RETAIL TRADE

The desirability for standardizing all of the commodities sold over the retail counter was stressed by D. F. Kelly, president of the National Retail Dry Goods Association, in an address before the Boston Conference on Retail Distribution.

All of these items should be made in accordance with standards and specifications, he stated, pointing out that this method is now being employed very successfully by certain merchants.

Emphasizing the value to the retailer of standard merchandise in the building of a reputation as a good merchant, Mr. Kelly said:

> Standards should be prepared by manufacturers and retailers and approved, if possible, by the Bureau of Standards in Washington, the American Medical Association (or some other responsible laboratory), the Better Fabric Testing Bureau, or others interested, with the purpose of supplying the public with quality merchandise that will be guaranteed by the retailer.
>
> No one could question successfully the merits of an article made to standard specifications and sold under a guarantee that would carry the hall mark of a retailer responsible for the quality of every item sold.

MEN'S SHIRTS

Conforming to a request of the National Association of Shirt Manufacturers, the Bureau of Standards conducted a survey among shirt manufacturers, requesting comments and suggestions relative to shrinkage tolerances and measurements for finished, shrunk shirts.

A summary of the results of this survey was turned over to the National Association of Shirt Manufacturers, which, on December 7, 1931, offered a specification as a basis for the establishment of a commercial standard. The proposed standard covers minimum finished measurements and shrinkage tolerances for men's shirts (exclusive of work shirts), the shrinkage to be determined after laundering according to methods set up by the Laundry Owners National Association. It is expected that the proposed standard will be brought to the attention of all interested manufacturers for comment and later to the entire trade for adjustment and adoption.

BRITISH STANDARDS ASSOCIATION EXPANDS SCOPE OF ITS WORK

To provide for increased expansion of standardization work in Great Britain, the British Engineering Standards Association has been completely reorganized, and the name of the association changed to that of the British Standards Institution, according to word received from the American Consulate General at London, England.

The institution was originally formed in 1901 as the Engineering Standards Committee by a group of professional organizations, and in 1918 was incorporated by license from the Board of Trade as the British Engineering Standards Association. In 1929 it was granted a royal charter.

During the last seven or eight years the scope of the organization has been greatly enlarged, and its range has left engineering far behind. It now already partly covers the chemical, textile, and building fields, and does not exclude ships' glassware. The need of regularizing this extension of its activities has been before the council of the association on various occasions, and became imperative where great industries, like the chemical and the building, urged it to undertake the task of standardization generally so far as their particular trades are concerned.

At the imperial conference held in 1930 the desire was also expressed that there should be a single centralized national standardizing body in each of the countries forming the British Empire. The nucleus of such a body already exists in practically all the Dominions, and Charles Le Maistre, the director of the association, is now en route to Australia, New Zealand, and Canada, at the invitation of the board of trade, to further that object. It is probable, according to information received from the American consulate general, that Mr. Le Maistre may visit the United States.

The change in organization of the British body will reorganize the work into four main divisions of equal status, each division to be responsible for the preparation of standard specifications in the engineering, chemical, building, and textile industries. The divisions will be under the control of representative councils. These changes have been duly authorized by a supplemental royal charter, which also empowers the change of name.

In the future the activities of the British Standards Institution will be under the direction of a general council, which will have under it the four divisional councils. The work of the engineering division will, as heretofore, be delegated to committees dealing with the main branches of the industry, such as civil engineering, mechanical engineering, electrical engineering, etc., and will for a time still represent the major portion of operations.

The great development in the standardization movement which has taken place, especially of late years, is a clear indication that industry as a whole is increasingly recognizing its value. There are now 600 committees and more than 400 published standard specifications. The term "British standard" is the registered standardization mark.

The institution is not a profit-making concern, and, apart from the grants received from the Government and the amount derived from the sale of publications, it has to look to the associated industries for the necessary funds to finance its work. Every British firm in these industries is eligible to become a member at a nominal fee. The recent change of name now leaves the institution free to expand its activities in any direction or field. The COMMERCIAL STANDARDS MONTHLY reported in September, 1931, the proposed change in the association.

