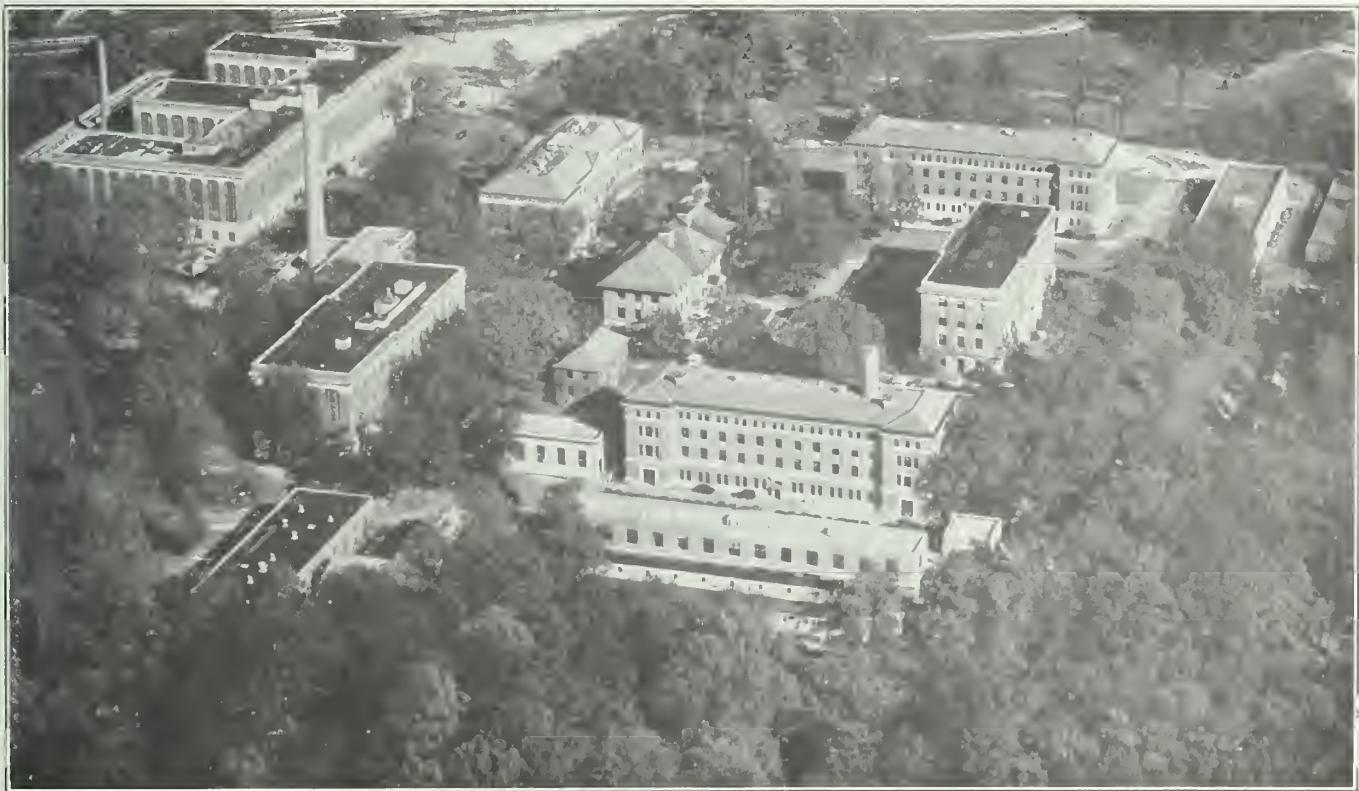


MAY 29 1931

# COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in  
Commercial Standardization and Simplification*



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

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

Vol. 7, No. 11



MAY, 1931

## 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.

### 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 Non-metallic Minerals and their Products." It also aids in preparing the Standards Yearbook.

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

### 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.



# COMMERCIAL STANDARDS MONTHLY

## A Review of Progress in Commercial Standardization and Simplification

VOLUME 7

WASHINGTON, D. C., MAY, 1931

NUMBER 11

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### AN INVITATION TO VISIT THE NATIONAL BUREAU OF STANDARDS

A cordial invitation is extended to all interested in scientific progress to visit the laboratories of the National 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, basic contributions to radio, aviation, and other modern arts and industries.

# Liquid Helium

*On April 3, 1931, Liquid Helium, The Most Difficult  
Of All Gases to Liquefy, Was Produced At The  
National Bureau of Standards*

**L**IQUID HELIUM was produced for the first time in the United States in the low temperature laboratory of the National Bureau of Standards on April 3, 1931.

Helium is the most difficult of all gases to liquefy, the boiling point of the liquid being minus 452° F., or only 7.4 degrees above absolute zero. The extremely low temperature which this represents will be realized when one considers that it is approximately 142° below the temperature of liquid air.

The process used in the production of liquid helium is an extremely complex and difficult one. It involves the progressive production of lowered temperatures by brine, carbon dioxide, liquid air, liquid hydrogen, and finally by expansion of the helium to produce liquid helium. By "boiling" the helium under a high vacuum, a temperature of minus 456° F. was obtained. The establishment of fixed points on the temperature scale from the lowest to the highest attainable temperatures is one of the basic functions of the National Bureau of Standards. Naturally, the greatest difficulty is experienced in setting up standards at the two ends of the scale. Such fixed points as the freezing and boiling points of water and the "freezing" point of gold no longer present any particular difficulties. But in only three other places in the world—Leiden, Holland; Toronto, Canada; and Berlin—has helium ever been liquefied. The successful production of liquid helium at the bureau will aid in the accurate establishment of another low fixed point for the further extension of the International Temperature Scale.

The full significance of this accomplishment can not, of course, be predicted at the present time, but there is no question that it is of the highest scientific importance. Many of the phenomena of modern physics, such as some of the postulates of Einstein and others, can be studied only at these extremely low temperatures.



## SIMPLIFICATIONS FOR HOUSEHOLD GOODS

### Labels Aid Consumer in Daily Purchases

By FAITH M. WILLIAMS, *Bureau of Home Economics*<sup>1</sup>

Women are interested in seeing standard grades developed for brooms as well as for other types of household equipment. If the manufacturers have been considering the development of standard grades primarily as a means for eliminating unfair competition within their own industry, they may not have realized that women are very much concerned about the construction of the everyday things they buy. With the enormous development in the last 25 years of new kinds of things for use in the household, every housewife is under a great pressure to make her every purchase satisfactory, to indulge in no mistakes.

Every month new toys are being put on the market for both adults and children. The electric train in the shop window creates an urgent demand in the breast of the small boy who sees it in the same way that a shiny new car makes his father feel that somehow or other economies must be affected in the family's everyday purchases so that the "old bus" may be replaced with a beautiful new model.

To the housewife is brought the problem of managing her buying in such a way that the needs of the family for nourishing food, for warmth, for shelter, for education, and for recreation may be met in the most satisfactory way. In order to solve some of her problems in economy, she is beginning to ask that standard specifications for staple household goods be developed in such a way that her purchases may result in more satisfaction for the money she spends. She has heard that at the present time many farm products are graded for sale according to standards set up by the Bureau of Agricultural Economics. Manufacturers have for a long time been writing accurate descriptions of the raw materials and partly finished goods they purchase. The National Bureau of Standards has worked with industrial and commercial agencies in setting up simplification recommendations that have limited the production of various articles to a given number of sizes and thereby cut down manufacturing costs. The Federal and State Governments have worked out specifications for purchases for various Government institutions.

For some time the Bureau of Home Economics of the United States Department of Agriculture has been cooperating with the American Home Economics Association and with manufacturers and distributors under the auspices of the American Standards Association, in the development of standard tests and specifications and of more satisfactory labels for different grades of refrigerators, bed blankets, and sheets. There are some housewives, of course, who will not take the trouble to learn anything about the details of construction, and are satisfied with a label which simply guarantees quality, but there are many more who want to know whether the construction of the article about to be purchased fits their particular needs, and the prices asked by their particular retailers.

Last year the Bureau of Home Economics and the American Home Economics Association received so many requests for information on the subject of standard specifications for household goods that they cooperated in the compilation and publication of a booklet entitled "Household Purchasing; Suggestions for Club Programs." It outlines the material available for club programs on "difficulties the consumer meets in the present market," "food standards and grades," "food containers, weights and measures," "quality standards and grades for foods," "buying textiles and clothing," "household equipment," and "what the Government can do to help the consumer."

This booklet will be revised from time to time to include information about new developments in the standardization of grades for household goods, such as the new grades which may be established for brooms. The book is in very general use this year. Some of the leaders in the General Federation of Women's Clubs are using it in planning study programs, and it is being widely used in the home economics clubs established by the extension service of the United States Department of Agriculture.

Another large group of women who are using specifications for household goods in as far as they are available, are teachers of home economics in high schools and elementary schools. They want to have definite facts, definite measurements to use in their classroom work. They want to have concrete material to give their students which will help them to improve the economy of the homes of which they are now a part and to organize effectively the homes of which they will have charge in the future.

In 1928 the Federal Office of Education estimated from figures then available that there were approximately 9,000 high schools throughout the country where home economics was being taught and approximately 500,000 girls taking home economics courses in these schools. More recent figures indicate that the number is increasing. These high-school teachers are constantly saying to those of us who are interested in standard tests and standard specifications, "What things are there in the stores to-day which are adequately labeled so that we can say to our students, 'this piece of equipment should be constructed thus and so for this purpose, and you should look for such and such facts on the label'?"

We hope that the broom industry will be able to develop standards for household brooms which will really meet the needs of the women who use brooms, and which will define the construction of brooms of different grades in such a way that the standards can properly be incorporated into courses which teach the basis for selecting household equipment.

As I understand the needs of the woman who uses brooms, she is first concerned with the quality of the broomcorn used in the construction of the brooms she purchases. She wants brooms that will sweep efficiently and will stand up under hard wear. Since the Bureau of Agricultural Economics has developed

<sup>1</sup> Abstract from speech delivered before Jan. 14, 1931, meeting of the Broom Institute, held in Washington, D. C.



standards for grading broomcorn, the problems involved in securing satisfactory broomcorn must have been greatly simplified. After she knows that the broom corn is of the right quality, the housewife wants to know that the brooms she buys are so made that they will look neat and trim throughout the period of their use; that the shoulders will not bulge and break after a short period of wear. On this account she is concerned with the methods by which her brooms are constructed, the amount the handle extends into the neck and body of the broom, the way the ties and stitches are made, and the strength of the twine and wire used. In addition, the woman who

does a great deal of sweeping, and thus uses several brooms in a year is especially interested in brooms having a light but strong handle. The weight of her broom is of considerable importance to the housewife. She wants to know that she is buying a firm, compact brushing surface with no skimping of the quality or quantity of broomcorn, with a handle made of wood which is as light as is consistent with service.

I believe that the broom industry's program of standardization may be very helpful in getting the housewife what she wants as well as in helping the trade to eliminate unfair competition.

## STATE-WIDE SIMPLIFICATION PROGRAM

### California State Chamber of Commerce Actively Engaged in the Elimination of Waste

In October, 1929, the California State Chamber of Commerce indicated its readiness to serve as the contact agency in California for the division of simplified practice of the National Bureau of Standards. This arrangement afforded a direct avenue through which the use of simplified practice recommendations could be encouraged and by which suggestions for new projects could be routed to the bureau.

This state-wide simplification program has been in operation for almost two years. Reports from the California State Chamber of Commerce show that favorable results have been achieved. As an outgrowth of the general plan, many specific objectives have been determined and committees appointed to attain these goals.

The cooperative simplification movement has developed through the customary three stages: (1) General education as to the philosophy of simplified practice and the building of interest in local applications; (2) acceptance of existing simplified practice recommendations; and (3) initiation of new simplified practice recommendations. The first stage consisted of the writing and publication of articles dealing with simplification and standardization. Speeches were made by industrial leaders and executives of trade associations before conventions, conferences, and other meetings. This promotional work aroused general interest by showing that simplified practice is an economic principle, the adoption of which results in direct and tangible benefits.

Several simplification committees were appointed to study safety codes, business codes, and other practices susceptible of simplification. Their initial efforts were necessarily confined to generalities, educational programs, and promotional activities. The committees are now engaged in certain specific programs.

The simplification committees report that (1) 103 California firms are using the simplified invoice forms, (2) 76 foundries have adopted standard specifications for castings, (3) 74 foundries have adopted standard patterns for castings, (4) 45 foundries have adopted standard sales agreement and trade customs, and (5) 25 California manufacturers of common brick have adopted one standard size.

The California committee is also using its best effort to gain additional support for simplified prac-

tice recommendation No. 26, steel reinforcing bars. This program, which was first proposed by the industry in 1924, recommends a reduction in the number of cross-sectional areas of bars (from 32 to 11) in accordance with normal demand as determined by a variety survey.

The committee, interested in the problems of steel reinforcing bar distributors, is also seeking information relative to the practicability of concentrating on a single grade for new billet steel reinforcing bars.

Under the head of new projects may be mentioned the simplification of items of pole line hardware, used principally by public utilities. The California group is now conducting a variety survey and has requested the cooperation of the National Bureau of Standards in establishing a recommendation for these items. The importance of this study will be realized when it is recalled that California ranks second in both the production and consumption of electricity.

Among its objectives for 1931, the California committees have listed the following: (1) To secure acceptance of 50 foundries of standard sales agreement and trade customs; (2) to collaborate with the California Industrial Accident Commission in drafting standard safety regulations; (3) to formulate standards for 12 items of pole line hardware, thereby increasing the number of standards from 8 to 20. Still other objectives will be developed in the course of the year.

For 1931, it is proposed to draw attention to the effective simplified practice recommendations covering the following commodities: (1) Reinforcing steel—secure state-wide adoption by reinforcing steel companies; (2) Common brick—secure adoption by 17 additional companies, the support of 25 firms having already been secured; (3) bank checks, drafts, etc.—obtain adoption by 10 leading California printing firms.

The progress made by the California group in promoting the elimination of waste through simplified practice and standardization has attracted the attention of groups in other parts of the United States, and it is probable that similar state-wide programs will be inaugurated in those areas. Moreover, this regional activity, in the interest of programs national in scope, has given renewed impetus to the present simplification and standardization work of trade association and other groups.



## STANDARD FITS AND TOLERANCES FOR CYLINDRICAL PARTS

### Proposal for Internationally Uniform System of Fits Being Considered

By JOHN GAILLARD, *American Standards Association*.

Standard fits between cylindrical parts determined by definite values for the allowances between the internal and external parts and for the tolerances on these parts are of fundamental importance to the mechanical and other industries. In fact, standard manufacturing limits are indispensable in any scheme of mass production where parts made in large quantities must be interchangeable.

Special attention was paid to standardization of fits in all industrial countries of the world after the World War. Production of war material had required strict application of the principles underlying interchangeability, and the economic pressure of the postwar period emphasized the importance of limit gaging in mass production as a means of increasing the efficiency of manufacturing processes and of lowering production cost.

In 1920 a technical committee—a so-called sectional committee—was established under the auspices of the American Standards Association (A. S. A.), then still called American Engineering Standards Committee, to deal with the above subject. Its work was sponsored by the American Society of Mechanical Engineers (A. S. M. E.). After making a canvass of the tolerance systems in use with a number of manufacturing concerns in the United States, the technical committee established a standard entitled "Tolerances, Allowances, and Gages for Metal Fits" which was approved in 1925 by the A. S. A. as a tentative American standard.

In spite of the fact that the interest in, and the art of establishing and standardizing fits had considerably increased in recent years, the tentative American standard has not been widely adopted in practice by American industry. Apparently there are three main reasons for this condition.

Limit gaging is still being applied by only a fraction of the manufacturing concerns that could apply its principles with advantage. Furthermore, a number of industrial concerns that are well aware of this advantage had a system of fits of their own at the time the American standard was adopted.

Transition to a new standard requires some time, under these circumstances, due to the investment in tools, gages, and other equipment, and the responsibility for supplying replacement parts for products made to the old company standard which are still in operation in industry.

Finally, criticism has been raised against the tentative American standard, some of which, in the writer's opinion, is well founded, while other objections are not compatible with the basic principles underlying a national standard system of fits, as will be seen in the following.

Reviewing the several fundamental features of the American standard, it will be found that the reference temperature for limit gages of 68° F. has been generally adopted in this country. No objection to

this value has been raised. The adoption of standard holes with plus tolerances on the nominal size had been criticized because of the fact that such holes can not be finished economically with commercial stock reamers as now commonly supplied by the tool manufacturers.

In fact, these reamers are made with a small plus tolerance on nominal size, and consequently wear down rather quickly to the point where they begin to produce undersize holes, that is, holes smaller than nominal size. American standard holes not being allowed to be smaller than the nominal size, the reamers must then be rejected even though they have still more "wear life" left.

