COMMERCIAL **STANDARDS** MONTHLY

A Review of Progress in Commercial Standardization and Simplification



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

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COMMERCIAL STANDARDS MONTHLY, S. F. Tillman, Editor

The Commercial Standardization Group

DIVISION OF SIMPLIFIED PRACTICE Edwin W. Elv

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 com-

modity 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 furtherng 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 speci-

fications, the first two volumes of which have been issued, namely, "Standards and Specifications in the Wood-Using Industries" and "Standards and Specifications for Nonmetallic Minerals and their Products." It also aids in preparing the Standards Yearbook.

DIVISION OF TRADE STANDARDS I. J. Fairchild

The division of trade standards, on request, assists industrial and commercial groups in the voluntary establishment of standards covering grades, quality, dimensional inter-

changeability, 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.

Address NATIONAL BUREAU OF STANDARDS, Washington, D. C., for further information

STANDARDIZATION ...15.. A CONTINUING PROCESS ~+> ITS AIM IS NOT FIXITY OR STAGNATION ...BUT.. TO ADD SERVICEABILITY AS OFTEN AS THE POTENTIAL GAIN MAKES IT WORTH WHILE

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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.

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CONTAINER SIMPLIFICATION

Industries Effect Economies in Cost of Operation Through Reduction in Variety of Containers

(An editorial reprinted from the magazine "Modern Packaging")

Should our readers be inclined to question the marked trend toward the simplification of containers, we would respectfully call their attention to the accomplishment of the division of simplified practice of the National Bureau of Standards. It is of particular interest, also, to note that the activities of this division have been the result of voluntary cooperation with packers, container manufacturers, distributors of products, shippers, and carriers.

Reviewing briefly these activities as they relate to the food industry alone, we find that there has been accomplished a reduction from forty or more sizes of preserve jars to 8 stock sizes; 25 to 7 jelly glasses; from 6 to 4 sizes of apple-butter jars, and from 20 different shapes and sizes of jars for cottage cheese and sour cream to 3. All of these in the glass-container group. Among the carton group has been the reduction of at least 100 sizes of 1-pound coffee cartons to 2. Standard sizes of cans are now reduced to include 27 sizes, to say nothing of additional containers such as those for carbonated beverages, ice cream, mayonnaise, and other items which have been studied in a comprehensive manner.

Were it possible to express in figures the number of all types of containers required annually in distributing the Nation's food supply, that total would be enormous, for it is variously estimated that canned fruits, vegetables, meats, fish, and milk alone require more than 7,000,000,000 cans annually.

Operations necessary to such a massive production as this constitute no small problem even though these operations may be divided among many producers, and until we reach that Utopian stage where production waste is entirely eliminated, there is always an opportunity to further reduce manufacturing costs. Added to these savings which simplification of containers can bring to the latter, there is plenty to be said on behalf of the effect of such reduced cost on distribution.

We can expect the further extension of simplification in the package field. Its limitation is bounded only by the economies which every good business demands.

EXPANDING BY PIONEERING NEW PRODUCTS

Mass Production of Diverse Products Made Possible Through Use of Standardized Parts

By W. B. GREENE¹

How can one continuously bring out new products, cater to a trade in which each customer demands certain variations in the standard product to meet his special needs, and still enjoy the benefits of mass production? The answer lies in the use of standardized interchangeable parts. Recognition of this fact has enabled the Barber-Greene Co., a comparatively small manufacturing firm, to develop steadily, and is largely responsible for such success as it has attained. It has given the company large-size leadership in the development of its field, and permitted large-scale manufacturing operations, while still allowing it to retain the flexibility and close contacts that are the inherent advantages of a small organization.

Pioneering new products rather than paralleling old lines, being careful never to bring out an article unless it is known to excel anything then on the market for the same purpose, has helped to avoid cutthroat competition; to avoid it at least until the company has had the market to itself for a sufficient length of time to be established as the leader in this particular field.