STANDARD SIZES OF TANKS PROVIDED FOR IN BRITISH SPECIFICATION

A specification for galvanized mild-steel cold-water cisterns and hot-water tanks and cylinders has been issued by the British Engineering Standards Association.

Standard sizes of tanks and cylinders are provided for, as well as two grades of thickness, which will enable the architect or engineer to specify the appropriate grade for his purpose. Tests for pressure and the quality of the galvanizing are also provided for in the specification.

Under the provisions of the specification. tanks will be recognized by their British standard number, nominal capacity, and grade, the details of which will be stenciled on the finished article.

STANDARDIZATION A PROBLEM FOR MANAGEMENT

The National Metal Trades Association, with headquarters in Chicago, through its committee on industries relations, has been making a thorough study during the past three years of steps which could be taken to stabilize employment in the metal-trades industry. The report recommends 10 major measures.

1. Develop further the technique of budgeting sales, production, buying, man load.
2. Encourage and cooperate in the collection of trade statistics.
3. Operate shops on a flexible week basis; that is, so vary the hours of work that variations in productive requirements can be met without resorting to variations in number of employees.
4. Take advantage of standardization and simplification wherever possible.
5. Within proper limit manufacture products for stock when sales levels are low.
6. Work toward minimizing unnecessary changes in style or design of products.
7. Create reservoir of odd jobs on which employees may work when reduction of productive effort must be made, through postponing in so far as practical, overhauling, rearranging, and repairing.
8. Encourage customer or consumer cooperation in discouraging minor engineering changes and in improving long-time buying programs.
9. Encourage adoption of well-balanced personnel programs.
10. Participate more closely in civic affairs especially those which have to do with making possible the creation of peaks in public-works employment corresponding to low points in industrial employment.

FEDERAL TRADE COMMISSION'S ANNUAL REPORT

More than 100 trade groups were affected by decisions of the Federal Trade Commission with regard to trade practice conference rules during the past fiscal year, according to the annual report of the commission, made public December 14. The commission reports its reconsideration of trade practice conference rules of many industries as another activity large in scope because of the number of industries interested.

Concerning its special board of investigation handling certain types of unfair advertising cases, the commission says that in many cases the parties concerned have either agreed to go out of business, discontinue advertising, or revise their advertising copy and literature to eliminate statements or representations which are untrue, misleading, or have the capacity and tendency to deceive and mislead the reader.

During the fiscal year for which the report is rendered the commission investigated applications for complaints preliminary to the correction of unfair methods of competition of 1,380 cases, while 523 applications were disposed of. The commission approved 165 stipulation agreements in which various individuals and companies agreed to cease and desist from unlawful practices. All but one of the 109 formal complaints issued during the year charged use of unfair methods of competition violative of the Federal Trade Commission act, including one involving alleged violation of this act as extended by the export trade act.

The commission's report is divided into seven parts, as follows: Introduction, general investigations, general legal work, trade practice conferences, special procedure in certain types of advertising cases, export trade work, and documents and summaries.

COMMERCIAL FORMS RECOMMENDATION REAFFIRMED

The standing committee in charge of simplified practice recommendation No. R37–28, Invoice, Purchase Order, and Inquiry Forms, met on November 10, 1931, in Washington, and considered all comments and suggestions received during the past year relative to possible revision of these standard forms. The committee unanimously decided to reaffirm the present schedule without change.

W. L. Chandler, chairman of the committee, reported that the National Association of Purchasing Agents had recently made a study of purchase order and inquiry forms, with a view to determining specific wording in lieu of the present system of zones. He further stated that a similar study was being made by the Harvard School of Business Administration for the National Association of Purchasing Agents, and that in addition to a standard phraseology, certain possible legal aspects would be given thorough consideration. It is expected that this report will be ready some time in January, 1932. Therefore, the standing committee agreed to take no action on the purchase order and inquiry forms until the results of the Harvard study are available. It was decided that the committee members should be afforded an opportunity to study the Harvard report and secure any necessary authorizations from their respective organizations. Subsequently another meeting of the committee will be held to formulate such definite action as may appear desirable.