Evidently this difficulty is due to a lack of harmony between the present manufacturing limits of reamers—which were established before the standard holes were adopted—and the limits of the standard holes. Maintenance of the nominal size as the low limit of standard holes being of fundamental importance in a national standard, it would seem logical to adjust the reamer limits to those of the standard holes. This step has already been taken, for example, in Germany, where a national system of fits giving entire satisfaction to all major branches of industry, has been generally adopted.

Another objection voiced by some concerns is the lack of a series of fits in the "basic shaft" system; that is, a system where the shaft is kept nominally constant while the hole diameters are varied to give the desired fits. Concerns able to use to advantage bar stock supplied by the mills in cold finished or ground condition—such bar stock not requiring a machine finish in the shop—could use in principle a basic shaft system to greater advantage than a basic hole system, as now exclusively given in the American standard. Although the basic hole system is the one preferably to be used by the majority of manufacturing concerns, the percentage of cases where the basic shaft system should be applied, appears to be large enough to call for addition of this system to the existing standard.

It has also been shown that the number of standard fits might well be increased in order to make the system more flexible in the hands of the designer. In fact, the most important foreign national systems give more than 20 different combinations of a standard hole and shaft, each of these combinations representing a complete fit, whereas only 8 of such complete fits are specified in the American standard.

Some firms in this country have used the tentative American standard with entire satisfaction, but have found it desirable to reduce the number of steps in the range of diameters, the steps as given in the standard being unnecessarily small, in their opinion.

The American Society of Mechanical Engineers, as sole sponsor for the project, decided in the fall of 1930 to reorganize the original technical committee in



order to have the existing standard reviewed with regard to the desirability or necessity of revisions or additions. The first meeting of the reorganized committee on Allowances and Tolerances for Cylindrical Parts and Limit Gages, was held on December 5, 1930, in New York.

The present situation in the United States and abroad was reviewed by the writer, and some of the points which have been subject to criticism from industry were discussed in the meeting.<sup>1</sup> Consideration was given also to the international situation. Under the auspices of the International Standards Association (I. S. A.), a federation of 18 national standardizing bodies of which the A. S. A. is a member, the

<sup>1</sup> For details see *Tolerances and Tools*, by D. W. Ovalitt, *American Machinist*, June 5 and 12, 1930; and the writer's discussion of these articles in *American Machinist*, Nov. 6, 1930. The discussion held at the meeting was along similar lines as given in these articles.

project "Fits between cylindrical parts" has been taken up in a preliminary way by a subcommittee of 5 members representing the national standardizing bodies of Czechoslovakia, France, Germany, Sweden, and Switzerland, which is developing a proposal for an internationally unified system of fits.<sup>2</sup>

This proposal will be submitted to all national standardizing bodies for criticism and comment. The A. S. A. having been invited to cooperate in this work, the question was laid before the new A. S. A. technical committee at its reorganization meeting. It was unanimously decided that the committee would cooperate with the I. S. A. technical committee and give due consideration to the international proposal when circulated by the American Standards Association.

<sup>2</sup> See *International Unification of Standard Fits*, by the writer, *Mechanical Engineering*, October, 1930.

## QUALITY STANDARD FOR RED CEDAR SHINGLES

### Industry Certifies Adherence to Standard Through Use of Quality Labels

One of the most representative groups of the shingle industry ever assembled, met at the Olympic Hotel, Seattle, Wash., on March 27, 1931, and recommended the adoption of a high commercial standard of quality for western red cedar shingles.

The conference was called by the division of trade standards of the National Bureau of Standards at the request of the Red Cedar Shingle Bureau, and practically all the more important red cedar shingle manufacturers, as well as many staining companies, distributor, and consumer representatives, were present to offer their advice and comment.

As set forth in the proposal, which was unanimously approved by the conference, the purpose of the standard is as follows:

This quality standard is recommended for western red cedar shingles as a basis of common understanding between manufacturers, distributors, and users. By its general acceptance, use, and certification by labels, it is hoped that interest may be increased in the manufacture, sale, and use of high-grade wood shingles which should redound to the mutual advantage of all concerned.

Manufacturers fully realize that protection and service afforded by wood shingles and, consequently, the success of their industry, is in direct proportion to the quality of shingles used and, therefore, offer the following recommended commercial standard of quality for guidance in the manufacture, sale, and use of their product.

The requirements of the commercial standard shingle cover the highest class product of the cedar shingle manufacturer comprising only those shingles with 100 per cent edge grain and 100 per cent clear heartwood and include other exacting requirements that reflect serviceability of the shingles, such as specific natural defects in the wood as well as defects of manufacture, uniformity of size, etc. In general, this commercial standard grade is the same as the "A" grade shingles described in the American Lumber Standards and published in *Simplified Practice Recommendation No. 16*.

It is the intention of the Red Cedar Shingle Bureau to initiate a campaign in which self-certifying, quality-guaranteeing labels may be applied to those shingles which meet the requirements of the commercial standard and in this manner provide a simple method of identifying those shingles, the durability and service of which can be fully guaranteed by the Red Cedar Shingle Bureau and the mill that produced them.

This plan, when in satisfactory operation and upon general acceptance of the commercial standard, will provide a definite and unmistakable basis for the specification of high-grade cedar shingles by architects, contractors, and home builders, as well as building and loan associations, insurance companies, and banks who are desirous of differentiating between cedar shingles of ordinary grade and those of commercial standard quality—the highest grade produced.

One of the incidental features of the conference, which well illustrates the progressive attitude of all those in attendance, was the recommendation for the elimination of the "thousand pack," as applied only to shingles of the commercial standard grade. The thousand pack is a remnant of the days when wood shingles were cut to even widths of 4 inches, and as used to-day it has no bearing on the number of shingles to the bundle and constitutes an element of confusion in the minds of many shingle distributors and prospective users. In addition to facilitating the procurement of the required number of shingles for any particular job, the simplification of the packing methods comes as an answer to the request of hundreds of retail distributors who were desirous of a ready means of comparison between wood shingles and other forms of roofing.

Those interested in red cedar shingles may obtain mimeographed copies of the recommended commercial standard by addressing the division of trade standards, National Bureau of Standards, Washington.



## PRINTING INDUSTRY ACTIVE IN STANDARDIZATION

### International Need for Uniform Printing Equipment and Nomenclature

Realizing the need for definite standards in the manufacture of printing plates, the International Association of Electrotypers of America, through its standardization committee, has for some time been trying to determine what standards would best meet the needs of the industry. Through the cordial cooperation of similar committees from the American Newspaper Publishers Association and the American Association of Advertising Agencies, it was found that the points involved were relatively simple, although there were wide differences in practice in various electrotyping establishments. These differences often proved expensive and annoying, particularly when plates from different electrotypers were used at the same time in a given issue of a publication.

A number of practical tests were made, and a series of experiments undertaken, before final recommendations were made, so that as finally adopted at the 1930 annual convention of the International Association of Electrotypers, these recommendations represented the consensus of opinion of all the interested parties. In setting up the recommended standards, it was recognized that the commercial manufacture of electrotypes, particularly under the hurried conditions which often seem unavoidable, and the quantity production necessary, would make it exceedingly difficult to maintain standards of perfection. Hence, an allowable "tolerance" in thickness was included and specified. The standards are as follows:

*Thickness of unmounted electrotypes.*—When made for use as "ad plates," 0.105 inch in thickness; tolerance, plus or minus, 0.002 inch; when made for "patent bases," and recognizing as a standard base height, 0.759 inch, plates are to be 0.154 inch thick, with 0.002 plus or minus tolerance. For regular book printing this will allow an underlay of 0.005 inch, and in case the pressman does not wish to place underlays between plate and base, he can slip a sheet of 0.005-inch tympan paper under the entire form. Because there are "patent bases" in use that vary quite materially from the suggested standard, plates of special thickness must of necessity be manufactured, but it is the thought to build for the future in the manner suggested.

*Thickness of curved electrotypes.*—Naturally, with rotary presses of many differing cylinder diameters in use, the electrotyper must continue manufacturing curved plates to the specifications of his customers, but it seemed desirable to set up a standard of thickness to enable the press designers to intelligently cooperate with the electrotypers in the future. Variations in cylinder diameters there will always be, of necessity, but the suggested standard of plate thickness is 0.187 inch, with a plus or minus tolerance of 0.002 inch, for cylinders of usual diameter; and a thickness of 0.250 inch for very large cylinders, also carrying the same tolerance.

*Bevel of edges of "patent base" plates.*—The makers of patent bases have apparently pretty well standardized the "hook" angles, so patent base plates

should be so beveled that the "hook" will engage exactly with the edge of the plate. A bevel of 20° (which is 70° from the horizontal) is recommended as standard.

*Thickness of shell.*—While it is undoubtedly true that within certain limitations, the thicker the shell, the more durable the electrotype, it is equally certain that for many other conditions a shell which is "just heavy enough to cast" will be just as serviceable. And because these widely varying conditions are constantly met with, it was almost useless to attempt setting up a prescribed thickness as a "standard." There is also to be considered that the quality of the shell, as to toughness and hardness is quite as important as mere thickness. In actual practice, furthermore, it is found that the plates are many times condemned for "not wearing well" when the real trouble is maladjustment of the printing press. It was, therefore, the belief that when the electrotyper is definitely advised as to the service his plates are expected to give, he will provide a shell that will be thoroughly adequate.

*Formula of electrotype backing metal.*—Having in mind that deterioration through "drossing" begins as soon as backing metal is melted, and that what is termed as standard metal shall have certain well-defined characteristics, the recommendation for backing metal is 4 per cent tin, 3½ per cent antimony, and 92½ per cent lead.

Since the 1930 convention of the International Association of Electrotypers of America approved the foregoing recommendations, they have been accepted by the American Newspaper Publishers Association, the American Association of Advertising Agencies, and the United Typothetae of America. The second conference of the technical experts in the printing industry (see *COMMERCIAL STANDARDS MONTHLY* for April, 1931) held March 16 to 17, 1931, at Washington, considered the recommendations of the International Association of Electrotypers of America, and recommended that they be considered by the committee of the American Society of Mechanical Engineers for adoption.

The subject of standardization of printing equipment is a world-wide one. In Germany there has been organized a standards committee for the graphic arts (Normenausschuss für das Graphische Gewerbe, briefly called "Nagra") to standardize paper, printing inks, types, and machinery for the printing industry of that country. This standardization, of course, will be based upon scientific research as a necessary preliminary.

Standards of paper sizes ("normals") have already been adopted there and are being used by a number of other countries. The master printers of Holland have established "normal" (standard) sizes for their products. Standard testing methods for printing inks have been set up by the German committee, which aims to standardize printing inks, particularly for color work, on the basis of these testing methods, taking into consideration the ingredients and



shades of colors. Other German standards include type cabinets and cases, proofreader's marks, composing sticks, galleys, chases, locking-up devices, press-roller diameters, and cylinder packing. It is proposed also to develop a German standard printing press.

Another organization to recognize the importance of scientific research and standardization is the International Bureau of Federations of Master Printers. The bureau was organized in compliance with a resolution adopted by the International Congress of Master Printers at its London meeting, which was held in 1929. Its membership at present includes the federations of master printers of Great Britain, Germany, Sweden, Belgium, and Switzerland, whose representatives constitute the council of administration. One of the main objects of the international bureau is the standardization of type, paper, machinery, and inks, and the investigation of new printing materials, inventions, and technical processes.

Results of a research completed at the National Bureau of Standards will aid in determining the cause and remedy of failure of electrotypes to exactly match in color printing. The studies at the bureau were made in cooperation with the International

Association of Electrotypers and the Government Printing Office.

The United States Government uses thousands of electrotypes annually in official reports, pamphlets, maps, and a wide variety of governmental publications. In addition, there were 12,657 book and job printing plants in this country in operation during 1929, and outside of these there were 221 plants in the country engaged in electrotyping and stereotyping work.

Difficulty is sometimes experienced by electrotypers in making plates for color printing that have exactly the same corresponding dimensions. In conducting the investigations at the bureau a special steel measuring device was designed for determining dimensions on the curved plates, as the "routing out" of the surface of the plates made a special curved gage necessary. Practically every printing press has different sized cylinders, for which different sized gages will be required. The results of the studies showed that the operations that must be most closely regulated are the casting of the electrotypes metal and the final curving of the plates. The results will be applicable to any color printing by electrotypes.

## AMERICAN SOCIETY FOR TESTING MATERIALS

The following current information relating to activities of the American Society for Testing Materials has been supplied by that association:

*Normalized and tempered alloy steel forgings.*—A tentative specification for normalized and tempered alloy steel forgings for locomotives has been prepared by the subcommittee on steel forgings and bullets. The specifications for physical properties are more severe than those now in use. Data are given on types of alloy steel which will meet the requirements. The specifications also contain methods of inspection and test.

*Valves and fittings.*—The subcommittee on valves, fittings, piping, and flanges for high-temperature service has recommended a number of revisions in the standard specifications for alloy-steel bolting material for high-temperature service which will provide for bolting stock material as much as 7 inches in diameter.

*Grain sizes.*—A new subcommittee is being organized to study grain sizes in steels and to prepare photomicrographs to be used as standards of comparison. These will be a companion set to the micrographs that were issued a year or more ago covering

grain size in nonferrous alloys, such as brass, bronze, nickel, and silver.

*Gray iron castings.*—A new subcommittee has been formed to consider specifications and problems pertaining to automotive gray iron castings. It is recognized that there is a need for a logical classification of gray iron castings. The new subcommittee will attempt to work out such a classification and then develop specifications accordingly.

*Fabricated pipe.*—One of the most important developments of the many projects under consideration by the committee on steel is the progress that has been made in the development of specifications for various types of fabricated pipe. Through the subcommittee on steel tubing and pipe, there have now been prepared specifications for five different types of piping; namely, riveted pipe, lock-bar pipe, hammer-welded pipe, electric-resistance-welded pipe, and electric-fusion-welded pipe. The substance of these specifications has now been agreed upon by the subcommittee, and after review by a harmonizing committee, it is expected that the specifications will be in suitable form for recommendation to the society for approval some time early in the summer.

## BRITISH STEEL INDUSTRY ADOPTS SOURCE LABEL

If the future users of British-made steel will be able to distinguish domestic steel from steel made in other countries by a national mark or label recently adopted by the British steel industry. This self-identifying label is being fostered by the British Steel Work Association.

The association, in making public the adoption of

the new label, pointed out that foreign steel is frequently purchased in Great Britain with the belief that it is British made. This confusion appears to have arisen largely because of the fact that some foreign steel is marked with the letters "B. S.," which purports to show that the steel was up to British specifications, but was frequently interpreted by the users to mean British-made steel. The national self-identifying label adopted consists of the words "British steel" divided by a cross.



## COMMERCIAL SIMPLIFICATION

### Elimination of Needless Variety Essential to Efficient Management

By EDWIN W. ELY, *National Bureau of Standards*<sup>1</sup>

Industrial management is concerned not only with proper operation of factories and efficient distribution of their products, but also with profits. This implies much more than simply selling the products for more than it costs to make them. Properly applied, it means actually lowering the selling price as a direct result of reducing production and distribution costs. To-day it is recognized that one of the surest ways of reducing costs is through the elimination of avoidable waste, and we now find corporations contemplating the appointment of vice presidents in charge of waste elimination.

One important method of eliminating waste is by applying the principles of simplified practice, which means reduction in unnecessary variety. Such reduction may apply to sizes, styles, dimensions, or any immaterial differences in commodities of a given kind. To-day simplified practice is recognized as an essential part of successful management. Industry is constantly improving the technic of its attack upon costs of production and distribution, largely by reason of its growing reliance upon simplification and standardization as two of its most powerful tools. The effective use of these tools is producing tangible results in the nation-wide effort to reduce the spread between the prices of raw materials and those of finished products.

The terms "simplification," "simplified practice," and "reduction in variety," have become definitely recognized as synonymous with waste elimination. As such, they have found a definite place in the vocabulary of industry. Applications of the principles of simplified practice are apparent on every hand. Many of them have come about through the initiative of individual firms or groups; in addition, there are those brought about through the concerted activities of entire industries working with the cooperation of the division of simplified practice of the National Bureau of Standards.

There is an industrial axiom that it costs less to make things alike than to make them different. Every manufacturer knows that it costs less to make 100,000 articles all alike than to make 1,000 each of 100 different kinds. It also costs less to account for them, to handle them, to store them, and to distribute them. Any manufacturer can determine from his own records the particular kinds or sizes of product which are in greatest demand by consumers. When a single manufacturer analyzes his market and then discontinues the production of certain items or sizes that are seldom called for—that is commercial simplification.