Confining activities rigidly to a definite line (standardized materials handling machines) has permitted close specialization in both engineering and selling, thereby avoiding the wastes of widely scattered sales effort. Designing the entire line to use interchangeable parts, with subassemblies and chassis units common to several machines, has resulted in low cost advantages of quantity production.

vantages of quantity production. Although apparently unrelated, these policies really overlap. For instance, there may arise the opportunity of manufacturing some item which is new and much better than anything on the market. But it must also fit into the general line in order to avoid waste in engineering and sales effort. Moreover, at least 75 per cent of it must consist of parts already being manufactured, in order to permit mass production of these parts.

When the company entered business about 15 years ago it was pioneering a new product in the materials handling field. There were already in the field a number of companies, long established and doing a profitable business. Their products, however, were of a type designed to be permanently installed, and required special engineering for practically every job. It was believed that there was room for a type of machine which could, by using standardized unit parts and without the necessity of special designing, be adapted to the needs of many customers. With this in mind there was launched the production of a portable belt conveyor, built in sections, which could be assembled, lengthened or shortened to any desired size with the ordinary coal yard or gravel pit labor. In other words, the decision was made to save the cost of tailoring each machine to fit the customer's individual needs.

The advantages of this type of manufacture were twofold. From it we derived the economies of a relative measure of quantity production, and the engineering expenditures were directed more wholly toward research and development.

To add to the original line of portable belt conveyors, designed principally for unloading cars in retail coal yards, the company went into the manufacture of self-propelled and self-feeding loaders of the bucket elevator type for use in building-supply yards and by road contractors. The manufacture of snow loaders was begun in part to level the seasonable curve in the factory. There was developed a line of ditchers designed not to compete with the old firms then in the field but to handle the lighter type of work, heretofore regarded as pick-and-shovel jobs. Recently the original belt conveyor line has been expanded to cover the handling of concrete on construction work.

On each of these items the company has pioneered a field. After completing the design and experimental work generally there is no competition for about a year and then there is plenty. As happens in every industry, other manufacturers begin to make similar products with changes or additions that may be real improvements over the company's machines or may represent only selling points. The company must make the utmost use of the year's start to go in for intensive development work which will make its machine just as good as its knowledge will permit. This preliminary period is the critical time in the production of an item, during which time the company must so develop the machine as to be better than anything that competition is likely to produce.

One result of this experience has been the development and improvement of manufacturing methods. High quality production methods are necessary to us to keep the quality of the products np and their cost down. The various types of work are set off by themselves in separate buildings. The departments are, in the order of flow, raw-castings stock room, with larger castings out of doors; raw steel, angles, bars, channels, and rods out of doors; machine shop; structural shop; assembly shop; and repair-parts stock room. Each building is served by the type of handling equipment that best suits its requirements. This equipment ranges from lift trucks and small hand hoists to an overhead electric crane. All of the manufacturing is under exact control throughout, the responsibility resting with a planning department which has charge of all stores, scheduling, and dispatching.

When the line of conveyors was brought out, it was the deisre to be able to attain sufficient volume to permit manufacturing on a mass-production basis, and for the first two or three years the business increased rapidly. However, competition and changing conditions necessitated the widening of the line of machines for the same field. With the increased line, business increased satisfactorily, but many manufacturing problems presented themselves. To keep down shop costs requires repetitive manufacture—to increase the business necessitated an even greater variety and adaptability in the line.

¹ Vice president and treasurer the Barber-Greene Co., Aurora, III.

The answer was found in the design of standardized parts and assemblies which could be used on many machines. Thus the crawlers on the ditcher are virtually the same as those on the coal loader or bucket loader, while the same flight conveyor boom may be used on a plain light truck, on a self-propelled wheel truck, or on a crawler-mounted truck. The same chassis that supports the snow loader boom is used also with the bucket loader boom. Most of the machines require band clutches; the same 7-inch clutch is used on the snow loader, coal loader, three sizes of bucket loaders, ditchers, and some other products. The sectional construction of the belt conveyors enables 32 sizes to be assembled from nine common units.