Through its devision of simplified practice, the Bureau of Standards reported that a list had been prepared for distribution, showing the names of more than 1,000 trade associations and individual companies which have formally accepted the recommendation. Forty-five associations which have, as corporate groups, indorsed these forms have an aggregate of more than 106,000 members.

The meeting voted to enlarge the membership of the committee so as to include representatives from a number of associations directly connected with standard commercial documents. The division of simplified practice was requested to communicate with the proper officials of these organizations regarding the appointment of representatives, and to make a report to the next meeting of the committee.

LUMBER STANDARDS DEVELOPED IN SOVIET UNION

Lumber sawing was, and remains, the basic problem in the Soviet Union lumber industry during its 5-year plan. The wooded area of the Soviet Union comprises 901,900,000 hectares or about one-third of the timber supply of the world, and almost three times as much as the rest of Europe possesses. Obviously, the first problem to be tackled in the industry was the creation of standards for lumber materials.

In a recent issue of the Bulletin of Standardization published in Moscow there appeared a résumé of the standardization program for the lumber industry during 1931. The principal standards developed prior to 1931 were for logs of the fir variety and scales for sawn wood of the fir family. The program for 1931 called for the the standardization of sawn wood materials of the fir variety, inasmuch as this production covers a large part of building materials and also materials of special production.

The program for 1931 furthermore includes groups of lumber materials of special purposes; wagon construction, agricultural machine construction and aviation construction. Provision is made to include items which are especially needed in establishing technical methods and standards. The program further includes the standardization of lumber materials having actual importance for construction and of lumber materials of deciduous wood having a wide application in special production.

Considering the necessity of the fullest possible utilization of raw material, the program provides for the standardization of a number of auxiliary products of lumber, and for the standardization of assortments of particular importance for other branches of industry, such as balances for the paper industry, mining supports and blocks for the coal and ore industries.

Taken as a whole there are 66 subjects covered in the program for 1931, of which 9 are for raw materials, 28 for semifinished products, 16 in typification of equipment, 10 for ready or stock items, and 3 for containers. In giving its approval to the program, the All-Union Committee on Standardization added 11 other proposals covering typification and establishment of technical processes for instruments.

WALL-PAPER STANDARD REAFFIRMED

The standing committee of the wall-paper industry recently signified its desire to have the Commercial Standard for Wall Paper, CS16–29, reaffirmed for another year. The industry was notified accordingly on December 16, 1931.

This standard of quality is based on several important characteristics of a serviceable wall paper, chief among which is color fastness. Other requirements concern the weight of the raw paper, the size of the rolls, and the ground coating applied prior to the printing of the pattern.

Some desire was expressed for a revision of the standard to make it more stringent, particularly as to the weights of raw stock to be used, but due to conditions in the trade, such revision was deemed inexpedient at the present time.

CERTIFICATION AND LABELING

In May, 1930, the National Electrical Manufacturers Association requested the American Standards Association to investigate the certification plan inaugurated and developed by the Bureau of Standards, and in August, 1930, the American Home Economics Association requested the American Standards Association to investigate methods of safeguarding the interests of the ultimate consumer when labels in term of specification are used.

Following a preliminary discussion of these requests, the council of the American Standards Association referred the matter to the board of directors which appointed a special committee on certification and labeling.

On behalf of the committee of the board, there was compiled by the American Standards Association staff, by direct contact and correspondence with considerably more than 100 trade and professional associations and Government departments, data relating to a considerable body of experience accumulated in the use of the certification and labeling methods to assure consumers that products are in accordance with certain designated specifications.

Brief sketches concerning the methods employed by the larger percentage of the agencies with which the American Standards Association committee communicated were given in the COMMERCIAL STANDARDS MONTHLY, January, 1931, in an article entitled "Making Standards Effective," which represented a compilation of the plans of various agencies to encourage the use of their specifications and standards.

On October 14, 1931, the committee submitted its report to the American Standards Association board of directors which expressed the opinion that the subject is an important and far reaching one which will require further study on the part of both the committee and the board.

The following are the points which were presented to the board, and discussed by it.