In a large number of industries, however, a single producer can not carry this process to its logical conclusion. He may feel that he must continue to carry certain unprofitable items because his competitors make them. Those competitors may be producing

many other items, the more profitable of which help absorb losses caused by those which sell in small quantities. This condition is one of the causes of over-diversification of unnecessary variety. Another cause is the quite natural desire of freshly graduated college students and others newly associated with a manufacturing concern to impress their individuality upon the product. They are firmly convinced that their best services to their employer will consist in the creation of something new. If the new creation is actually something better than has heretofore existed, it may, in fact, represent the best service that could be rendered. Too often, however, it is merely something different, in no way better than that which it is intended to replace, and an economic waste may result from its adoption.

Of course, this creative desire, carrying as it does the vital principle of growth, must not be wholly suppressed. At the same time a clear distinction should be made between actual improvement of product and mere added diversity. The ultimate consumer can help materially in deciding when improvement stops and needless diversity begins. Usually, however, knowledge of the consumer's preference travels slowly, over a devious route to the manufacturer. Furthermore, it is not sufficient for one or two manufacturers to know a little about a fraction of the total market. The entire market, with its host of distributors and legions of consumers, should be sufficiently articulated to reach the attention of those who supply its needs.

In order to provide for the essential spread of knowledge and ideas, some form of clearing house or general meeting place is of first importance. Such agencies have existed for hundreds of years in connection with the marketing of securities, and of certain basic commodities, such as grain and cotton. With the establishment of the division of simplified practice within the National Bureau of Standards a similar agency, though wider in scope, became available in the industrial field. Industries acting singly or in groups can utilize the facilities of the division, and cooperate with each other in solving their problems. When they can analyze the data that has been brought out by studies and surveys it will be possible to approach more nearly the desired balance of the forces of production, distribution, and consumption. Any plan with this objective can only be worked out to its full possibilities when all interests act in concert. It should also be national in application if the widest benefits are to be realized.

Anyone connected with an industrial establishment, whether as an officer or even in a relatively minor capacity, can be of inestimable value to his employers if he equips himself with a knowledge of the principles of simplification. He can then apply these principles on every appropriate occasion in conducting his own part in the affairs of his company and can also bring to the attention of his employers the great quantity of valuable information and services that are available in Washington for their use.

<sup>1</sup>Abstract of radio talk made Mar. 30, 1931, over station WRC, Washington, D. C., under auspices of the Vocational Guidance Committee of the Kiwanis Club of Washington.



## INSPECTING PRODUCE FOR MATURITY AND DEFECTS

### California Fruits and Vegetables Meet Certain Standard Specifications Before Being Marketed

By H. W. PAULSEN, *Department of Agriculture, State of California*

California's standardization work has been built up during the past 15 years from a very small undertaking when only half a dozen commodities were covered by law, and involved the shipment of a relatively few thousand carloads. The law at that time did not have any direct bearing on the sales which were made in our local markets.

At each session of the legislature more commodities have been added, and shipments covered by law have increased until now the enforcement work involves the inspection of about 285,000 carloads of produce annually. This figure does not include the produce which is sold in local markets within the State. The enforcement work is now conducted by 300 or more inspectors in practically all counties of the State.

The enforcement of the standardization act is delegated to the county agricultural commissioners and inspectors under the direct supervision of the bureau of fruit and vegetable standardization of the State department of agriculture. There are, at this time, agricultural commissioners in 51 counties who employ an all-year force of more than 350 men.

Many of these regular men are delegated to the enforcement of the standardization act during the shipping season, but this force is supplemented by a large crew of temporary men employed only for that purpose. The duties of the bureau of fruit and vegetable standardization staff include the supervision of the work in all counties for the purpose of bringing about a uniform and efficient enforcement.

*Grapes.*—This work can be illustrated by referring to some of the individual counties. In Tulare County, for example, where 10,000 carloads of grapes are shipped annually, the commissioner employs 25 or 30 men during the grape shipping season to inspect the grapes for maturity requirements and defects. These grapes are then packed in standard containers and loaded from about 75 packing sheds scattered over the entire county, involving considerable activity to police such shipments properly.

*Citrus fruits.*—Citrus growing is also an important industry in Tulare County. Citrus fruits being shipped from at least 50 different packing houses. Each lot of citrus fruits must be tested for maturity as it arrives at the packing house. Considerable time is required to check over every grower's lot. One man at a packing house may have to run 75 to 100 tests in a day.

*Cantaloupes.*—The cantaloupe is another commodity about which little can be told by the novice from outside appearance. In Imperial County, where a large cantaloupe growing section is located, from 400 to 600 carloads of cantaloupes are loaded and shipped in one day. The entire crop of from 12,000 to 15,000 carloads must move in a period of a few weeks. Therefore, the 12 to 150 inspectors who are ordinarily employed must work rapidly and for longer periods in order to cover as many of the shipments as possible. In the same valley, the lettuce crop moves in quan-

ties of from 200 to 400 carloads a day. Again, this work involves many daily inspections.

*Point-of-origin inspection.*—The specific enforcement problems are slightly different in every county of the State because some counties have a few crops which are moving in large quantities and the men can more or less specialize in those particular commodities, while in other counties there are many deals of a much smaller size which involve practically all of the commodities covered by the standardization law. For this reason, all standardization inspectors must have a working knowledge of the various commodities and be familiar with the defects and conditions affecting them. In the point-of-origin inspection, it is necessary for the inspectors to look over several packages selected at random in the various carloads or truckloads being shipped and to examine them very carefully.

Another important type of inspection involved in the enforcement of the standardization law is the policing of local wholesale markets. Los Angeles, San Francisco, and Oakland have exceptionally large markets where several men are continually inspecting the produce offered for sale on the street. If any of the packages are found to be below the requirements of the law, they are rejected and must be reconditioned before being allowed to be sold. There are several other very important wholesale markets in the State and in each case these are carefully watched.

*Highway inspection.*—During the past few years, the movement of produce by automobile trucks has increased tremendously. Highway inspection stations have been established at advantageously situated locations in the State for the inspection of produce moving in this manner. The three most important of these are located at Lebec on the Ridge Route highway; at Tracy on the main highway from the San Joaquin Valley to San Francisco; and at Buellton on the coast route from the coast vegetable producing areas to Los Angeles.

At the peak of the season, about 15 carloads move daily from the San Joaquin Valley to Los Angeles and about 18 to 20 carloads from the same valley to the Oakland and San Francisco markets. In the coast district, from 7 to 9 carloads move daily at the peak of the season to the San Francisco markets. Similar stations which are maintained for a short period or at irregular intervals are set up in various parts of the State where sufficient produce is moving to warrant them. The results of such inspection have been very gratifying.

All enforcement officials have authority to enter every place where fruits, nuts, or vegetables are stored, packed, offered for sale, or sold; and to stop automobile trucks for the purpose of inspecting the produce. While it is not compulsory for growers or shippers to have each shipment inspected, the responsible party is directly violating the provisions of the



law if the produce does not conform to the requirements of the standardization act.

When the inspector finds a lot, truckload, or carload of produce not in conformance with the law, he makes a rejection of that produce under authority delegated to him by the act and gives the owner or responsible party a chance to recondition and sell it in a legal condition.

Oftentimes the produce is so defective that it can only be sold to a legitimate by-product concern, and then only under special permit or under observance of the inspector. It is often necessary to cause the arrest of individuals when they persist in violating the law. This is rarely done, unless it has been de-

termined that the violation was done intentionally or repeated violations have been observed. Fines range from \$50, part or all of which is sometimes suspended, to \$400 or \$500, or a jail sentence, depending upon the seriousness of the offense.

It is not the intention of the enforcing officials to cause the arrest of any individual or concern unless it is absolutely necessary. The enforcement work is done as efficiently as possible and excellent results are obtained, as evidenced by the fact that the majority of the industries are continually asking for stricter provisions and a more thorough enforcement organization.

## PRINTING CONFERENCE CONSIDERS STANDARDIZATION OF EQUIPMENT

### Papers on Research and Standardization Read to Washington Meeting

The second conference of the technical experts in the printing industry, held March 16 and 17, at the Government Printing Office, Washington, D. C., was featured by standardization and research group conferences on subjects of vital concern to the industry. The conference was sponsored by the printing industries division of the American Society of Mechanical Engineers.

It was brought out by the several speakers attending the conference that the application of science in industry is ever receiving greater recognition. The constantly increasing knowledge which research has brought to bear on industrial problems is producing a higher degree of standardization in equipment and materials, as well as improved methods and processes. The work of the engineer is paving the way for greater efficiency in the printing industry, and will help to meet the constantly increasing demand for greater production.

Group conferences were held on "Air Conditioning Data for Printing," "The Need for Standardization of Sizes, Quality, and Permanence of Paper," "Standardization of Thickness of Plates (Engraving, Electrotyping, Stereotyping, Off-set) and Patent Bases

and Cylinder Diameters," and "Establishing Color Standards for Printing."

The conference on "Need for Standardization of Sizes, Quality, and Permanence of Paper" recommended that the addition of generally accepted commercial sizes of bristol, cover paper, post card and rope bristols, blotting and carboard, in simplified practice recommendation No. 22, Paper, be referred to the standing committee in charge of the simplification, for consideration at the time of its next revision.

The conference on "Standardization of Thickness of Plates and Patent Bases and Cylinder Diameters" recommended that the committee of the American Society of Mechanical Engineers, take the subject under consideration. It was brought out in the conference that the International Association of Electrotypers of America, through its standardization committee, has recommended a standard thickness of unmounted electrotypes for "ad plates," of 0.105 inch with a tolerance, plus or minus, of 0.002 inch. When made for "patent bases," a thickness of 0.154 inch, with 0.002 plus or minus tolerance.

## PROPOSED STANDARDS FOR CANNED FRUIT CONSIDERED

Numerous changes in the tentative standards for canned peaches, cherries, and tomatoes formulated by the United States Department of Agriculture were suggested April 13, 1931, at a hearing in Washington called by the Food and Drug Administration of the department, to ascertain views of the trade on the proposed standards.

The requirements that tomatoes should carry no more than 1.5 square inches of peel to a pound of the canned product brought out suggestions for changes ranging from an increase to 3 square inches to a reduction to 1 square inch. Dr. W. G. Campbell, chief of the Food and Drug Administration, who presided at the meeting, pointed out that there was no

disposition to attempt to attain an ideal condition at prohibitive costs for removal of the peel, and added that there would be no manifestations of such "zeal" on the part of Federal inspectors as would result in the seizure of a large quantity of tomatoes because a can or two was found to contain more than 1.5 square inches of peel.

Suggestions were presented in the requirements "that there be no more than one unsightly blemish in each 8 ounces of tomatoes" be changed to an area basis; for instance, that there should be not more than one-fourth of a square inch of such blemishes. Numerous recommendations for minor changes in the proposed standards for cherries were presented, and there was brief discussion of the peach standards. The recommendations were taken under advisement.



## "FOUR FEET EIGHT AND A HALF INCHES"

### History of the Railroad-Track Gage

By HOMER H. SHANNON<sup>1</sup>

In overlooking the question of why the majority of railroad track mileage of the world has been standardized at a width between rails of 4 feet 8½ inches, detective story writers have passed by one of the great mysteries of modern life. After more than 100 years of railroad construction in this country, no one knows clearly why the "standard" track width is what it is, rather than something else. Some chapters of the story have been written, but there are large gaps in the manuscript.

Few unwritten transportation stories are more potentially rich with interesting side lights on the development of the railroads than that of track gages. Such a story would not only set off to striking advantage the long distance traveled in general transportation policy and railroad management since the first clumsy steam horse bumped along its uneven track of rails, but would, as well, serve as a particularly good vehicle for the drama in railroad construction at the time that construction was greatest.

There are many contradictions in what has been written on the question of gage standardization, and no one seems to have displayed the necessary zeal or energy to demonstrate conclusively just what the elements were in the plot that ultimately made "4 feet 8½ inches" the hero of the piece.

Nothing better than the whim of the builders is credited with having set the gage of the first track laid in this country. There were at least a half dozen different widths represented by the railroad construction of the first decade, and there was no improvement in the situation for at least the first 30 years of railroad building.

Of 11 roads begun by 1836, the track gage of 4 was that now called "standard," or 4 feet 8½ inches. English influence is generally credited for that. The English gage is said to have been set by the Stockton & Darlington, the first steam railroad in that country. Construction on it began in 1822. Its track had an inside width of 4 feet 8 inches, the additional half inch since added remaining unaccounted for. As a number of early engines used in this country were constructed in England, and English experience was largely drawn on for our first railroads, it was natural that an influence should be reflected across the Atlantic.

Going back beyond the first English railroad, however, there is little more than conjecture and myth to suggest why the particular gage that won out was as well represented in early construction as was the case. Some commentators profess to find the explanation in the fact that early rail equipment was an adaptation of highway equipment. Carts and other horse-drawn equipment, on the scene when railroads were built, had a width between wheels of 4 feet 8½ inches, it is said.

The explanation of that, according to one writer, is that it was roughly adequate to obtain suspension,

between the wheels, of a carriage wide enough for two individuals abreast. Wheels of early horse-drawn vehicles had been standardized at that distance apart, since the chariots of early Roman times, it is said. But the evidence does not seem to be conclusive on the point. If there were any such standardization of the Roman chariot, the fact is in sharp contrast to the condition that existed at the beginning of railroad construction in this country.

The first railroad constructed in New York, the line connecting Albany and Schenectady, had a width between tracks of 4 feet 9 inches. New Jersey's first pretentious railroad, the Camden & Amboy, had a gage of 4 feet 10 inches. For more than a generation the roads of New Jersey were principally of that gage. Selection of a gage of 5 feet by the Charleston & Hamburg, the first southern road, set a precedent that was followed below the Mason & Dixon line until after the Civil War. When the Erie tracks were given a width of 6 feet, it was followed in that gage by other roads as far west as the Mississippi, some of which maintained that gage for nearly 50 years.

At least one authentic instance, in which the gage of a track was taken from the wheels of an engine, which had been constructed prior to the beginning of construction of the railroad, is recorded. That historic engine was the "Sandusky," the first to be operated west of the Allegheny Mountains. It had been built for a small New Jersey railroad with a gage of 4 feet 10 inches, but subsequently was purchased by the Mad River & Lake Erie, on which construction between Sandusky and Springfield, Ohio, was begun in September, 1835. Before that, however, the "Sandusky" arrived on the scene, and the tracks were made to accommodate it. The track width that resulted was made standard in that State for many years by an act of the State legislature.

The diversity of railroad-track gages prior to the Civil War brought about a number of expedients to overcome operating difficulties when through traffic over a number of lines developed. They ranged all the way from the laying of a third rail to lifting the bodies of the cars from one set of wheel trucks to another.

By 1860 there were at least a dozen different gages represented by the railroads of the country. Many lines in Missouri, and in the Southwest, had track with a width of 5½ feet. Canada was laying its track with that width. California had adopted the 5-foot gage of the southern roads by State enactment.

No approach toward a national rail system with uniform interchange of cars had been made. It was on this scene that construction of the Union Pacific was projected.

"Some strong influence was imperatively needed to rectify conditions," says Seymour Dunbar, in his "History of Travel in America." Creation of the transcontinental road was "destined to become that

<sup>1</sup> Member of the editorial staff of the Traffic World.



influence," he says. A political storm of modern dimensions was stirred up by the question of what should be the gage of the Union Pacific. Finally, by act of the national legislature, in 1862, President Lincoln was authorized to settle the question. The President, when informed of his responsibility, said he would be very glad to fix the gage, "if I only knew which was the best gage." He finally determined on the 5-foot gage of the California lines and issued a proclamation to the effect, but the quarrel went back to Congress, and after eight months more of wrangling, that body decided on 4 feet 8½ inches.

That decision, more than any other single factor, it is generally agreed, ultimately determined what was to become "standard" gage in this country. Physical transformation of other lines began at once, but it was a good many years before the job of bringing them into line with that width approached completion.

There was still life in the gage controversy in 1872, when a National Narrow Gage Conference was called in St. Louis, "in view of the fact the gage question, as applied to railways, is attracting a large share of attention, and that there is a general desire in the public mind to arrive at an intelligent conclusion in relation thereto."

At that conference the necessity for a national system of railroads with a 3-foot gage was advocated, on the theory that operating expenses on such a system would not be so great as on the systems of a

wider gage. The gage question offered a solution, it was thought, for the high freight rates of the day. As late as 1876, the Chicago Board of Trade adopted a resolution declaring that "the best interests of Chicago demand the early completion of said railway (the Chicago, Millington & Western, a 3-foot gage line projected from Chicago to the Mississippi), as the initial link connecting this city with the rapidly developing narrow gage system of the West."