This program of standardization was started a few years ago and is still in progress.

The interchangeability of parts has changed the manufacturing program materially. A large proportion of everything manufactured by the company is now used in sufficient numbers to enable production on a quantity basis. Pieces are bunched up and run through in quantities that will last two or three months.

It might be thought that this policy of standardization is a restraint to the salesmen in laying out han-

GRADING PLYWOOD

The commercial standard grade rules for plywood of hardwood species, which were developed by the Plywood Manufacturers' Association and approved by a general conference of all interests of the industry, have since been accepted as the basis of daily trade by practically all the larger plywood manufacturers, a large number of distributors, and many consumers, according to information received by the National Bureau of Standards.

Heretofore, in the absence of well-defined grade designations, the industry sustained inestimable losses through confusion and misunderstanding. Merchandise had to be returned because of misunderstandings as to quality conceptions entertained by the buyer and seller, and the condition of uncertainty was often an invitation for sharp practices and grade substitutions on the part of the unscrupulous dealer.

In the establishment of the commercial standard grading rules for plywood, the industry received the cooperation of the National Bureau of Standards in bringing about the wider adoption and further promulgation of the industry's own grade specifications which in due course will be printed as a publication of the bureau.

Certain general requirements are stipulated in the standard as to workmanship, gluing, packing, and inspection, and the various grades of veneer faces are described in detail as to the defects admissible. The grades are designated A, 1, 2, and 3. The A grade includes the best of commercial production which is well matched for color and figure and practically free of defects.

The No. 1 grade is a high-class product admitting a few minor defects, while the next grade admits a wider variation of defects and usually makes no refdling systems for prospective customers, but it is not. "Specials," which were at first avoided entirely, then accepted as a necessary evil, have been incorporated in the scheme of production. All special work is departmentalized and no special job is undertaken that does not embody at least 90 per cent of standardized units. This small latitude gives a really surprising range of possibilities to the salesman. Rather than being a burden on the manufacturing departments, the additional volume of standard units obtained through these "specials" helps to enhance rather than defeat the possibilities of mass production.

The three basic policies—to pioneer new products that temporarily will have no competition, to get quantity production in the sales efforts by broad but specialized lines, and to make the products of parts which are interchangeable in several of the machines have enabled the company to go steadily ahead. Pioneering has brought the company leadership in most of the fields covered; concentration of sales efforts, with complete lines, has helped to keep down selling costs; and interchangeability of parts has given mass production, despite the variety of the finished products.

erence to matching. The No. 3 grade describes a strictly utilitarian product embracing the material commonly referred to as "reject" backs, such as used on the unexposed side of desk or other furniture panels.

This system of grade designations, which has been successfully used by many plywood manufacturers, should provide a practical method of ordering. Those panels designated "A-3" are made with one face of the highest grade and the reverse side of a No. 3 or "reject" back, while one of A-A grade would constitute the highest grade on both faces.

Standard sizes and quantities are established, together with reasonable tolerances on size to meet good manufacturing practices.

NEW ENGLAND QUALITY LABEL FOR ROAD-SIDE STANDS

The New England quality label, which has been adopted by the New England Association of State Marketing Officials, to identify roadside stands selling locally grown produce, graded and labeled in accordance with the New England farm-marketing program, is now in use on 48 stands in Massachusetts. Preparations are being made to use the sign in other States also.

To receive permission to use the sign a stand owner must raise or buy locally direct from the producer the produce offered for sale, must offer two or more products, or at least 25 per cent of the total produce, graded and bearing the New England quality label, must have a neat, clean stand so situated as not to interfere with traffic, and must meet certain other conditions.

traffic, and must meet certain other conditions. The New England farm-marketing program was developed by the New England Council.