1. Any program of certification, labeling, or grade marking, in order to be adequate, should be based upon specifications which are publicly available and nationally recognized.

2. It is for the group or groups substantially concerned with the specifications to decide whether there is to be certification or labeling; and the A. S. A. itself can not directly take any primary responsibility in respect to such activities.

3. Any certification or labeling program should be effectively supervised by a properly qualified body; for example, a trade association, or a testing laboratory, operating under proper administrative management.

4. It is suggested to the member bodies that they make a study to determine to what extent certification and labeling would be advantageous or disadvantageous to their work.

5. It is suggested that the board of directors discuss whether the A. S. A. or the staff should promote such activities among member bodies.

S. A. E. CONSIDERING 75 STANDARDS

More than 75 projects in progress before the various divisions of the standards committee of the Society of Automotive Engineers, include mountings for airplane cameras, wood propellers, carbureters, and other aircraft fittings; a standard for taper roller bearings; Diesel-engine fittings and their mountings; and revised specifications for insulated wire and cable and storage batteries for various types of vehicle.

In the metallurgical field, work is in progress on further development of iron and steel specifications and physical-property charts, including aircraft steels and nonferrous metals.

A study of motor-vehicle chassis lubrication, to simplify both fittings and lubricants, is in progress, while in the field of screw-thread products the refinement of existing standards for screw threads, screws, bolts, and nuts, and a broad survey of modern requirements in practice are probably the most important projects.

PHOSPHOR-BRONZE CASTINGS AND GEAR BLANKS

The British Engineering Standards Association has issued a specification which provides for the chemical composition and physical properties of phosphor-bronze castings and gear blanks.

The specification covers centrifugal, chill, and sand castings, and the manner of providing test samples for each of these methods of casting and for castings of various weights is outlined. Tensile and Brinell hardness tests are specified, while general clauses dealing with testing facilities, and the freedom of castings from defects are included.

WOODEN BUTTER TUBS

Simplified practice recommendation covering wooden butter tubs has been mailed, by the Bureau of Standards, to all interests for the consideration and written approval. This simplification program establishes dimensions for the inside diameters of the top and bottom, the inside vertical depth, and the outside length of stave for the 10, 33, and 63/64 pound tubs. The recommendation will be effective one month after the division's general announcement that the necessary volume of acceptance has been received.

PUBLICATIONS

How to own your home.—Buying or building a home requires the use of sound judgment in seeing that the personal needs of the family are best met with the funds available. It involves not only the carrying on of transactions of financing and buying or building, but it involves the proper determination of location with respect to school, to work, and to neighborhood. Maintaining a high percentage of individual home owners is one of the searching tests that now challenge the people of the United States. The contribution of the Bureau of Standards is represented in its handbook for prospective home owners, How to Own Your Home (BH17), prepared by John M. Gries and James S. Taylor. It is obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents per copy.

Recommended minimum requirements for plumbing.—The Bureau of Standards has issued a supplement to its circular on Recommended Minimum Requirements for Plumbing, which may be secured from the Superintendent of Documents for 10 cents a copy. In the supplement the subcommittee on plumbing of the Department of Commerce Building Code Committee recommends that certain sections of the previous report be eliminated and that the modified sections in the supplement be substituted therefor. In taking this action the committee is following its policy of periodically examining available data and adjusting its recommendations so as to take advantage of increased knowledge of the subject. It offers the changed sections as a progress revision pending the time when experimental work now under way will develop further information.

Sheet-metal gages.—Common or stock sizes of metal plates and sheets are based either on definite thicknesses or on definite weights per unit area. In some cases the same kind and grade of sheet metal is made to conform to more than one list of stock sizes or sheet-metal gage. Realizing the need for information as to the usual practice of American manufacturers with regard to stock thicknesses or weights of sheets and plates of common metals and alloys, the Bureau of Standards recently compiled its Circular No. 391, on Standard Thicknesses, Weights, and Tolerances of Sheet Metal (Customary Practice). The circular also contains information with regard to manufacturing tolerances on thickness or weight adopted by American technical societies, manufacturers' associations, and standardizing bodies, or used by leading manufacturers. This circular is available on purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C.