Few people would now deny that width of railway track is at least one thing that calls for standardization. The enormous transportation waste that inhered in the old medley of gages would be multiplied a hundredfold in this day of 120-ton cars and 100-car trains. But differences of track gage, in both this country and England, held over almost into this generation. One of the important English lines, the Great Western, maintained a 7-foot gage against all opposition up to 1892. In this country, the 6-foot gage of the Erie had not been replaced by "standard" gage until about 1880.

The principal railroads of France, Germany, Italy, Canada, and a number of central European countries operate on the same gage as the lines in this country. But Indian railways have a gage of 5½ feet; Russian, 5 feet; and Japanese, 3 feet. At least the great majority of the railway mileage of the world now conforms to the "standard" of 4 feet 8½ inches, but still one wonders why "standard gage" is standard.

## INTERNATIONAL EXCHANGE OF RESEARCH WORKERS

### National Bureau of Standards and Physikalisch-Technische Reichsanstalt Compare Notes on Technique

Closer international scientific cooperation is manifested in a recent exchange of scientists between the United States and Germany.

The arrival of Dr. F. Henning, chief of the division of heat and pressure of the Physikalisch-Technische Reichsanstalt of Germany, as an exchange guest at the National Bureau of Standards, and the detailing of G. W. Vinal, of the bureau's electricity division, to the Reichsanstalt and other national standardizing institutions, marks an important step in the development of closer cooperation between the leading national laboratories.

Doctor Henning will spend a considerable portion of his time in the bureau's high temperature section, where it is planned to repeat the work so successfully completed during the past year on the Waidner-Burgess standard of light, using a black-body radiator at the freezing point of platinum as the primary standard of light. By repeating this work, an opportunity will be given to Doctor Henning to study the methods used at the bureau and take back with him to Germany a personal knowledge of the technique employed, in this manner arriving at a better and probably quicker international agreement concerning this basic standard. It is planned also to extend this work, within a short time, to include iridium and rhodium, and Doctor Henning will become an active collaborator and participant in this additional program. Accordingly, both the bureau's personnel and the guest representative will have the benefit of an

immediate and mutual exchange of ideas concerning the technique to be followed.

Mr. Vinal's visit to the Reichsanstalt and later to the national laboratories of France and Great Britain is rendered very timely by the recommendations adopted last year by the advisory committee on electricity of the International Committee on Weights and Measures that direct comparisons on certain electrical standards be made between the national laboratories.

In 1910 a very thorough international comparison of voltmeters and standard cells was carried out at the National Bureau of Standards by representatives of three national laboratories abroad working with members of the bureau's staff. As a result of that comparison the electrical units used in the several countries were brought into exact agreement, but during the past 20 years some small discrepancies have developed. The present international comparisons are intended to find the explanation of these discrepancies and to determine what steps may be desirable in order to remove the differences between the laboratories.

In general, the settlement of such questions is greatly facilitated by direct personal contact between the research workers concerned which makes possible the detailed discussion of methods, apparatus, and results of measurements. It is hoped, therefore, that the interchange of workers now being made will establish a precedent to be followed in the future, when other technical questions of international importance arise.



## UNIFORMS FOR WOMEN WORKERS

### Various Occupations for Women Necessitates Uniforms to Insure Sanitation, Safety, and Comfort

Increasing interest is being evidenced by employer and worker alike in the many advantages inherent in the use of uniform dress for certain industrial and occupational work for women, according to information received from the Women's Bureau of the United States Department of Labor. While the need for uniforms varies with the kind of work performed in many industries or occupations, a special work dress may be essential for any one of a number of reasons—sanitation, safety, comfort, the protection of clothing, the identification of the worker in a group where the public is also present, and the creation of a desirable work morale among employees.

The public, in general, is most interested in uniforms for women workers from the angle of the safeguarding of the food it consumes from possible impurities originating from the street clothing of the workers who prepare it for consumption. A large number of plants handling food products have accordingly introduced standard caps and aprons for all employees. A few of the States have gone to the length of prescribing through legislative acts that such protection be taken.

Safety, comfort, and the protection of clothing constitute the most important advantages of uniform dress to the worker. Where women are operating machines, there is often the risk of their clothing and hair becoming entangled in the cogs and wheels. Neat overalls and caps remove the hazard of billowing skirts and the danger of fly-away hair. Sensible heels on shoes in industrial work involving greasy, slippery, or oily floors are wise precautions against injuries and consequent loss of working time induced by falls. Proper shoes are also of great importance in those factory duties requiring walking and standing as a preventive of early fatigue.

The Women's Bureau investigation of pineapple canning in Hawaii disclosed the universal use of rubber gloves among women workers, which, while add-

ing to the general sanitary effect, were worn chiefly because of the protection they afforded to the hands of workers on which the acid in the juice of the fruit had a most unpleasant effect. Other bureau cannery investigations noted the stress laid on proper shoes because of cannery floors, which at times become quite slippery.

For women exposed to oils, chemicals, or excessive dust, the protection or replacement of street clothing comes as a boon to the meager budgets of many workers in such occupations. Few pay envelopes provide adequate sums for women to purchase for themselves proper protection for their garments against the harmful atmosphere in which they work.

In addition to public confidence which the employer gains through safeguarding his products against contamination from workers' street clothing, and increased production on the part of workers who feel that the management through supplying uniforms is looking after their interests, employers have found other advantages in the utilization of uniform clothing. The managers of many department stores stipulate dresses of a single color for the women clerks. It has been characteristic of theaters, hotels, and restaurants, and similar enterprises to require uniforms. Employees are easily identified and their work is facilitated. While in some plants, the suits are furnished by the firms and the laundering is also borne by them, this is not the general rule, as is illustrated by the Women's Bureau study of women in Oklahoma industries, which reports that of 567 employees required to wear uniforms, 73.5 per cent had to supply their own and 56.6 per cent were expected to provide for the laundering. On the other hand, the Hawaiian pineapple canneries exhibited to the bureau investigator an ideal system of fresh uniforms supplied by the concern to any worker at any moment of the day when the need was indicated.

### GRADING RULES RECOMMENDED FOR PLYWOOD

In order to provide a definite grading basis for the manufacture, sale, and use of plywood a general conference of all interests of the industry was held at Chicago, Ill., April 9, 1931, to consider the commercial standard proposed by the Plywood Manufacturers Association.

The acceptance and use of the standard grade rules, as unanimously approved by the conference, will bring about a more general knowledge of the product and facilitate the procurement of the proper grades by furniture designers, cabinetmakers, architects, and other purchasers of plywood.

The commercial standard applies to plywood such as used in the furniture industry, for interior panels, and

in the cabinet trade as made from the commonly used hardwoods and eastern red cedar.

Certain general requirements of workmanship, gluing, and packing, apply to all species, while specific detailed requirements are set forth for the several grades of each particular species. The different kinds of cores and crossbands are also classified in several grades according to their quality, and standard sizes and quantities, as well as dimensional tolerances are provided.

The effective date for the commercial standard was fixed at 30 days after announcement by the Department of Commerce of general acceptance of the project.

Those interested in any phase of the plywood industry may obtain copies of the recommended standard by writing to the Division of Trade Standards, National Bureau of Standards, Washington, D. C.



## SIMPLIFIED PRACTICE IN THE SOUTH AND SOUTHWEST

Interest in simplified practice has been steadily increasing among the industries and commercial enterprises in the Southern and Southwestern States. In March, two representatives of the division of simplified practice of the National Bureau of Standards completed tours to cities in these regions. The dual purpose of these trips was to respond to requests from groups who wished to hear first-hand talks on the simplification movement, and to crystallize the evidenced interest into tangible programs.

Eighteen cities in 10 different States were visited. An aggregate of more than 1,200 producers, distributors, and consumers attended 34 meetings held by organized groups. A total of 525 students were addressed in seven universities. Both the students and those attending all other meetings engaged in lively discussions following the talks on simplified practice. These discussions were helpful alike to the speakers and the audience.

One preliminary conference was held, and several local simplification committees were appointed. In addition, committees are being appointed in two States for the purpose of conducting state-wide elimination-of-waste and simplification programs. Three of the chief functions of these committees will be:

1. Stimulate interest in simplified practice as a philosophy of modern management.
2. Promote adherence to existing simplified practice recommendations.
3. Originate suggestions for new simplified practice projects.

Ten new projects were proposed to the division of simplified practice, and many questions were asked during the meetings and interviews, about the work of the Government departments and establishments. It was necessary to refer 12 of the specific inquiries to the testing and research divisions of the National Bureau of Standards for complete reply.

The district offices of the Department of Commerce served as headquarters for the bureau's representatives, and the managers of these offices assisted in arranging the schedules of appointments in their respective areas.

The cities visited are as follows: Birmingham, Ala.; Jacksonville, Fla.; Atlanta, Ga.; Louisville, Ky.; New Orleans, La.; St. Louis, Mo.; Cincinnati, Columbus, Dayton, and Springfield, Ohio; Oklahoma City and Tulsa, Okla.; Chattanooga, Tenn.; and Dallas, Fort Worth, Galveston, Houston, and San Antonio, Tex.

## AMERICAN STANDARDS ASSOCIATION

### Scope of Current Standardization Projects Reviewed

Information on certain standardization projects, under the auspices and procedure of the American Standards Association, has been furnished as follows:

*Screw threads.*—An investigation which is intended to show the state of screw-thread standardization in the United States, the range of accuracy desirable for an acceptable product of a given class, and the range of accuracy commercially attainable, is being made by the sectional committee on screw threads for bolts, machine screws, nuts, and commercially tapped holes. The committee will visit approximately 125 plants, selected as being representative manufacturers and consumers of bolts, screws, and nuts. The committee members will call at each of these plants and select from the stock bins samples of screws, bolts, nuts, and certain small threaded parts made to the American standard or other screw-thread standards. For the purpose of this survey these parts may be either purchased or made on the premises. They are to be tagged and sent direct to the National Bureau of Standards where they will be measured for all the elements of a screw-thread fit. The results of these tests will be published, but in such a way that no one except the officials at the bureau and the individual manufacturer will be able to identify the samples.

*Insulators for electric power lines.*—The scope for the A. S. A. project on standardization of insulators for electric power lines has been approved by the standards council as follows: Specifications, including

rating, dimensions for interchangeability, and tests for line insulators of all types except those used for communication lines.

*Industrial sanitation safety code.*—A tentative draft of the proposed safety code for industrial sanitation has been prepared for the consideration of the sectional committee by the sponsor for the project, the United States Public Health Service. The scope is as follows: General sanitary requirements of industrial plants, construction operations, and temporary labor camps, including water supply, drainage, sanitary conveniences, disposition of refuse and waste.

*Coal-mine cars.*—The work of the sectional committee on specifications for coal-mine cars will include the design and materials of construction for certain car details. It has been estimated there are more than \$200,000,000 worth of coal-mine cars in operation, and are manufactured in a great variety. Lack of standardization causes more waste here than in any other item of equipment used underground in coal mines. Although the sponsor of this project, the American Mining Congress, believes that complete standardization of these cars is not possible, it does feel that a start should be made in the standardization of details of design and materials of construction which will ultimately fit into and form a basis for complete standardization.

*Pneumatic coal-cleaning plants.*—The American standard regulation for the prevention of dust ex-



plosions in pneumatic coal-cleaning plants, approved as American standard in December, 1930, has been published and is available from the offices of the association, 29 West Thirty-ninth Street, New York, N. Y.

*Box wrenches and socket wrenches.*—The Detroit Edison Co. has recently brought to the attention of the association the desirability of standardizing box wrenches and socket wrenches. Since this subject is closely related to the work of the subcommittee dealing with wrench head bolts and nuts and wrench openings, of the sectional committee on bolt, nut, and rivet proportions, the question has been referred by the association to the American Society of Mechanical Engineers. Although there are certain difficulties involved which are recognized by the subcommittee, it has stated its willingness to give the subject consideration.

*Electric arc welding apparatus.*—A single committee to develop standards for electric arc welding apparatus and electric resistance welding apparatus has been approved by the standards council. The scope of the work of the committee will be as follows: The formulation of standards for electric welding apparatus, including definitions of terms, classification, rating, heating, efficiency, testing methods, dielectric

test, standard values of current and voltage and name-plate data.

*Wood poles.*—Lodge-pole pine and Douglas fir will be included in the standardization of wood poles, work on which has been going forward under the sponsorship of the A. S. A. telephone group. Specifications and uniform dimension tables for poles of these types will be developed along the lines established in the work on western red cedar, northern white cedar, chestnut, and southern pine, which is now nearing completion.

*Fire hose.*—A revision of the specifications for cotton rubber-lined fire hose has been approved by the association. This revision increases the permissible organic acetone extract from 3 to 4 per cent of the rubber compound by weight. The use of various antioxidants and accelerators in rubber compounding has been brought about by developments in modern rubber manufacture for the purpose of insuring longer life and better wearing qualities in finished rubber products. The use of these compounding agents increases the organic acetone extract and the revision brings the specifications in line with the modern practice.

### MINIATURE HOUSE SHOWS USE OF COPPER AND BRASS

In order to indicate the many possible uses of copper and brass in dwellings, the Copper and Brass Research Association has constructed a miniature house which is on display at the National Bureau of

tor, a copper coil in the hot-water heater, and copper wires for electric light connections.

The bathroom fixtures are representative of copper alloys, either plated or otherwise. The water pipes



Standards, and is shown in the accompanying illustration.

It is completely equipped as a larger house might be, even to the electric lights, and demonstrates the use of copper roof, copper gutters, downspouts, copper screens, tubes of copper in the electric refrigera-

throughout the house are of brass. Many articles of household use, such as andirons, screens, and basket for the fireplace, ash tray, clock, desk set, teakettle, and boiler are also of brass. The lanterns and door knocker and even the tiny fastenings on the doors and shutters illustrate further uses of this metal.



## PROGRESS VIA SIMPLIFICATION

### Knitting Mill Reviews Benefits Derived from Simplifying Products

By IRWIN S. ADAMS, *Jantzen Knitting Mills*

What has the Jantzen Knitting Mills accomplished as the result of simplification? The most natural place to begin is in the factory.

The usual knitting mills have a host of products, such as, sweaters, coats, caps, stockings, etc., with swimming suits as one of the lesser items. Swimming suits are a seasonable item, yet we manufacture them the year 'round. In contrast with the sometimes thousands of styles, size, and color combinations of the usual knitter, we have but one product, 29 styles, 17 colors, 15 combinations of these colors, and a range of 17 sizes.

Investment in specialized equipment has meant not only greater productivity, but also has made it possible to get along with a minimum investment in such assets.

Our savings in production have increased considerably, as is indicated by the following figures on garments produced per operator: 1,503 in 1922; 1,841 in 1923; 2,204 in 1924; 2,575 in 1925; 2,715 in 1926; and 3,500 in 1929. It must not be supposed that our present program was inaugurated without a struggle. The germ had well begun work in 1920, and since then progress has been rapid; but it was not until 1926 that we decided to throw out the one remaining line in addition to swimming suits.

When our business was smaller and conducted differently, it was necessary for employees to work on different machines, make different products, and, in general, be on the alert to undertake another task as the occasion might arise. When an operator was shifted from one job to another she achieved a standard of 9 seams an hour. To-day, an apprentice operator shortly reaches this figure, and in due time turns out 45 seams an hour with ease.

We find real economies in purchasing, storing, and using material. It is possible to buy our comparatively few dyes in large lots and this means a saving. Also we have been able to get yarn spun under a different system and "dyed in the wool." To "dye in the wool" means faster color, something especially necessary in swimming suit dyes, which must stand hard usage.

The elements which make up our overhead have also been favorably affected. For instance, supervision is better and costs us less per unit of product now than formerly. Superintendent and foreman alike have more time for constructive work that pays

dividends in the form of a higher and more uniform standard of product. The increased efficiency of indirect employees for the past few years is measured by a per garment output of 16,470 in 1924 as compared with 17,832 in 1926.

From the sales angle the benefits of simplification may not be as easily discerned, but they are nevertheless real and appreciable. In the first place a salesman can not concentrate on a big line. Also the buyer's attention is diverted by an imposing array of samples with the result, oftentimes, that he picks what looks like the bargain. With a simplified line the salesman needs no sample room. He knows that under his company's plan of manufacture, niceties of fit, appearance, and style are developed first as a result of focal point for all the thinking of the organization. National and international preference for a type of garment unknown except on the coast in 1920 speaks volumes for such selling.

Our line is restricted to the most fashionable and fast-turning numbers as determined by our sales records. We add a new number only when we are convinced that sales will result in sufficient volume to justify it. On the other hand, a number is dropped if the demand for it does not equal a certain minimum. As a consequence, we now produce only one quality.

Administrative efficiencies also result from simplification. One of the greatest advantages to us has been the ability to do a larger volume of business on a given amount of capital than would otherwise be possible. This means additional profit. Under this simplification plan, small savings on production result in comparative reduction in our selling price.