LABELING FOOD PRODUCTS

Improved Facilities Needed to Protect the Public from Violations of Pure Food and Drug Act

The future value of the public service involved in the regulation of interstate traffic in foods and drugs depends upon the character and scope of legal authority with which officials are clothed, the staff and equipment at their command, and the administrative attitude which they adopt, W. G. Campbell, director of regulatory work, United States Department of Agriculture, told those in attendance at the annual convention of the Association of Dairy, Food, and Drug Officials September 4, at West Baden, Ind. "In the face of legal restrictions, administrative resourcefulness will not suffice for the protection of the public," he said.

Mr. Campbell forecasts what, in his opinion, will characterize, within the next 25 years, regulatory operations under the Federal food and drugs act, the text of which has, for the sake of uniformity, been adopted in substantial measure by most of the States. Following a brief summary of enforcement in the last 25 years, he outlined the faults of omission and commission, and declared that the measure is characterized by generalities and is too frequently inept in its statutory definition of adulteration of foods.

"Aside from the labeling requirements of imitations and net weight in food, alcoholic content in drugs, and the enumeration, if present, of certain ingredients in both, the act's definition of misbranding is wholly negative," he declared. "In saying only that such statements as the labels bear must not be false, misleading, deceptive, nor fraudulent, the law makes possible the sale of either foods or drugs without any representation whatever concerning the identity of the ingredients or their nutritive or therapeutic value. In this regard the law by no means assures the public the greatest protection."

The speaker said that there have been attempts by the trade to weaken the food and drugs act by amendment. Such amendments were never seriously considered, because of the distinct public opposition to them. "Fearful that emasculating measures might be passed, the public has the feeling that it would be better not to tamper with this law at all. The law has served a distinctly useful purpose in its present form, but it unquestionably has faults. If the act is to be an effective instrument for the achievement of purity in foods and drugs and fair dealing in the sale of them, timely consideration should be given to the inauguration of a movement for bringing about such modifications as a sober and dispassionate appraisal may indicate. It is important that no sentimental opposition intervene to defeat the accomplishment."

The director of regulatory work said that it is axiomatic that laws of the nature of the Federal food and drugs act are not self-enforcing. "No matter to what extent they may be faulty, it is certain that the public will derive no benefits from their worthy provisions unless those upon whom the burden of administration has been placed are given facilities with which to work. Food and drug production has kept pace with the increase in population over the past 17 years. Additionally, the growing tendency both in urban and rural homes to turn to the products of food factories, rather than to depend upon kitchen facilities, has increased commerce in food materially more than a per capita census would indicate. This situation challenges the utmost administrative resourcefulness, not only in effecting economies, but also in formulating administrative policies. An important administrative problem with which the food and drug administration is daily confronted is not whether authority, but, rather, whether funds can be found to support action".

"The food and drug administration recognizes fully the prevalent need, especially at this time, for drastic economies in governmental operations," Mr. Campbell said, adding that every enforcing official is concerned about the expenditure of appropriations so as to acquire the maximum amount of public protection. "There is inherent in the character of his administrative obligation a challenge so to employ the facilities at his command that the biggest possible dividends will be declared in the interest of national health and the national pocketbook".

"In our enthusiasm for the protection of public interest in the enforcement of food control laws," he said, "we can not be blind to the legal and equitable rights of industry. The Supreme Court has said that this statute was enacted in the interest of the public. It has said further that wherever doubts exist they should be decided so as to further the purposes of the law. We have undertaken literally to observe this authoritative injunction, and, in doing so, have not, I hope, been guilty of executive legislation."

The speaker cited the recent passage of the Mc-Nary-Mapes' amendment to the food and drugs act an amendment proposed by the canning industry itself which requires more stringent Federal regulation of that industry—as an example of the cordial support which business is giving the continued enforcement of the food and drugs act.