SIMPLIFYING SINGLETREES, DOUBLETREES, ETC.

A simplification program covering singletrees, doubletrees, neck yokes, plow sets, and similar items was approved at a general conference of the industry held in Chicago in November. Accumulation of many sizes and varieties over a period of years developed the need for a sound simplification program, having for its purpose the selection of items which would meet the normal requirements of the trade.

A survey of current demand, disclosed the items which should be retained, and these were approved by the conference. It is estimated that approximately 90 per cent of items formerly catalogued will be eliminated by this program.

A report of the conference, containing the recommendation, will be mailed to the industry in the near future for acceptance. Should the program receive the required support, it will be printed and published in the interest of waste elimination through cooperative simplification.

STAPLE VITREOUS CHINA PLUMBING FIXTURES REAFFIRMATION

The Commercial Standard for Staple Vitreous China Plumbing Fixtures, CS20–30, has been reaffirmed, without change, for another year beginning March 3, 1932. This action was taken upon the recommendation of the standing committee after considering the results of an adherence survey undertaken in cooperation with the manufacturers of vitreous china plumbing fixtures.

The report summarizing the results of the survey was based on replies from 19 manufacturers of this commodity, 4 or whom indicated 100 per cent adherence to the requirements of the standard. The average unweighted adherence to standard regular selection grade was 85.8 per cent. The unweighted average adherence on marking of culls was 91.4 per cent. Complete adherence to standard types and sizes was reported by seven manufacturers; one reported no adherence; the unweighted average adherence was 89.7 per cent.

The chief reasons for deviation from the standard were (1), the demand from purchasers for a few articles of special equipment, and (2), the fact that a few molds had not been altered to commercial standard measurements.

Actual direct benefits from the establishment of the commercial standard were reported by 17 manufacturers, while no benefits were reported by 2. Further details are made available in the report.

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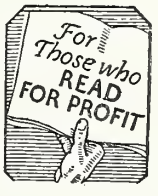

COMMERCIAL STANDARDS MONTHLY

This new governmental periodical is a review of progress in commercial simplification and standardization. It is the only journal of its kind. It covers the national movement initiated by President Hoover for the reduction of needless sizes and varieties of products and the promotion of voluntary commercial standardization by industry.

The Secretary of Commerce in the first issue of this new journal said: "Certain standards, such as those used for weights and measures, * * * have been fixed by legislative enactment. Mandatory standards of this character, however, are few in number when compared with the large and steadily growing volume of standards developed by industry and commerce and voluntarily maintained. * * * The activities of the Commercial Standardization Group of the Bureau of Standards are concerned with standards adopted by voluntary agreement."

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R. P. LAMONT, Secretary of Commerce

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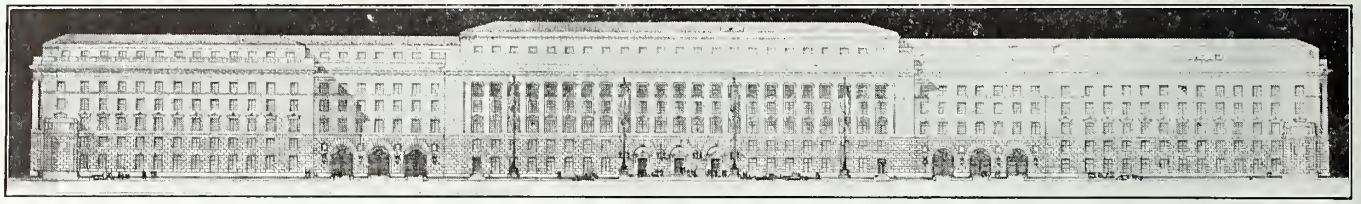
—President Hoover, at the laying of the corner stone of the new building of the U. S. Department of Commerce, June 10, 1929.



AERONAUTICS BRANCH, Clarence M. Young, Assistant Secretary of Commerce for Aeronautics.