Our accounting system is much simpler and more accurate now than previously. Since most of our business is necessarily booked months in advance, we find our tabulating machine very helpful. As orders come in, cards are punched and from these tabulations, we know what styles, sizes, and colors of swimming suits are required for shipment on a certain date. We manufacture against these records, based on bona fide orders. The merchant helps to promote a speedy, efficient, fill-in service from an easily accessible balanced stock, by estimating in advance the number of suits he might sell.

To summarize, simplification means that each dollar works harder, which, after all, is the aim of progressive management.

## BUILDING INDUSTRY INDORSES CERTIFICATION PLAN

Desire to cooperate with the National Bureau of Standards in making the certification and labeling plans effective has been expressed by several associations interested in various types of building materials, including roofing, lumber, brick, metal lath, plaster, and structural tile.

On March 17, 1931, the Associated Metal Lath Manufacturers voted to request the bureau to include metal lath in its certification plan. The significance of this action will be appreciated when it is known that the association (and also the Concrete Reinforcing Steel Institute) had expressed some hesitancy in



carrying forward such standardization because of the supposed possibility of opposition on behalf of the Federal Trade Commission. This commission (see *COMMERCIAL STANDARDS MONTHLY* for April, 1931) stated recently that it regards the work of the Department of Commerce in encouraging standardization of commodities as important and beneficial to the public, and that it regards the promotion of standardization of commodities among the members of an industry as peculiarly the work of this department. In no case has the commission ever held standardization of commodities by the members of an industry to be a violation of any of the statutes which the commission is required by law to enforce.

The Structural Clay Tile Association, which has been basing its quality labels on the standards of the American Society for Testing Materials, has expressed a desire to include a suitable reference to the Federal specifications, and to act as an inspection agency in "policing" the labels.

In cooperation with the trade association department of the Chamber of Commerce of the United States, the bureau has been collecting copies of labels

or their equivalent used by various organizations for identifying commodities complying with the requirements of the specifications or standards of these associations. The chamber of commerce is arranging both a "stationary exhibit" and a "loan exhibit" of the association labels.

At the present time the National Bureau of Standards is preparing to supply the purchasing agents of the Federal, State, county, and municipal governments and individual public institutions with lists of lumber manufacturers, wholesalers, and retailers who have expressed willingness to supply hardwood or softwood lumber guaranteed to comply with the Federal specification requirements.

The work is part of the bureau's certification plan, designed to obtain the broadest possible use and effectiveness of Federal specifications. In supplying all national and local governmental purchasers with lists of manufacturers and distributors willing to guarantee compliance with nationally recognized specifications, impetus is given to the popularization of the use of specifications.

## PREVENTING FIRE LOSS TO LIFE AND PROPERTY

### Bureau Report on Building Regulations Suggests Requirements to Minimize Fire Loss

Government scientists and nationally known experts in the field of construction join hands in fighting the fire menace, through a series of recommendations just issued by the National Bureau of Standards, showing how loss of life and property from this hazard can be materially reduced.

Hundreds of architects, fire chiefs, building officials, and others, have been consulted by the committee of experts, who were responsible for the preparation of the report, in order to arrive at a well-balanced and generally acceptable body of advice and suggestions. In this investigation the National Bureau of Standards has given the benefit of the experience it has gained, by many years of study, dealing with relative fire hazards and means of meeting them.

The report includes such topics as classifications of buildings into groups according to use and type of construction; delineation of fire limits and the structures permissible with them; protection needed for columns, beams, and other structural members, and miscellaneous requirements, all tending toward lessening the fire hazard. Recognition is given to the fact that each material now in use has a legitimate place according to its demonstrated capacity to resist fire, and economy in construction is given weight throughout.

The report is the sixth of a series prepared by the Building Code Committee of the Department of Commerce, with the object of providing recommended minimum requirements that may be made available to States and municipalities engaged in preparing building regulations. These reports have found wide acceptance. The committee is proceeding with studies of other matters taken up in building codes and it is expected that further recommendations will be issued from time to time.

Copies of this report, which is entitled "Recommended Minimum Requirements for Fire Resistance in Buildings," National Bureau of Standards Building and Housing Publication No. 14, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

## FEDERAL SPECIFICATIONS

### Status of 22 Projects Announced

Revision of 17 Federal specifications and 5 proposals were submitted during the month of April for criticism and comment. Copies of these specifications and further information can be obtained from the Federal Specifications Board, National Bureau of Standards, Washington, D. C.

| New designation | Specifications revised                                 | F. S. No. |
|-----------------|--|-----------|
| T-R-601.....    | Rope, manila.....                                      | 61b       |
|                 | Pipe, water, cast-iron.....                            | 537       |
|                 | Apples, evaporated (or dried).....                     | 634a      |
| FF-T-311.....   | Thumb tacks.....                                       | 600       |
| GG-S-776.....   | Straightedges.....                                     | 599       |
| GG-T-671.....   | Triangles.....   | 601       |
| GG-T-711.....   | T-squares.....   | 602       |
| TT-W-261.....   | White lead, basic sulphate (dry and paste in oil)..... | 6         |
| TT-Z-321.....   | Zinc oxide, leaded, dry and paste in oil.....          | 9         |
| UU-B-561.....   | Board, bristol.....                                    | 589       |
| UU-P-226.....   | Paper, drawing.....                                    | 595       |
| UU-P-231.....   | Paper, drawing, printed.....                           | 596       |
| UU-P-236.....   | Paper, drawing, ruled.....                             | 597       |
| ZZ-H-541.....   | Hose, steam.....                                       | 49b       |
| ZZ-H-601.....   | Hose, water, braided.....                              | 588       |
| CCC-C-531.....  | Cloth, tracing.....                                    | 591       |
| DDD-C-481.....  | Cloths, table, cotton.....                             | 500       |

### PROPOSED SPECIFICATIONS

|               |   |       |
|---------------|---|-------|
| JJ-U-531..... | Underwear, knit (standard sizes).....     | ----- |
|               | Culverts, steel or iron, zinc-coated..... | ----- |
|               | Damask, table (in bolts).....             | ----- |
|               | Noodles.....                              | ----- |
|               | Twine, hemp.....                          | ----- |



## SIMPLIFICATION BRIEFS

*Welded chain.*—S. P. R. No. R100 has been reaffirmed by the standing committee, without change, for another year, according to the National Bureau of Standards.

*Forms for concrete ribbed floor construction.*—S. P. R. No. R87-29 has been reaffirmed by the standing committee, without change, for another year. This recommendation reduces the variety of widths from 7 to 2, or 71 per cent.

*Vitrified paving brick S. P. R. 1-29.*—Simplification for vitrified paving brick (S. P. R. 1-29) has been reaffirmed by the standing committee, without change, for another year. This recommendation has been instrumental in reducing the varieties from 66 to 6, or 91 per cent.

*Cotton Duck S. P. R. 27.*—It has just been announced by the National Bureau of Standards that Simplified Practice Recommendation No. 27, Cotton Duck, has been reaffirmed by the standing committee of the industry, without change, for another year. This recommendation has been instrumental in reducing the numbers and widths of wide and sail cotton duck from 460 to 90, or 80 per cent.

*Block Sizes for Calcimine Brushes S. P. R. R121-31.*—The National Bureau of Standards has just announced that Simplified Practice Recommendation R121-31, Block Sizes for Calcimine Brushes (Dutch, Semi-Dutch, and Baby Dutch), has received the required degree of acceptance and may now be considered as in effect. The simplification program, as recommended, is responsible for reducing the number of sizes of block widths from 47 to 10, thicknesses from 34 to 8, and an actual combination of 70 sizes to 16.

*Simplifying building and construction.*—As a result of the twentieth annual convention of the National Association of Builders Exchanges at San Antonio, Tex., in February, 1931, a simplified practice committee was appointed to act in liaison between the association and the National Bureau of Standards for the purpose of increasing adherence to simplified practice recommendations in the building and construction industry, and to develop new opportunities for simplification as a method of eliminating avoidable waste.

*Paperboard shipping cases for canned goods.*—The National Bureau of Standards has arranged for a general conference of all interests, on May 27, 1931, in Washington, D. C., concerning the simplification of paperboard shipping cases for canned foods at the request of the Paperboard Industries Association. These cases will accommodate the cans mentioned in

the recent simplified practice recommendation covering fruit and vegetable cans. The latter program brought about a reduction in sizes and varieties, from an indefinite number to 27.

*Web-steel joists.*—Simplified Practice Recommendation R94-30 covering open web-steel joists is now available in printed form, and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents a copy. This recommendation is confined to joists between 8 and 16 inches in depth and not longer than 24 times their depth, and specifies properties and allowable loads in pounds per linear foot. In establishing this simplified list of definite depth dimensions, it was necessary to include designations, stresses, resisting moments in inch-pounds, and maximum end reaction in pounds.

*Idle time in delivery-truck operation reduced.*—By the simple expedient of instructing his salesmen to turn in their orders on hand at 1.30 p. m. instead of waiting until 4, a food wholesaler found that he could greatly reduce idle waiting and delays in truck operations. By this change 5 porters and helpers were able to do the work formerly done by 7, and 5 trucks were reduced to 4. Thirty per cent of the assembling formerly done at 8 a. m. was reduced to 18 per cent, with the remainder spread more evenly over the day. An estimated saving of \$3,000 during the first year is reported to have resulted from this increased efficiency. A survey revealed that 41 per cent of the working day was spent in idle waiting and delays, 34 per cent in loading and unloading, and only 25 per cent of the time in actual running. Delays in assembling and loading and delays at the point of delivery were the two major sources of lost time.

*National drug-store survey.*—Active field work on the national drug store survey was begun the last week in March, 1931, according to Domestic Commerce. Under the guidance of a group of trade specialists of the Bureau of Foreign and Domestic Commerce, Washington, D. C., the recording machinery was set in motion for what is expected to be one of the most comprehensive studies of retail merchandising ever undertaken in any field. Inventories of 11 drug stores will be taken, as of April 1, 1931, and regular inventories will be taken for a period of one year. The work of the survey will be carried out along the general lines of the Louisville grocery survey, which has had such widespread effect in modernizing the methods of retail grocery distribution, and the results obtained are expected to find application to the retail drug trade on the same nation-wide scale as in the case of the grocery survey. Final reports from this survey will not be available until after its completion in 1932, but progress reports will be published from time to time.



## PAN AMERICAN CONFERENCE

Conference to Be Held October 5 to 12, 1931, Featuring Standardization of Commodities

By L. S. ROWE, *Director General, Pan American Union*

The Fourth Pan American Commercial Conference, which will meet in Washington from October 5 to 12, 1931, under the auspices of the Pan American Union, will mark one more step in the development of commercial relations between the 21 American republics.

Originating in 1911, when the First Commercial Conference was held, and followed by the Second and Third Conferences in 1919 and 1927, respectively, the gatherings have on each succeeding occasion been widened in their scope and influence. The Fourth Conference represents the most ambitious attempt yet made in the history of the Union of American Republics to bring together official and unofficial elements for a frank discussion of the problems affecting inter-American commerce, and the steps that may be taken to solve them in the most satisfactory manner.

At the Third Commercial Conference the precedent established at former gatherings of inviting individuals to take part in the discussions was changed, and calls were issued to chambers of commerce and other commercial organizations, as well as to the Governments of the several republics. This change in policy permitted a much more representative assemblage of delegates than had been possible at the two previous meetings, and its success was not only borne out by the results accomplished at the conference, but at the Sixth International Conference of American States in 1928 a resolution adopted at the Fourth Pan American Commercial Conference included the suggestion that this policy be continued.

To give the work of the conference an even wider scope, however, invitations for this gathering were not only issued to the Governments and commercial entities of the various countries, but for the first time to those colleges and universities maintaining schools of commerce or foreign trade. It was felt that the rapid growth of this type of institution warranted the presence of their representatives, who could make not only material contributions to the more theoretical phases of the discussions, but take away with them stimulating ideas of inter-American commercial problems as presented from the angle of the business man. It may be mentioned in passing that the response of these colleges and universities to take part in the conference has been most enthusiastic.

The Second Pan American Standardization Conference, held under the auspices of the Inter-American High Commission, met in Washington a few days after the close of the Third Commercial Conference in 1927. The importance of close cooperation between the two gatherings was evident, and the interest in the discussions of the latter meeting, which many of the commercial conference delegates attended, caused the subject of standardization to be given serious consideration by the committee formulating the program of the Fourth Commercial Conference. As no standardization conference has been held since that time, the subject "Standardization of commodities as an

aid to commerce and the protection of producer and consumer," was placed on the program. It was also intended by the committee that the various phases of standardization having a relation to other topics on the program would be included in the discussions of these subjects, in order to further the results already accomplished and to consider recent developments in the field.

That the questions to be discussed at the commercial conference might comprise those subjects in greatest demand for consideration, a draft of program was drawn up and submitted to the Governments and various commercial organizations of each republic early in 1930, with a request for suggestions looking to additions to, or modifications of, the subjects outlined therein. On the basis of the responses received by the Pan American Union, the program, as it appears below, was finally drawn up.

The next step in the preliminary work of the conference called for the preparation of memoranda on each of the topics of the program, with the object of setting forth the antecedents of each topic, together with relevant data upon which might be based suggestions as to the particular phases of each question which might most profitably be considered by the conference. This material has been compiled and issued by the Pan American Union to all the organizations invited to the gathering and, on the basis of the replies received, a schedule of specific questions will be prepared for presentation to the delegates.

It is proposed at the forthcoming conference, in view of the length of the program and the wide scope of the subjects contained therein, to divide the delegates into six committee groups, according to the general divisions of the subjects on the program. With adequate representation on each committee, both by countries and by the specific fields of activity of the members, it is felt that their round-table discussions will be productive of more practical and efficient results than if general sessions were held, attended by all the delegates. The question of language interpretation will be solved by the use of a telephone reporting system, which has met with signal success at past conferences.

Perhaps the most important function of a gathering, such as the commercial conference, is the carrying into effect of the steps advocated at the conference. In this rôle, the position of the Pan American Union is unique, in that its character as the international organization of the American Republics provides an opportunity for following up the work of the conferences, placing the adopted resolutions and draft conventions before the International Conferences of American States, whose delegates have plenipotentiary powers, and later working for the ratification of the action taken by these international conferences.

There is given below the program of the Fourth Commercial Conference:

*Trade barriers.*—Consideration of inter-American trade barriers with a view to their elimination.



*Trade promotion.*—(1) Development of inter-American commercial relations by means of general or special economic agreements, (2) means of developing closer relations between chambers of commerce and analogous associations of the American Republics, (3) standardization of commodities as an aid to commerce and the protection of producer and consumer, (4) uniformity in the definition of customary trade terms, and (5) the development of tourist travel as an aid to commerce.

*Transportation and communication.*—(1) Highway construction and finance in the American Republics; relation to other means of transportation; the Pan American highway; (2) the Pan American Railway; (3) the development of ocean steamship services between the American Republics; (4) the development of national and international commercial aviation on the American Continent; (5) creation of free ports to facilitate the distribution of merchandise; and (6)

the development of international cable, wireless, and telephone communication on the American Continent.

*Consular procedure and customs regulations.*—(1) Uniformity of consular fees in the American Republics, (2) progress in the simplification and standardization of consular procedure, and (3) consideration of the results of the Pan American Commission on Customs Procedure and Port Formalities.

*Finance.*—(1) Currency stabilization as a factor in the development of inter-American trade, and (2) the compilation and dissemination of financial and economic statistics.

*National and international juridical questions.*—(1) Inter-American commercial arbitration; (2) uniform legislation on bills of exchange, checks, and other commercial paper in the American Republics; (3) treatment of commercial traveling agents and means of facilitating the introduction of samples; and (4) the protection of trade-marks and patent rights.

## STANDARD SWITCHING PLAN FOR TELEPHONE TOLL SERVICE

### Efficiency Increased Through Improved Coordination in Planning, Designing, and Arrangement of the Toll Plant

By H. S. OSBORNE, *American Telephone & Telegraph Co.*

One of the more important engineering problems before the Bell system in recent years has been that of providing adequate service conditions for the very rapidly growing toll business represented at the present time by considerably more than 1,000,000,000 messages annually. This large growth in toll traffic has been felt in practically all sections of the country, a particularly marked feature being the development of the longer hauls; that is, toll messages between the more widely separated areas.

Accompanying this growth there has naturally been a correspondingly rapid and extensive development of each component of the toll plant. These rapid developments have resulted generally in a tendency toward the establishment of many well-defined routes along which the heavy growth in circuit facilities might be concentrated with a suitable degree of liberality and over which the large volumes of traffic might be directed. In addition, a myriad of lesser routes and branches have been required to reach into all sections of the country, including, of course, the smaller communities.