In outlining some of the difficulties of enforcing the measure, Mr. Campbell declared that he was not sounding a pessimistic note but that, on the contrary, he entertained the utmost optimism about the development of this public service along more useful lines in the future. "Food control statutes 25 years ago were regarded as the forerunner of an era of legislative radicalism," he said, "but when the value of such legislation can be still more effectively appreciated, through observing the results which it has produced, such fear as once existed will be found to have completely disappeared. The public, expecting to be dealt with fairly, is seeking no favors, but is requiring only those rights which, by the existence of these laws, it has some power to exact."

¹ See "Labeling of Subgrade Canned Goods" in August, 1930, Commercial Standards Monthly, and "'Canners' Bill' to Establish New Food Standards," by W. G. Campbell, in December, 1930, Commercial Standards Monthly.

ACTIVITIES OF THE AMERICAN SOCIETY FOR TESTING MATERIALS

Committees Are Making Notable Progress in Various Tests

American Society for Testing Materials Committee E-10 on Standards, at its meeting on August 6 at society headquarters, Philadelphia, approved 13 new tentative specifications and methods of test and the revision of 4 existing tentative standards. The titles and designations of these tentative standards are as follows:

New tentative standards.—Specifications for Electric-Resistance-Welded Steel Pipe (A 135–31 1): for Electric-Fusion-Welded Steel Pipe (A 134–31 T); for Forge-Welded Steel Pipe (A 136–31 T); for Riveted Steel and Wrought-Iron Pipe (A 138–31 T); and for Lock-Bar Steel Pipe (A 137–31 T). all submitted by Committee A–1 on Steel.

Specifications for Concrete Masonry Units (C 90-31 T), submitted by Committee C-10 on Hollow Masonry Building Units.

Specifications for Round-Hole Screens for Testing Purposes (E 17–31 T), submitted by Committee E-1 on Methods of Testing.

Methods of Test for Soundness of Fine Aggregates by Means of Sodium Sulfate (C 88-31 T); and for Soundness of Coarse Aggregates by Means of Sodium Sulfate (C 89-31 T), both submitted by Committee C-9 on Concrete and Concrete Aggregates.

Methods of Shear Testing of Natural Building Stone (D 338-31 T), and for Determining the Elasticity of Natural Building Stone (D 339-31 T), both submitted by Committee D-18 on Natural Building Stone.

Method of Bend Testing for Ductility of Metals (E 16-31 T), submitted by Committee E-1 on Methods of Testing.

Definitions of Terms Relating to Building Stone (D 340-31 T), submitted by Committee D-18 on Natural Building Stone.

Revisions of existing tentative standards.—Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-31 T). Submitted by Committee B-5 on Copper and Copper Alloys, Cast and Wrought.

Specifications and Test Methods for Asbestos Tape for Electrical Purposes (D 315–31 T), submitted by Committee D-13 on Textile Materials.

Method of Flexure Testing of Natural Building Stone (D 327-31 T); Method of Test for Absorption and Apparent Specific Gravity of Natural Building Stone (D 328-31 T), all submitted by Committee D-18 on Natural Building Stone.

The American Society for Testing Materials is one of the two sponsors of the Sectional Committee on Standardization of Wrought-Iron and Wrought-Steel Pipe and Tubing. This sectional committee has requested the American Society for Testing Materials to develop specifications for pipe and tubing which were not already in existence.

In accordance with this request, Subcommittee IX on Steel Tubing and Pipe of Committee A-1, began in 1928 to enlarge its membership to take care of producing and nonproducing interests, and presented to Committee A-1 the five specifications which have been approved by Committee A-1, referred to letter ballot thereof, and submitted to Committee E-10 for approval, which was voted by the latter. The Specifications for Electric-Resistance Welded

The Specifications for Electric-Resistance Welded Pipe represent a new type of manufacture during the past two years. The Specifications for Fusion-Welded Pipe also represent a new product which is largely coming into use. The Specifications for Forge-Welded Pipe and Lock-Bar Steel Pipe are new specifications for a standard product. The Specifications for Riveted-Steel and Wrought-Iron Pipe have been referred to Committee A-2 on Wrought Iron which will present certain revisions as applied to riveted wrought-iron pipe but which has no objection to their adoption as tentative, subject to later revision.