Establishment of civil airways and maintenance of aids to air navigation; inspection and registration of aircraft and licensing of pilots; enforcement of air traffic rules; investigation of accidents; encouragement of municipal air ports; fostering of air commerce; scientific research in aeronautics; and dissemination of information relating to commercial aeronautics. (Some of these functions are performed by special divisions of the Lighthouse Service, the Bureau of Standards, and the Coast and Geodetic Survey.)

BUREAU OF THE CENSUS, William M. Steuart, Director.

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Compilation quarterly or monthly of statistics on cotton, wool, leather, and other industries; annually of forest products.

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The study of the processes of domestic trade and commerce.

BUREAU OF STANDARDS, George K. Burgess, Director.

Custody, development, and construction of standards of measurement, quality, performance, or practice; comparison of standards used by scientific or other institutions; determination of physical constants and properties of materials; researches and tests on materials and processes; and publication of scientific and technical bulletins reporting results of researches and fundamental technical data.

Collection and dissemination of information concerning building codes and the planning and construction of houses.

Establishment of simplified commercial practices through cooperation with business organizations in order to reduce the wastes resulting from excessive variety in commodities.

BUREAU OF MINES, Scott Turner, Director.

Technical investigations in the mining, preparation, and utilization of minerals, including the study of mine hazards, and safety methods and of improved methods in the production and use of minerals.

Testing of Government fuels and management of the Government Fuel Yard at Washington.

Research on helium and operation of plants producing it.

BUREAU OF MINES—Continued.

Studies in the economics and marketing of minerals and collection of statistics on mineral resources and mine accidents.

The dissemination of results of technical and economic researches in bulletins, technical papers, mineral resources series, miners' circulars, and miscellaneous publications.

BUREAU OF FISHERIES, Henry O'Malley, Commissioner.

The propagation and distribution of food fish and shellfish, in order to prevent the depletion of the fisheries; investigations to promote conservation of fishery resources; the development of commercial fisheries and agriculture; study of fishery methods, improvements in merchandising, and collection of fishery statistics; administration of Alaska fisheries and fur seals; and the protection of sponges off the coast of Florida.

BUREAU OF LIGHTHOUSES, George R. Putnam, Commissioner.

Maintenance of lighthouses and other aids to water navigation. Establishment and maintenance of aids to navigation along civil airways. Publication of Light Lists, Buoy Lists, and Notices to Mariners.

COAST AND GEODETIC SURVEY, R. S. Patton, Director.

Survey of the coasts of the United States and publication of charts for the navigation of the adjacent waters, including Alaska, the Philippine Islands, Hawaii, Porto Rico, the Virgin Islands, and the Canal Zone; interior control surveys; magnetic surveys; tide and current observations; and seismological investigations. Publication of results through charts, coast pilots, tide tables, current tables, and special publications.

BUREAU OF NAVIGATION, Arthur J. Tyrer, Commissioner.

Superintendence of commercial marine and merchant seamen.

Supervision of registering, enrolling, licensing, numbering, etc., of vessels under the United States flag, and the annual publication of a list of such vessels.

Enforcement of the navigation and steamboat inspection laws, including imposition of fees, fines, tonnage taxes, etc.

STEAMBOAT INSPECTION SERVICE, Dickerson N. Hoover, Supervising Inspector General.

The inspection of merchant vessels, including boilers, hulls, and life-saving equipment, licensing of officers of vessels, certification of able seamen and lifeboat men, and the investigation of violations of steamboat inspection laws.

UNITED STATES PATENT OFFICE, Thomas E. Robertson, Commissioner.

The granting of patents and the registration of trade-marks, prints, and labels after technical examination and judicial proceedings.

Maintenance of library with public search room, containing copies of foreign and United States patents, and trade-marks. Recording bills of sale, assignments, etc., relating to patents and trade-marks. Furnishing copies of records pertaining to patents Publication of the weekly Official Gazette, showing the patents and trade-marks issued.

RADIO DIVISION, W. D. Terrell, Chief.

Inspection of radio stations on ships; inspection of radio stations on shore, including broadcasting stations; licensing radio operators; assigning station call letters; enforcing the terms of the International Radiotelegraphic Convention; and examining and settling international radio accounts.

U. S. GOVERNMENT PRINTING OFFICE: 1932