With the realization of these changing conditions, the improving standards of service, and the increasing vastness and complexity of the toll plant, it had become evident that there were both an increased need and an increased possibility for closer coordination in the planning, designing, and arrangement of the toll plant. It was apparent that this was particularly essential for those portions of the plant which might be involved in long haul, countrywide connections, as this part of the business, because of its scattering nature, offers the greatest difficulty in furnishing a high-grade service. A large step forward has been taken toward meeting these needs in the Bell system by the recent adoption of the general toll switching plan, a plan which is essentially a new fundamental arrangement to provide systematically

for the layout of the plant and the routing of toll messages to allow the interconnection of toll centers in a manner most suitable from both traffic and transmission standpoints.

The essential features of this plan may be summarized as:

1. The reduction in the number of intermediate switching points by concentrating all switching at a limited number of important offices.
2. The establishment of improved design standards providing adequate over-all transmission for all cases involving the interconnections of toll circuits.
3. The provision of improved methods of introducing voice frequency amplifiers at intermediate switching points, assuring faster and more reliable performance.

Briefly, the general plan may be described as a comprehensive countrywide network of toll circuit facilities connecting important switching offices over which practically all traffic, not handled by direct circuits, will be routed. The toll business of any part of the country is handled at a point termed a "toll center." Each toll center may serve one or several small communities or in the case of multioffice cities, may be the concentration point for all local central offices. Under the plan, each of the toll centers of the country will be directly connected to at least one of about 150 selected switching offices, termed "primary outlets." Within limited areas, the primary outlets will be directly interconnected. These small groups of interconnected primary outlets will handle the switched business originating and terminating within their respective areas. Also each primary outlet will have connections to at least one of a countrywide group of eight interconnected key switching points, termed "regional centers." The countrywide group offers suitable routings for the interconnection of toll messages originating in any area and terminating in a different area.



By this complete arrangement, a connection between any two toll centers within an area of interconnected primary outlets may be completed with a maximum of two switches, and any primary outlet may be connected to any other primary outlet in the entire country with a maximum of two switches.

The extent of the interconnection of the primary outlets is largely on the basis of State areas, as these, in general, represent areas of closely interrelated communities of interest; the individual selection of the outlets being the result of careful study of the present plant layout and operating conditions having also in mind the probable future development within that area. The regional centers were selected from among the primary outlets, being chosen chiefly because of their strategic locations and their importance from traffic distribution standpoints.

The basic network of circuits and switching offices, outlined above, is supplemented by a limited number of secondary type offices, termed "secondary outlets" and "secondary switching points." These latter offices do not have strict requirements as to their connections, but by convenient "tie ins" with the basic network, they serve principally to furnish greater flexibility in route selection by providing alternate routes and reducing the possibilities of large back hauls. The general plan is further supplemented by the provision of direct circuits where the volume of business is sufficient to justify them. In addition, further interconnection of the various switching offi-

ces beyond the strict requirements of the plan is provided where justified by normal development.

Of equal importance in the development of the plan was the determination of the proper transmission requirements so that any toll connection established in accordance with the plan would have satisfactory transmission efficiency. Studies were made of the most economical distribution of the transmission losses of the various circuit links, including the necessary portions of local plant, which would furnish satisfactory over-all transmission for connections involving different numbers and types of the individual links. The classification of all circuits involved in the plan into distinct classes to which similar transmission requirements could be applied, simplified this problem materially.

A further important requirement of the plan is the provision of suitable methods of introducing transmission gain on all connections switched at the selected offices. Under the plan, this will be accomplished by an improved switching arrangement which provides for the automatic introduction of transmission gain when two toll circuits are switched together.

Although the adoption of the plan is scarcely a year old, considerable progress has been made in placing it into effect, and the results to date have substantiated the expected service advantages. It is anticipated that the complete application of the plan will effect a substantial advancement toward the ideal of universal service.

## MARKETING NEW ENGLAND AGRICULTURAL PRODUCTS

### Rhode Island Farm Marketing Program Outlined

By HARRY R. LEWIS, *Commissioner of Agriculture, State of Rhode Island*

For many years prior to 1926, agricultural leaders throughout New England considered that some change should be made in the existing marketing structure in handling New England farm products. This culminated in the New England Farm Marketing Conference, held in Boston December 9 and 10, 1926.

For many years prior to that time products from various sections of the country had been constantly increasing in volume in our New England markets and in many cases replacing the native grown products. The principal reason that the distant products received such a ready welcome was their attractive appearance, neat packages, and uniform good quality. The farm-marketing conference brought together the various agricultural leaders, and a definite program was recommended for the New England States, to improve marketing conditions. This program consisted of definite steps, briefly as follows:

To set up standards and grades for farm products in each State to protect the grades; to disseminate knowledge pertaining to the grades and to study marketing methods; to bring about such improvements as were needed. It can not be said that Rhode Island did not need products from outside areas because all realize that a State having only about 3,500 farms can not be expected to supply all the food needs of

a population of approximately three-quarters of a million, but what products the State did produce should be of the best and should meet the exacting demands of a consuming public who could and was willing to pay for quality.

Since this farm marketing program has been in effect, the Rhode Island bureau of markets has promulgated grades for apples, eggs, dressed turkeys, potatoes, baby chicks, hatching eggs, and numerous vegetables.

To date more than 1,049,000 dozen of Rhode Island special eggs have been sold. All of these eggs have been identified with the New England quality label, and returns obtained from market reports show that approximately 5 cents more per dozen has been returned to the farmers for this grade of egg. Thus at least \$50,000 has been returned to the poultry men who are grading Rhode Island specials as compared with those poultry men who are not grading them.

The farm marketing program is recommended by the agricultural department of the State of Rhode Island and recognized by farmers as the best means of farm relief of that State. It is a program which helps the farmer to help himself by becoming acquainted with the existing conditions and acting accordingly.



## PUBLICATIONS OF THE NATIONAL BUREAU OF STANDARDS

### Printed Results of Research and Standardization Distributed the World Over

By HENRY D. HUBBARD, *National Bureau of Standards*

Two thousand publications have been issued by the National Bureau of Standards since its establishment in 1901. About 60,000 printed pages in the fields of physics, chemistry, engineering, and technology have thus been the outlet for results of bureau researches, investigations, and compilations. Printing broadcasts such scientific results to the world. A radio-broadcast ends when spoken, but the printed pages endure for the life of the paper which bears it. We still consult printed science a century old, and bureau publications will doubtless be read a century hence.

Congress, in establishing the National Bureau of Standards, gave it authority commensurate with the bureau's scope, to publish "such information as may be of value to the public or facilitate the bureau in the exercise of its functions." That scope has been broadened by the newer arts of radio and of motor transport by land and by air, and also by the great increase in accuracy demanded by modern industry, and by the new types of measurement made possible by scientific research. After 30 years the bound volumes of bureau publications fill eight library shelf units.

Publication and a restricted official distribution of its research results are functions of the bureau; the sale of its publications is not restricted in number or time. A recent report shows sales equal to about four-fifths of the bureau's annual printing and binding appropriations. By a revolving fund recouped from sales, the Public Printer continues to reprint for sale at nominal prices all bureau publications in demand, and does so without taxing the public funds.

The published results of the bureau's work find their way all over the world—to 110 points in England; 68 in France; 20 in Japan; and so on. There is a restricted official distribution to several hundred Government depository reference libraries, to certain scientific departments of universities and research institutions, technical and scientific journals, and finally exchange copies for institutions which publish results of value to the bureau in its work. Through this system of exchange the bureau is now receiving about 800 American and foreign scientific and technical journals.

The bureau's five periodical publications comprise two annuals—the annual report of the director, and the Standards Yearbook; three monthlies—the Bureau of Standards Journal of Research, the Technical News Bulletin, and the COMMERCIAL STANDARDS MONTHLY.

The annual report of the director summarizes research findings by bureau appropriations (about 30 in all), giving an interesting narrative of discovery, invention, and other research results.

The Standards Yearbook is an annual review of world-wide progress in standardization movements, now touching every human activity with stimulating effect.

The Bureau of Standards Journal of Research gives the results from active projects, of which there are several hundred continually in progress. The articles in the journal are reprinted in a series of research papers for sale by the Superintendent of Documents. These research papers, of which 267 have been issued, together with the scientific and technologic papers which were issued prior to the advent of the journal (over 1,200 in all), represent a large output of results in the service of science and industry. They tell narratives of discovery and inventions of unusual interest. They have made history for science and industry.

The Technical News Bulletin is a concise monthly news coverage of the bureau's scientific and technical work, with announcements of new publications, both in the bureau's series and outside journals.

The COMMERCIAL STANDARDS MONTHLY is a review of world-wide progress in simplification and standardization, with feature articles by experts in their fields on active phases of standardization. It reports monthly progress of leading standardizing associations and the four divisions of the bureau which specialize in commercial standardization—simplified practice, trade standards, specifications, and building and housing.

Bureau circulars (388 have been issued) give information on tests, units, standards, measurements, and important data for industry. These circulars are diverse in subject. Some announce test fee schedules and regulations affecting tests of weights, measures, measuring instruments, and materials. More often they contain master specifications for materials or useful data compiled for some science or technology. Light Metals and Alloys is a notable example, which is most useful in bringing a new era of light metals.

Circulars may run to 200 pages of highly technical matter; as, a comprehensive text on polarimetry; standard methods of gas testing; instruments and measurements of radio, etc. The last is a basic reference text for radio experts; the others are classics in their respective fields. The publications of the National Bureau of Standards are, in general, for the expert.

A letter from a national business organization received as these lines were being written expressed the belief that "every manufacturer in the Nation should be kept progressively informed on the results of the work being done by the National Bureau of Standards." This is the purpose of the bureau's publications. However, some popular publications are prepared for the average citizen, including experts who are laymen in subjects other than their own field.

Some circulars are full of data from bureau researches. The National Standards Petroleum Oil Tables serve as a basis for the sale of gasoline in this country. Others appeal directly to the household, as, Measurements for the Household; Safety for the Household; and Materials for the Household. A



famous publication widely circulated by the industry pointed out a million-dollar-a-day waste of natural gas in domestic gas appliances and showed how to prevent the loss of an amount exceeding by many times the total bureau budget.

Many articles by the bureau staff are published in outside technical journals where the subject or mode of treatment make it more suitable.

Forty industries maintain about 60 research workers stationed at the bureau. The results are published either by the bureau or the supporting organization. Some of the results are of the utmost importance, reporting new processes for industry, new

results in aeronautics or automotive researches, and numerical data on the properties of materials or the controls of industry.

The descriptive catalogue of the bureau's publication is the most comprehensive of its kind and contains a synopsis of every publication and a geographic list of the Government depository libraries maintaining files of bureau publications for public reference use.

Scientists refer to scientific journals issued a century ago and it is quite certain that the bureau's publications will be consulted by experts a century hence.

## COLORED SANITARY WARE

A report of the general conference held in Washington, D. C., on January 23, 1931, of producers, distributors, and users of colored sanitary ware, including a revised draft of the recommended commercial standard and a brief history of the project, has been circulated to all interests of the industry for written acceptance.

The recommended commercial standard covers six colors, namely, green, orchid, ivory, blue, light brown, and black. These colors are to be used as a guide in the production of sanitary ware, which includes plumbing fixtures and allied products, made of vitreous china, porcelain (all-clay), enameled iron, metal, wood, or glass. The method of making color comparisons is briefly described.

Abundant interest in this project is shown by the large number of signed acceptances that have been received in the comparatively short time since the recommended standard was circulated. This interest is further apparent in the heavy demand for the standard color reference samples.

## HOW MANY EXITS DOES A BUILDING NEED?

The Department of Commerce Building Code Committee has been making a study of exit facilities provided in various buildings, in cooperation with the Building Exits Code Committee of the American Standards Association.

Various methods of determining mathematically the necessary number and size of exits in relation to population of a building have been proposed, but it has been difficult to prove whether these will accomplish the desired result. It has been felt that experience and good judgment necessarily play a large part in the solution of the problem and that by assembling examples of current practice light would be thrown on the whole matter.

Accordingly, plans have been reviewed, stairways measured, and architects and building officials consulted. Much helpful information has been obtained. Safety considerations are paramount and at the same time attention must be given also to the economics involved, for to subtract a large amount of area from useful floor area in order to provide stairwells presents a serious problem for architects and owners.

## UNIFORM LAW FOR LICENSING DRIVERS

Active campaigns are in progress in a number of States, according to the National Conference on Street and Highway Safety, to bring about the enactment of a uniform law covering the licensing of all drivers of motor vehicles, by examination as to traffic rules and regulations, essentials of physical condition, such as eyesight, and demonstrations of ability to drive and control an automobile under normal traffic conditions.

Automobile accidents, measured by the records of the last two years among the country's population, have claimed, in each of these years, the life of one person in every 3,968 and injured one in every 123. It is reported that States that have laws which provide for licensing of drivers through examination, have eliminated at least 25 per cent of traffic deaths, on the average, as compared with their respective accident records before the adoption of these license laws.

Among the States conducting these campaigns are: Ohio, Illinois, Michigan, Minnesota, Montana, Idaho, Oregon, Utah, Nevada, Virginia, North Carolina, Georgia, Alabama, and Tennessee.

## DEMAND FOR GRADE-MARKED LUMBER

There can no longer be any question about the permanency of grade marking as a practice among mills whose grading is supervised by the regional associations of lumber manufacturers, according to the Southern Pine Bulletin. The past six months have witnessed such a decided demand from all classes of buyers for "officially" grade-marked lumber that countless letters have been received by the Southern Pine Association from mills not in the association inquiring about grade marking, and how this privilege might be obtained.

Much of this is doubtless traceable to the persistent trade-promotion work that has been carried on by the Southern Pine and other lumber trade associations, according to the item in the Bulletin. It is also true that many consumers, particularly the highway departments of a large number of States, have been scrutinizing the grades of lumber purchases, in keeping with the economic demands of the times, and have come to the conclusion that the best assurance of getting what they order is through the specification of a branded product.



## UTILIZATION OF PETROLEUM WASTE

### Petroleum Industry Transformed from an Illuminant Basis to One of Gasoline Fuels and Oil Lubricants

Since the inception of the American petroleum refining industry in Pennsylvania in 1861, refiners constantly have been facing changing situations, and the present is no exception. It was changing conditions that actually brought the American petroleum refining industry into being, records show.

At the beginning of the nineteenth century civilization relied upon candles and sperm oil for illumination. Candles were unsatisfactory, sperm oil lacking in quantity. Scientists had been experimenting in the hope of finding substitutes, producing, among other compounds, a mixture of turpentine and alcohol, called "camphine." Around 1847, James H. Young obtained an illuminating oil from the coals and shales of Scotland by a crude refining process. In 1854, Dr. Abram Gessner, an American chemist, patented an improved illuminating oil obtained from coal, calling it "kerosene." When in 1859 the Drake oil well came in, there were more than 50 companies in operation in this country producing illuminating oils from coal and shale. In 1861 the first American commercial petroleum refinery began operation in Pennsylvania.

Dr. Samuel Kier, experimenting in the hope of transforming his "rock oil" medicinal products into something more valuable, had evolved "carbon oil," an illuminant, before the Drake well came in. It was produced in quantity from petroleum, but it was unsatisfactory for burning in lamps. Its odor was disagreeable, it quickly turned black, and it carbonized lamp wicks, interfering with the flame. Distillation being unable to cope with the difficulties, refiners experimented with chemical treatments and found that processing crude oil with solutions of alkali and acid overcame much of the trouble.

Kerosene became an accepted illuminant, displacing whale oil, coal oil, shale oil, rape seed, sesamun, and, of course, the candle. But it had its drawbacks. Accidents and fire were caused by kerosene lamps. A serious study of the situation led to the conclusion the source of danger was in the "waste" products—

gasoline, naphtha, and benzine incompletely removed from the illuminant. Improved lamp construction produced the "safety" lamp. Improved and more careful refinery processing removed the explosive lighter fractions of the crude oil, while development of a market for these "wastes" encouraged their thorough separation.

Meanwhile, markets were developing for other petroleum products, notably the fuels and lubricants. The internal combustion engine created a hunger for gasoline. Increasing use of machinery caused a demand for lubricants. The coming of the self-propelled vehicle enormously augmented the demand for both. At the same time the growing use of the electric light reduced the demand for kerosene. Within a few years the petroleum industry was transformed from an illuminant basis to one of gasoline fuels and oil lubricants.

Statistics best show how rapid was the change. In 1880 from a 42-gallon barrel of crude oil there were obtained, roughly, 32 gallons of kerosene, and 5 gallons of gasoline. Ten years later the proportion of kerosene had declined to 28 gallons, and by 1900 fell to 20 gallons. Another 10 years found the kerosene output down to 10 gallons, while the gasoline proportion, comparatively stationary all this time, had moved up to 8 gallons. In 1920 the gasoline proportion increased to 11 gallons and kerosene dropped to 6. Last year the production of gasoline from a barrel of crude oil exceeded 17 gallons, while the kerosene output was less than 3 gallons.