The Specifications for Copper-Base Alloys in Ingot Form for Sand Castings have been revised to include a total of 20 alloys instead of 15 as first submitted. These have been grouped under the various general classes, such as bronze alloys, red brass alloys, high lead alloys, etc., which enable a clearer presentation of the data in print. The tables of examples of use, foundry manipulation, and characteristics have likewise been enlarged to include the new and revised alloys and its form changed to conform to the "group" system.

Committee C-9 has pointed out the following as reasons for the prospering and publishing of the methods of soundness testing by means of sodium sulfate:

1. They represent a coordination of what seem to be the best procedures from methods in general use.

2. Sodium sulphate methods of tests are being used by various engineering organizations, which differ from each other in varying degrees, and it seems highly desirable to suggest a standardized procedure.

3. They standardize technique and provide for the control of variables in a greater measure than any other methods which have been proposed.

4. It is believed that the publication of these methods as teatative provides the surest method of obtaining competent criticism which will result in the development of a standard procedure which will be generally accepted by specification bodies throughout the country.

The subcommittee of Committee C-10 on Hollow Masonry Building Units began its work toward the preparation of specifications for concrete units about a year and a half ago. Since then a proposed tentative standard has been submitted to letter ballot of the committee on three occasions. The committee as a whole has been in substantial agreement as to the desired provisions in the specifications with the exception of the paragraph dealing with the strength requirements. Data resulting from tests of a large number of concrete masonry walls were presented in papers at the last annual meeting of the society. Partly as a result of the papers presented, the paragraph on strength requirements has been revised in a manner that has met with approval of the majority of the members of the committee.

Since the publication as tentative standards of the society of Flexure and Absorption Testing Procedure for National Building Stones, and the distribution of this testing procedure in pamphlet form to testing laboratories all over the United States, several criticisms of certain details of the procedure were sent in to Committee D-18.

These communications were all carefully considered at the meeting of Committee D-18 held in Washington June 18 and 19, and as a result certain changes in wording decided upon, only one of which really affects the specification requirements, as follows:

It was found that the high sensitivity of the testing apparatus specified for flexure test in determining the modulus of rupture was too great and that this requirement could not be met with the machinery available in the ordinary university and commercial laboratories, nor was it considered, upon restudy, that it was at all essential to require as great a sensitivity as that, since such sensitivity would be of value only in connection with weak stones that have quite low transverse strength.

The specifications, as revised, will clear up these matters and also make them conform with similar standards for slate.

The specifications for round-hole screens for testing purposes were prepared by the section on coarse screens at the request of Committee E-1 on Methods of Testing, which felt that, inasmuch as there are at present a number of society specifications for materials which specify the use of screens with round openings for measuring size, a specification for this type of equipment should be prepared. These specifications were submitted originally to

These specifications were submitted originally to the members of the section under date of June, 1930, and comments were received from a number of interesting members. These and other comments were thoroughly discussed at a meeting of the section held in Pittsburgh, March 17, 1931, at which all but four members of the section were present. Certain minor corrections in the specifications were made at this time and it was voted unanimously to recommend its adoption as a tentative standard.

Committee B-4 of the American Society for Testing Materials has outlined its work for the ensuing year. This committee functions in the field of electrical-heating, electrical-resistance and electricalfurnace alloys.

Life tests.—The subcommittee on life tests has made notable progress in the comparative tests to show the relation between the life of electrical heat-

WELDED-CHAIN INDUSTRY WILL IDENTIFY SIMPLIFIED LINES IN CATALOGUES

All of the manufacturers of welded chain who have accepted simplified practice recommendation No. 100–29 have recently expressed their intention to identify the simplified lines in their new catalogues and trade lists, according to information received by the National Bureau of Standards' division of simplified practice.

This plan is designed to assist buyers in maintaining close adherence to the waste elimination program. Cooperation by purchasing agents, architects, contractors, and other users greatly increases the benefits and economies possible through simplified practice. The welded chain industry is the first to record 100 per cent identification in the catalogues of acceptor manufacturers. ing wires as indicated by the American Society for Testing Materials accelerated life test for metallic materials for electrical heating and the life of the same wire under service conditions in an electric toaster. Two lots of wire, short and long life, are being used and tests are made both on commercial circuits on which the voltage is closely controlled. Six laboratories are cooperating in the tests.

The question of preparing an accelerated life test to allow larger sizes of wire to be tested is being studied.

Electrical tests.—A new tentative method of test for determining the temperature-resistance constants of resistance alloys was approved for publication at the recent annual meeting of the society. It is expected this will be followed in commercial use. In order to facilitate this test a method for making the resistance measurements within the accuracy called for in the test will be prepared. Mechanical tests.—Several laboratories are trying

Mechanical tests.—Several laboratories are trying the bend test for determining the elastic properties of alloys at temperatures up to 1,000° C. The permanent change in curvature produced by heating metal strips to various temperatures while constrained to known curvatures has been determined. It has been shown that the proportional limit as determined by the tension test at room temperature corresponds to the sharp bend in the permanent bending curve at the same temperature.

Wrought and cast alloys for high-temperature use.— The subcommittee in charge of this project is outlining a procedure for preparing cast test specimens for the tension test. This involves a study of mold construction and foundry practice necessary to insure a sound specimen.

A test specimen to determine the tendency to warp at high temperatures is under consideration, and methods of test for thermal conductivity and coefficient of linear expansion are being prepared.

Specifications for heater wires.—The tentative specifications for 80–20 nickel-chromium and 60–15–25 nickel-chromium-iron alloys for electrical heating elements which have just been put out as tentative standards, will be followed in commercial use during the year. These specifications cover two grades of alloys which are in general use for electrical heating elements.

The National Association of Purchasing Agents, the American Institute of Architects, the Associated General Contractors of America, the Chief Coordinator's Office of the Federal Government, and other representative users of simplified commodities have for some time strongly urged that this policy be adopted by manufacturers. When the simplified items are so identified in trade literature, selection of the simplified items can be made without difficulty, and often much waste now incurred in checking over files and subsidiary records for this data is eliminated.

There is every indication that manufacturers in other industries who have cooperated in establishing simplified practice recommendations will adopt this same policy of identification. This forward step indicates a realization by producers, distributors, and consumers of the value of cooperation in applying self-government to business.

COMMITTEE AGREES UPON UNIFORM MECHANICS' LIEN ACT

Draft Act Receives Tentative Approval of National Conference of Commissioners on Uniform State Laws

By DAN H. WHEELER, National Bureau of Standards

A committee appointed by Mr. Hoover in 1925, while Secretary of Commerce, to consider the necessity for a uniform mechanics' lien act and to prepare such an act if desirable, has reached a unanimous agreement upon a draft act, and this act has received the tentative approval of the National Conference of Commissioners on Uniform State Laws who have cooperated with the committee of the Department of Commerce throughout the study.

The appointment of the department committee was urged by one of the national associations whose members are engaged in the construction industry, and the request was given the indorsement of other groups actively engaged or interested in the industry. The reasons urged for the appointment of the committee were, among others, divergencies in existing State laws which caused unnecessary expense and inconvenience to persons doing business in more than one State and under which the laborers who went from one State to another were handicapped in enforcing their rights, and inequitable burdens or benefits on certain groups. These, it was felt, made a uniform law desirable.

In selecting the committee, which now consists of 12 men, Mr. Hoover asked the president of the American Bar Association, Charles Evans Hughes, to name a representative. Mr. Hughes recommended that the matter be taken up with the president of the National Conference of Commissioners on Uniform State Laws, and this resulted in the appointment of a special committee on the subject by the national conference. The two committees have worked together throughout and have held a number of joint meetings.