The trend now is toward a higher output of gasoline and a smaller proportion of other products, such as gas and fuel oils, kerosene and lubricating oils. However, none of these products to-day suffer the fate of gasoline in the early days—waste. Domestic and industrial oil heaters and gas manufacturing plants now absorb much of the gas and fuel oil not used for "cracked" gasoline. There is still a large market for kerosene. The demand for gasoline and lubricants steadily is growing.

### DEVELOPMENT OF DROP-CENTER RIMS FOR AUTOMOBILES

The objective method of problem analysis which aims to replace "I think" with "I know," should be applied to the solution of the automotive industry's rim riddle, states the editors of the S. A. E. Journal (March) in a review of "Tires and the Rim Riddle" by B. J. Lemon, of the United States Rubber Co.

During car life, tire costs average more than 30 times rim costs. This makes rim design a major tire problem. High speed, safety, appearance, and service focus present attention on automobile rims, wheels, and tires.

The English pioneered the well-base rim, and decided that its success depends on the nice adjustment of rim dimensions to the requirements of the tire. English and American international standards of

drop-center rims seem likely to be adopted. German drop-center rims resemble the English standard and include a safety type of rim. The French drop-center rim and tire are not interchangeable with other European or with American equipment.

In his article, Mr. Lemon advances two factors considered essential for the prolonged success of the drop-center rim in America. One factor is that tires shall mount and dismount with the same or with greater ease than that for flat-base rims. The other factor is that tire service and car-operating safety on drop-center rims shall be comparable with or better than past performance.

For light cars the public appears to have accepted the drop-center rim as a step in advance. The years 1931 and 1932 will record car-owner reactions to the rim for larger cars.



## SURVEY OF LOW-PRESSURE STEEL HEATING BOILERS

A summary report of a survey of a variety of low-pressure steel heating boilers, recently conducted by industry under the auspices of the National Bureau of Standards, has been mailed to those interested.

Twenty-one firms representing more than 90 per cent of the 1930 output reported total shipments of 7,805 boilers, of which approximately 76 per cent were of the welded combination type. Of the total shipments, 3,036 boilers were to be mechanically fired. Eighteen different kinds of boilers were reported, each made in from 6 to 132 different capacity ratings. The total variety aggregated 1,072. An analysis of the two most popular kinds of boilers showed that more than 84 per cent of the sales were made in 20 per cent of the capacities produced, and that no shipments were made in more than 28 per cent of the capacities produced.

A detailed report of the survey is in the hands of the simplified practice committee of the industry and is being used as a basis for the development of a simplified practice recommendation on the capacities of low-pressure steel heating boilers, in an attempt to eliminate the waste prevalent in this field.

## CONSUMERS URGED TO READ FOOD AND DRUG LABELS

"The public will not get the fullest benefit from the enforcement of the national pure food law until it has a fuller understanding of what food and drug labels mean," said W. R. M. Wharton, of the United States Department of Agriculture, in an address before the Tea Association of America.

"In order to understand what labels mean," Mr. Wharton said, "the consumer must know how to read them; must be aware of the significance of words used to name and describe products; and must know definitions and standards. The consumer must know kinds, varieties, and grades of foods and drugs, and weights and measures equivalents. The consumer must also know the requirements of regulatory laws as they affect labeling. Consumers have a right to know the composition, quality, efficiency, and limitations; in fact the whole truth about the products they buy. If they will insist upon exercising and holding this right, the manufacturers of the country can do nothing less than comply with their demands."

Mr. Wharton expressed the belief that the manufacturer should always play fair and label his products so that the consumer will have a full understanding of their nature, quality, condition, and relative value. He believes that if a proper conception of the label's purpose is held in mind, and if the manufacturers will look upon the labels on his products as representing his personal representations, his pledged word, his written contract with his customers, then that manufacturer will get what he is rightfully entitled to receive in buyer confidence and increased profits.

"It is also the tradesman's duty to assist the buyer to learn what labels mean," Mr. Wharton said, adding that "it is likewise his obligation to know how to

read labels himself in order that he may properly interpret them for his customers. Moreover, in every retail store, there should be a ready, truthful, and agreeable response to any question regarding the kind, quality, grade, and relative value of any product on sale. A retail dealer may properly be expected to furnish such essential information to his customers on request."

## AMERICAN AND NORWEGIAN SHIPPING-TAG STANDARDS

In Norway a large variety of shipping tags is in use, varying both in size and typography. To effect a more simplified use of tags and the resultant economies, the Norwegian Standardization Committee has proposed two standard tags. One standard is for tags in ordinary use and the other for goods on which there is a standard freight rate. Tags used for express freight would be bright red, and those used for slow freight bright blue in color.

In the United States the great diversity existing for shipping tags led the industry to promulgate a simplified practice recommendation, under the auspices of the National Bureau of Standards, which resulted in reducing the number of sizes of tags from 16 to 8, the grades of stock from 21 to 8, the number of thicknesses from 7 to 5, and the colors from 32 to 15. This recommended simplification became effective September 1, 1929. Like the proposal advanced in Norway, the American schedule for tags provides a definite standard tag each for freight, express, and parcel-post shipments, and five standard tags for inside or city delivery use.

## STANDARD TIME SERVICE

The Naval Observatory, Washington, D. C., has developed plans for assuring the accuracy of the standard time service which it operates, contemplating installation of new clocks of great precision in a new vault of special design. The vault will be embedded in the ground below the frost line, and will be equipped with a periscope which will permit visitors to the observatory to see the clocks that "keep the Nation's time" without exposing the sensitive mechanism to vibration.

The new vault in reality will be two vaults, one within the other. The inner compartment will be made of hollow tile, while the outer will be constructed of either stone or concrete. Hot-water heat will be used in maintaining a constant temperature of 85° F. An air space of at least 18 inches will be provided between the inner and outer walls, thus giving opportunity for inspection, cleaning, and other activities. Air locks will be provided so that access to the vault may be made without exposing the timepieces to atmospheric changes. Illumination of the inner vault will be accomplished by a system similar to that employed in lighting magazines on board naval vessels. This will permit the observatory staff to change globes, polish and clean reflectors, and make repairs to wiring without entering the chamber.

The periscope will extend through the roof so that the interior of the vault in which the clocks will be situated can be inspected from the record room above.



## COMMERCIAL STANDARD FOR PLATE GLASS MIRRORS

The printed pamphlet entitled "Plate Glass Mirrors, Commercial Standard CS27-31" has been released, and was distributed to acceptors of record on April 9, 1931.

The standard provides for five distinct grades of quality which follow closely the existing grades of plate glass. The defects allowable in the several grades are plainly indicated, and a common understanding of the several qualities will provide a more intelligent basis of comparison which should work to the mutual advantage of manufacturer, distributor, and purchaser. Various colored labels have been designated for use on the face side of the mirror to represent each of the five grades established. The use of these labels is left optional with the manufacturer.

The pamphlet includes a list of acceptors and the membership of the standing committee which was appointed to consider any comment or suggestions as to changes in the standard in order that it may be kept in accord with the desires of the industry and the advance in the art.

Copies of the pamphlet may be purchased from the Superintendent of Documents, Washington, D. C., for 5 cents per copy (stamps not accepted).

## DETERMINING KNOCK CHARACTERISTICS OF FUELS

The progress made toward the establishment of a standardized method of measuring the ability of commercial gasolines to overcome detonation or the knocking tendency of automobile engines was described before a meeting of the American Petroleum Institute's division of refinement, April 15, 1931, at St. Louis, Mo., by Dr. H. C. Dickinson, of the National Bureau of Standards.

For the purpose of establishing this standard there has already been adopted a scale for rating the knock characteristics of different fuels. This is based on the blend of two pure hydrocarbons, normal heptane and iso-octane, used as standards of knock rating. Ratings are expressed in octane numbers, the octane number of a blend of the two standard substances being numerically the percentage by volume of iso-octane which it contains. The octane number of the fuel is that of the blend of the two standards which it matches in knock value when tested by an approved method. This standard has already been generally accepted in the United States and Europe.

The second step in the program is the adoption of a standard test engine which, Dr. Dickinson explained, has developed to the point where an experimental engine is now undergoing final check tests and will probably be adopted as standard. This is a single-cylinder engine of normal motor-vehicle size. It has a cooling system which automatically keeps the temperature constant, a variable compression ratio, and a special carburetor which permits instantaneous change to any of four fuels.

The final step in realization of this standard will be the adoption of a standardized test procedure.

Such procedure has been prepared in tentative form and is being developed and refined by means of tests carried on in 15 cooperating laboratories, to determine the degree of accuracy with which the various factors involved in engine operation must be controlled. These factors include, for instance, engine speed, spark timing, mixture ratio, air and jacket temperatures, air humidity, and general engine conditions, all of which have an important bearing upon the results obtained.

## FRENCH ADOPT BRITISH-AMERICAN STANDARD CAN SIZES

British-American net standards for mushroom cans must be employed by members of the Syndicate of French Mushroom Canners, according to a recent decision of the syndicate. The net weight must be indicated on each can.

The new standards adopted are as follows:

|          |  |
|----------|--|
| 4/4----- | 460 grams approximately 1 pound.             |
| 1/2----- | 230 grams approximately $\frac{1}{2}$ pound. |
| 1/4----- | 115 grams approximately $\frac{1}{4}$ pound. |
| 1/8----- | 58 grams approximately $\frac{1}{8}$ pound.  |

The American assistant trade commissioner at Paris, George W. Berkalow, has been informed that the decision of the syndicate provides that the manufacturers are to be permitted to sell or manufacture on the basis of former net weights within a period of one year, dating from the adoption of the new regulations; that wholesalers and retailers will be permitted to sell merchandise manufactured on the basis of former standards for a period of two years.

## IDENTIFYING MAPLE-SIRUP PRODUCTS

Alert and progressive to new ideas in merchandising, and convinced of the necessity of quality and standardization, maple-products producers have adopted labels, quality grades, and color standards.

*New England.*—The three and a half million dollar maple-products industry in New England is rapidly adopting the New England quality farm products label. For example, Vermont has used 249,000 labels on maple products, and there are 232 producers using the label in that State. One producer who used 1,000 labels last year as an experiment, has ordered 9,000 for this season. In 1929, the last year for which figures are available, New England produced 12,109,000 pounds of maple products, expressed in pounds of sugar, and this amounts to about 54 per cent of the annual maple crop of the country. The two largest producing States outside of New England are New York, which produced 5,255,000 pounds, or 23.4 per cent; and Ohio, 1,983,000 pounds, or 8.9 per cent.

*Pennsylvania.*—The bureau of markets of the Pennsylvania department of agriculture has promulgated color standards and grades for maple sirup, based on the official Vermont grades, which are: Fancy, grade A, B, and C.

*Canada.*—Producers of Canadian maple sugar and maple sirup are now required to label their products, according to a new regulation which became effective March 1, 1931.



## SPECIFICATIONS NEEDED FOR LUBRICATING OILS

Transmission and rear-axle lubricants frequently have small quantities of soap or other material added to decrease the tendency of the lubricant to leak from the housings. Although these additions may increase the apparent viscosity of the oil, they may have little or no effect on the load-carrying properties at high temperatures or on the tendency of the lubricant to make gear shifting harder at low temperatures than with the straight oil.

On account of the many different conditions under which transmission and rear-axle lubricants are used, and because of the many different methods of manufacture, no one detailed specification is applicable as an indication of the performance characteristics of a lubricant.

Therefore, said C. M. Larson, supervising engineer of the Sinclair Refining Co., in an article "Classifying Transmission and Rear Axle Lubricants," in the March S. A. E. Journal, consumers must necessarily depend upon the individual oil companies to produce a quality lubricant, using for their guidance a viscosity, consistency, and film-strength classification to be determined upon and subsequently published in the car manufacturers' instruction books.

## AUSTRALIA TO STANDARDIZE PAPER SIZES AND COMMERCIAL FORMS

The Standards Association of Australia has formed a committee to prepare recommendations for the standardization of sizes of commercial papers and the simplification of related practices, according to information received from Assistant Trade Commissioner H. P. Van Blarcom, at Sydney, Australia.

The committee is the outcome of a conference of representatives of New South Wales Government departments and business associations, including the Federated Master Printers Association; Chartered Accountants of Australia; Institute of Incorporated Secretaries; several banks; New South Wales mines, lands, public work, agricultural, labor, and taxation departments; New South Wales Government printer; and a number of other groups.

Recommendations are to be prepared on the simplification of the following: Letter paper, envelopes, invoice forms, statement forms, order forms, delivery forms, receipt vouchers, credit vouchers, debit vouchers, paper stampings and perforations, and such other subjects as considered advisable.

## REDUCING WRAPPING AND PACKING WASTE

Four types of wrapping and packing materials were approved by a general conference of interested elements of the industry, held February 7, in New York, N. Y., in the program to reduce cost of distribution. The recommended simplified schedule covers set-up boxes, folding boxes, corrugated boxes, and notion and millinery paper bags used by department and specialty stores.

Prior to the holding of the general conference to consider the recommended simplified schedule, the National Bureau of Standards, at the request of the National Retail Dry Goods Association, conducted a survey of 34 typical department and specialty stores to ascertain the diversity of wrapping and packing materials in use. The findings of the survey were used as the basis for the simplified schedule. The recommendation, as approved by the general conference, will reduce the variety in wrapping and packing materials as follows: Notion and millinery paper bags from 188 to 28, set-up boxes from 1,035 to 194, folding boxes from 262 to 59, and corrugated boxes from 325 to 75.

## MANUAL OF TYPOGRAPHIC STYLE SUGGESTED BY BOOK MANUFACTURERS

At a meeting of the National Book Manufacturers Association, Composition Group held in New York, N. Y., on April 8, 1931, four standards were discussed, namely, (1) a standard method of preparing copy, (2) a standard house style, (3) a standard set of basic specifications, and (4) a standard set of trade customs. Problems of the book manufacturers were reviewed.

Henry D. Hubbard, chairman of a subcommittee on the revision of the Government style manual, and assistant to the director, National Bureau of Standards, was requested to make the opening address of the national meeting. He spoke of the work of the Government Printing Office, and the efforts of Hon. George H. Carter to revise the Government style manual. Mr. Hubbard pointed out the principles that he and his subcommittee were working on, namely, to present a manual of style based upon logical principles rather than mere usage arbitrarily fixed by each printer or publisher.

E. W. Palmer, president of the National Book Manufacturers Association, Composition Group, is primarily responsible for the concerted action evidenced by competitive manufactures to eliminate the most obvious evils now rampant in the composing rooms. A truly national manual of style would solve a large portion of this problem, is the opinion of E. J. Triebe, of Kingsport Press (Inc.).



## STANDARDIZATION BRIEFS

*Cotton fabric tents, tarpaulins, and covers.*—Having been accepted by a majority of the industry, the commercial standard for cotton fabric tents, tarpaulins, and covers will be considered effective January 1, 1932.

*Committee on technical standards for maps and charts.*—At a recent meeting of the Board of Surveys and Maps, Washington, D. C., a committee on technical standards was proposed to investigate and report on subjects relating to the standardization of conventional signs and symbols used on all types of maps and charts, and such other technical matters as may be assigned to it by the board.

*Revised definitions for aviation lighting terms.*—A list of definitions covering the entire field of aviation lighting is being prepared by a subcommittee of the aviation lighting committee of the Illuminating Engineering Society. A paper summarizing aviation lighting research will be presented at the fall meeting of the International Commission on Illumination.

*Lightning arresters.*—The American Institute of Electrical Engineers has issued a second revised report on Standards for Lightning Arresters, which is being circulated for criticism before final adoption. It deals with definitions, classification of arresters, ratings, tests, etc. It prescribes an operating cycle and recommends a specified surge as typical for testing purposes.

*Labeling eggs.*—Leading Massachusetts poultrymen are forming an organization to advertise and market Massachusetts eggs. The product will be known by the brand name of "Minute Man Eggs" and will bear a label depicting a minuteman and incorporating in the design the New England quality farm products label. Owners of more than 100,000 birds have already agreed to market their eggs through this organization.

*Standard television apparatus.*—Experimenters in television development are getting together with the idea of standardizing television apparatus, according to a news account appearing in the Washington Star of March 26, 1931. A 60-line picture of sufficient clarity to be seen over an average sized room is the objective. Since several different scanning systems are now employed, each transmits a different sized picture.

*Steel bone plates.*—A tentative draft of a proposed commercial standard for steel bone plates used by some hospitals in the reduction of bone fractures, has been prepared for consideration by a committee of the American College of Surgeons. The tentative draft

covers physical and chemical requirements of the steel, dimensions and tolerances for the plates, and self-tapping screws, means of identification and certification of quality from the manufacturer to the surgeon.

*Six-day summer meeting of S. A. E.*—The six-day summer meeting of the Society of Automotive Engineers will be held this year from June 14 to 19, at the Green Brier Hotel, White Sulphur Springs, W. Va. Programs which are being arranged by the eight professional departments of the society as well as by the standards, research, and meetings committees will comprise 15 technical and professional sessions dealing with motor cars, motor trucks, coaches, airplanes, fuels, Diesel engines, and the minutiae of standards and research work.

*Recording the evenness of raw silk.*—A very ingenious machine which measures the variation in thickness of a filament passing through it and records these variations on a chart, was described by Dr. W. F. Edwards, director of research, U. S. Testing Co., at a recent meeting of the American Society for Testing Materials. It is a decided step toward the satisfactory estimation of evenness in silk by mechanical means, thus eliminating the human factor.

*International trade council.*—The formation of the International Trade Council of Washington County, Me., and Charlotte County, New Brunswick, made up of two delegates each from the local chamber of commerce and boards of trade, is the first case of organized international cooperation for the development of a region. This council meets every six weeks, and has already established committees working on agriculture, forestry, fisheries, industries, recreational development, and transportation.

*Defective tires cause accidents.*—Manufacturers of automobiles or automobile parts and accessories are actively interested in the safety characteristics of their products. This is especially true in connection with tires. While the time may not yet have come when one who wilfully operates with a defective tire can be found legally negligent, it seems clear that such an act does constitute negligence. With increasing road speeds it is desirable that the tires be as safe as other parts of the car, since serious accidents are possible from tire failure.

*Purchasing walk-way materials by specifications.*—Specifications of materials used for walk-way surfaces are now being compiled by a technical committee of the Federal Specifications Board. It is proposed in these specifications to divide the materials into a num-



ber of general classes such as: (1) Gratings, (2) pre-cast material, (3) terrazzos, (4) linoleums, and (5) rubber compounds, etc. This classification will, no doubt, be of great assistance to the Government architects, as well as purchasing agents. It will also assist the manufacturers of these materials in making bids.

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*Cost accountants considering standardization.*—The most modern ideas of management will feature the Twelfth International Cost Conference of the National Association of Cost Accountants to be held in Pittsburgh, Pa., June 15 to 18, 1931, at the William Penn Hotel. A plan of standard costs, which has been developed by the cost accountants, will be presented for consideration. The plan involves the determination of a comprehensive sales budget as the basis for determining standards for labor, materials, and burden costs.

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*Measuring the thermal transmission of textiles.*—An apparatus for measuring thermal transmission of textiles was devised at the National Bureau of Standards. The apparatus is compact, inexpensive, portable, and automatic in operation. A test is completed in a short time (approximately one-half hour), and the results are shown to be reproducible. Like other textile tests, thermal transmission tests of fabrics are made in a room where the temperature and humidity are controlled.

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*Utilizing skim milk.*—Profitable utilization of milk by-products is now more important than usual, according to the Bureau of Dairy Industry, United States Department of Agriculture. Cottage cheese offers a dairy-products plant a profitable outlet for its skim milk. The bureau has, by experimental work both in the laboratory and on a commercial scale, demonstrated a method for making the low-acid rennet-type of cottage cheese which has consistently produced excellent results. A mimeographed circular which tells how to make this type of cottage cheese may be obtained free by writing to the Bureau of Dairy Industry, Washington, D. C.

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*Crazing.*—The resistance of glazed ware to the development of hair-like cracks, commonly called crazing, when subjected to unusually large changes in temperature may not always be as high as is desired. This lower resistance is generally attributed to a differential in expansion of the glaze and body. Although this is an important cause, it has been discovered at the National Bureau of Standards that the failure of such ware may also be caused from cracks which develop in the body and extend to the surface. The importance of selecting the proper bodies as well as the proper glazes is therefore evident.

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*Marketing code for petroleum industry.*—Realizing the need of a code of marketing practices, the petroleum industry will ask the Federal Trade Commission to perpetuate the present National Code of Practices

for Marketing Refined Petroleum Products. Sixteen thousand marketing units have approved the code and agree that its abandonment would result in great confusion. Besides preventing fraud and deception by prohibiting misbranding and the unfair substitution of products, the code also requires each marketing company to post publicly the price at which it offers its products for sale, thus promoting fair and honest competition.

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*Magazine accepts standard size.*—Starting with the February, 1931, issue the Music Trade Review appeared in the standard size approved by the Associated Business Papers (Inc.) and recommended by the Department of Commerce. The type size of the page is 7 inches wide and 10 inches deep, and the all-over size 9 inches wide and 12 inches deep. The change, which is in accord with modern business paper practice, not only makes possible a more attractive publication as well as one which will be more convenient to handle, but at the same time effects a distinct saving for advertisers.

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*Radio exhibit.*—A permanent exhibit of the latest types of radio transmitting and accessory equipment will be opened in the National Press Building in Washington by the National Radio Equipment Exhibitors. It is planned to maintain the exhibit primarily for the benefit of broadcasters and other users of radio, which will afford these interests an opportunity to view at a convenient location a comprehensive display of the latest developments in radio art. Besides its generally instructive features, the exhibit will provide a means to keep informed of equipment designed to meet the continually increasing rigid engineering standards of the Federal Radio Commission.

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*Staple seats for water-closet bowls.*—Signed acceptances for commercial standard covering staple seats for water-closet bowls have been received from a number of manufacturers, distributors, and users, estimated to represent a satisfactory majority. The National Bureau of Standards has therefore announced that the recommended commercial standard may be considered effective for new production and clearance of existing stocks as of October 1, 1931. Types, shapes, materials, construction, color finishes, hinges, and general practices applying to the manufacture of seats for water-closet bowls are covered by this recommended commercial standard.

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*Care and repair of the house.*—Desirable details on how to keep up and repair the average home, with subsequent savings to the home owner, is contained in a manual, *The Care and Repair of the House*, just compiled by the National Bureau of Standards. The manual endeavors to present in handy form explicit directions for dealing with problems, such as doors that stick or jamb, leaking faucets, painting the walls or trim, reroofing, and scores of other repairs and improvements about which inquiries have come to the bureau. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., price, 20 cents per copy.



*Cotton yarns and fabrics.*—A systematic, quantitative study of constructions and properties of yarns and fabrics is being made at the National Bureau of Standards. One lot of 1-inch staple good ordinary cotton was carded and spun into 10s yarn in a variety of twists from twist multipliers  $2\frac{1}{4}$  to 9 inch increments of  $\frac{1}{4}$  to twist multiplier 5, thereafter in increments of 1. Both right and left hand twists were used. The strengths of these yarns, determined by the single strand, multiple strand, and skein tests, and the stretch, diameter, and angle of twist as affected by the twist were discussed at a recent meeting of the American Society for Testing Materials.

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*Testing tenderness and texture of canned foods.*—Tenderness and texture of canned fruits and vegetables are of major significance in the commercial grading of these products. Accordingly, official standards, under the McNary-Mapes amendment, for canned peas, peaches, and pears, announced by the United States Department of Agriculture February 16, 1931, and to go into effect May 18, exactly define the measurements for tenderness for these canned foods, as established by tests with a machine perfected by United States food experts. The use of the device by the trade will make it relatively simple for manufacturers of certain canned foods to comply with Government standards, so far as tenderness of the foods is concerned.

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*National Conference on Weights and Measures.*—The Twenty-fourth National Conference on Weights and Measures will be held at the National Bureau of Standards in Washington, D. C., on June 2 to 5, inclusive. These meetings will be attended by State and local weights and measures officials from all sections of the country and by representatives of manufacturers of weighing and measuring devices and others interested in some phase of weights and measures supervision. The conference considers questions of standardization along weights and measures administrative lines, including the development of methods of test for commercial devices and codes of specifications and tolerances which are recommended for State adoption.

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*Installation of proper highway lighting.*—Declaring that it takes approximately 10 years from the time that a new idea is conceived to the time it becomes commonplace to the public, W. M. Johnson, an engineer of the General Electric Co., speaking before the recently organized Baltimore section of the Society of Automotive Engineers stated that the installation of proper highway lighting was one of the greatest public aids to safety that could be considered by a municipality. A striking instance of what proper lighting will accomplish is found in experiments made on St. Claire Avenue, Cleveland, Ohio. Before the installation of the new lights, fatal accidents averaged six per year on this highway. The new lighting system has reduced this figure to an average of two.

*Standardization of printed forms and paper sizes.*—Standardization of printed forms and quantity printing, two or more in the same press-run, were offered as economies which any advertiser can practice without disadvantage, by M. G. Dunnagan, of the D. S. Warren Co., speaking before the Technical Publicity Association of New York, March 11, 1931. Mr. Dunnagan urged hearty support of the National Bureau of Standards in its effort to reduce the costs of manufacturing and handling paper by the adoption of 10 standard sizes, because in this direction lies a real opportunity for saving.

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*Certified horticulturists cultivate medicinal plants.*—The Italian Minister of Agriculture and Forests has recently published a decree, the purpose of which is to control and stimulate the cultivation of medicinal plants, according to advices received in the Department of Commerce from Trade Commissioner Elizabeth Humes of Rome. The decree makes it obligatory that those engaging in the cultivation and processing of medicinal plants be certified horticulturists. The sale of such plants is reserved entirely to pharmacists having a degree in horticulture. A central committee of official horticulturists under the supervision of the Minister of Agriculture has been created to supervise activities in connection with plant cultivation. A fund of 500,000 lire has been established to carry on this work.

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*Automatic radio volume control.*—An automatic volume-control device has been developed at the National Bureau of Standards for use in the reception of visual type radio-range-beacon signals whereby the pilot is relieved of the need for constantly adjusting the receiving set output volume as the distance between airplane and the range-beacon station is varied. In the course of a flight on a radio range beacon, it has heretofore been necessary for the pilot to make frequent volume adjustments, particularly within the last 10 or 15 miles from the station in which region the received signal varies most rapidly. Since the pilot has numerous other duties, these adjustments have proved troublesome. The new device will materially assist the pilot in his use of the range beacon.

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*Cottonseed oil.*—Transformed by chemists into a snow white, sweet smelling, pleasant tasting hard fat from an unsightly, ill-smelling, offensive by-product, cottonseed oil is a spectacular example of progress made in utilizing the crop wastes of farmers, according to the U. S. Department of Agriculture. Farmers may anticipate the farm by-products or crop wastes such as cornstalks, straw, and cotton stalks to help pay for their production, Dr. W. W. Skinner, of the Department of Agriculture believes. He points out that the advances which have been made are the result of steady and persistent research which has uncovered, step by step, some of the possibilities latent in these by-products which are composed chiefly of cellulose, lignin, and carbohydrates. The utilization of cottonseed has been one of the most spectacular examples of progress in the disposal of what was once a crop waste.



*Standard for second-grade wheat in Australia.*—A sample officially described as of milling quality, bleached, and free from any commercially objectionable odor is called second-grade wheat in Australia. The standard weight of second-grade wheat in bags was fixed at 56½ pounds per Imperial bushel by the grain trade section of the Sydney Chamber of Commerce, on February 9, 1931, according to a report from F. E. McFadden, American Vice Consul in Sydney, Australia. Trading in wheat below "f. a. q." (fair average quality), the weight of which has been fixed at 59½ pounds a bushel, should now be able to proceed smoothly. At the Chamber of Commerce, a representative sample of second quality was agreed upon, and this will be distributed in the same manner as f. a. q. samples. The second quality will include practically all the wheat kept in good order by its owners.

*Aircraft safety.*—Carrying of pets (animals or birds) in passenger cabins will be barred on airliners, and only children in arms under 2 years of age will be carried free on domestic routes, as a result of conferences of the Aeronautical Chamber of Commerce held in Detroit, April 15, 1931, in connection with the National Aircraft Show. These regulations, together with a number of other agreements reached by chamber committees representing the aircraft industry, were announced as the culmination of a series of conferences lasting nearly a week. Adoption of a code of standard practices to insure safety in the manufacture and operation of aircraft, development of a uniform system to aid the interchange of traffic between air transport lines, and authorization of a study of maintenance methods to reduce operation costs were numbered among committee agreements.

*Philippine marking of origin requirements.*—The Philippine customs authorities have announced that within four months there would be put into operation a strict enforcement of the marking of origin requirements on imported articles, according to a radiogram received in the United States Department of Commerce from Trade Commissioner E. D. Hester, at Manila. Section 1272 of the Administrative Code states, in substance, that all articles of foreign manufacture such as are usually or ordinarily marked, stamped, branded, or labeled, and all packages containing such or other imported articles, must, respectively, be plainly marked, stamped, branded, or labeled in legible words in a conspicuous place so as to state the country of their origin and the quantity of their contents; and until so marked, stamped, branded, or labeled, will not be delivered to the importer. "Foreign" means any place other than the Philippine Islands, so that the marking-of-origin requirements apply to manufactures of the United States also.

*"Fluidity" of metals.*—One of the current projects at the National Bureau of Standards is the development of a method which can be used in a practical way by the foundryman for determining the relative "fluidity" of metals, and the effect of variations in pouring temperatures, and in molding practice upon this property. What appears to be a very feasible and useful test has been developed. This consists in pouring into a sand mold a long spiral strip of metal, the length of which is an index of the fluidity of the metal—in the sense that the foundryman uses this term. It is easy to show by this means the pronounced difference in the apparent fluidity of the same metal poured in green and in dry-sand molds; likewise, the marked increase resulting from a relatively small increase in the temperature of the metal when poured. The method was described before the American Foundrymen's Association at its meeting held during the current month.

*Bonding of brick and mortar in masonry units.*—Tests made at the National Bureau of Standards have shown that 50 freezing and thawing cycles in some cases failed to disintegrate brick and mortar in masonry units. The results show that strength and durability are not necessarily related in brick masonry construction. The degree of adhesion between mortar and brick may be relatively great (measured in pounds per square inch necessary to pull the brick apart) and yet under severe weathering conditions this high strength of bond may not insure that the bond itself will last. All other things being equal, the most durable bond would be obtained if the mortar and the unit expand and contract simultaneously and to the same extent during different weather conditions. It is likely that the proper adapting of cementing materials to masonry units has from this standpoint not received the attention it deserves. A report of this work was published in the March 1931 issue of the Bureau of Standards Journal of Research.

*Hydraulic laboratory section.*—The Director of the National Bureau of Standards has created a hydraulic laboratory section in the division of mechanics and sound of the bureau, as announced April 30, 1931, with H. N. Eaton, of the bureau staff, as acting chief. The President approved the bill creating the National Hydraulic Laboratory at the bureau on May 14, 1930, to cost \$350,000. (See COMMERCIAL STANDARDS MONTHLY, June, 1930.) A laboratory of this type will inevitably bring about enhanced efficiency in the construction of large hydraulic projects. Mr. Eaton recently completed a study of similar research laboratories abroad.



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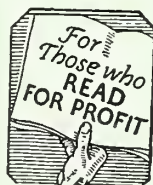
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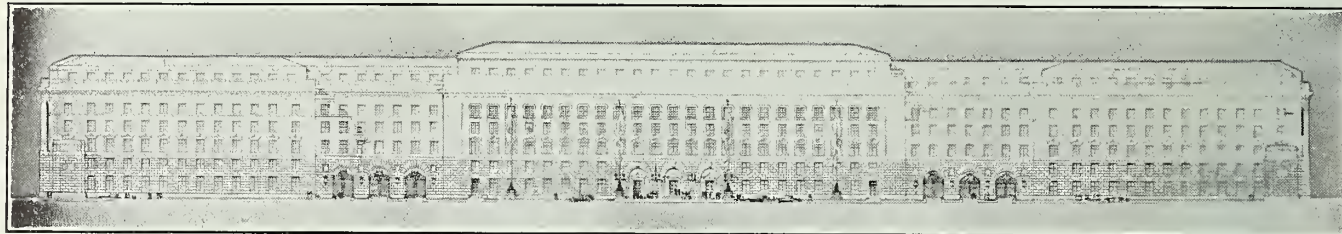
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—President Hoover, at the laying of the corner stone of the new building of the U. S. Department of Commerce, June 10, 1929



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

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**BUREAU OF LIGHTHOUSES, GEORGE R. PUTNAM, Commissioner.**

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**BUREAU OF NAVIGATION, ARTHUR J. TYRER, Commissioner.**

Superintendence of commercial marine and merchant seamen.

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**STEAMBOAT INSPECTION SERVICE, DICKERSON N. HOOVER, Supervising Inspector General.**

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**UNITED STATES PATENT OFFICE, THOMAS E. ROBERTSON, Commissioner.**

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**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.