Existing State acts were found to fall roughly into three classes:

1. Those under which the owner may be held liable for all the unpaid debts of the contractor incurred on the job. Under them an owner might pay a contractor in full on a \$10,000 contract and then have to pay liens for an additional \$3,000 or \$4,000.

2. Those under which the owner is liable for no more than the current price, and in case liens are filed. has merely to see that lien claimants are satisfied up to the amounts due the general contractor. In the case of a \$10,000 contract, for example, the owner might pay out \$8,000 according to the contract, when the work is nine-tenths completed and then be liable to lienors up to the sum of \$1,000 at the time, and thereafter for a sum up to \$1,000 additional, which they might earn in completing the job.

3. Laws similar to the second type in not holding the owner liable for more than the contract price but imposing upon him, when making payments, of requiring from the contractor a statement under oath showing sums due or to become due to subcontractors, material men, and laborers for services performed on the operation. The owner is required to retain money due the contractor up to the amount of his obligations as shown by the contractor's statements, as well as money claimed to be due them by subcontractors, material men, and laborers in notices which they may give direct to the owner.

The department committee collected material on existing and previous State acts, consulted court decisions, and decided that the third type of act was built upon a theory which more nearly divided responsibilities among the groups involved than did the other types. They consequently produced a first tentative draft of an act drawn in accordance with this basic theory with, however, some modifications, and several thousand copies of the act were circulated for criticism among individuals and organizations throughout the country. On the basis of criticisms received the draft was revised with a further modification of the theory involved and this draft was similarly circulated for criticism.

The act in its present form, after undergoing further revisions which rather extensively modify in details the theory contained in the third type of act, embodies principles that the committees are convinced equitably apportion to the groups involved the burdens and benefits of the act.

In brief the proposed act limits liens to the contract price provided the owner observes procedure set up for his guidance, and provides that liens shall attach from the time of the visible commencement of operations on the site. It provides for the giving of informal notices to the owner by lienors other than the contractor and laborers within a period of 30 days after the lienor begins his services or before completion thereof if that is earlier. Laborers, and persons contracting directly with the owner, are not required to give such notices. Should the lienor not give such a notice within the limited period he may give notice thereafter but his claim is given a different status than that of the lienor who gives timely notice. Under this act the contractor is required to submit to the owner a statement under oath showing his out-standing obligations but only at the time that final payment becomes due under the contract.

The owner may make payments direct to laborers as their claims arise. Sums above the amount necessary to pay the claims of laborers may be paid direct to lienors who give the owner notices within the 30day period, as their claims arise, the owner being required to take cognizance only of notices received up to the time of such payment. If he has in his hands sufficient money to meet the claims of all laborers for past and future services the owner may make payments direct to lienors who give him notice after the 30-day period only when he has in his hands money in excess of the amount necessary to pay all past and future claims of laborers and all past and future claims of lienors serving notice within the limited period, and payments to those who give notice after the 30-day period are prorated among all such lienors according to the ratio of their respective liens to the total amount of such excess and such direct payments can not exceed the amount for which these lienors might ultimately have liens allowed in a court action.

The owner may make payment direct to the contractor in accordance with terms of the contract and as the amounts become due, provided he retains enough to pay laborers and lienors who have given or who may give notice of claims to the owner within the limited period, or who have previously given notice after the limited period, provided that these amounts are paid to the contractor in good faith in payment, or for application to payment, of debts incurred in the construction.

In making payment direct to lienors the owner must give the contractor 10 days' written warning of his intention to make such a payment. It is provided that the courts shall allow liens in four classes in the following order:

1. Liens of all laborers.

2. Liens of all lienors who shall have given the owner notices within the limited period.

Liens of all other lienors except the contractor.
 Liens of the contractor.

The act provides that the owner may take from the contractor a bond conditioned for the payment of liens and, in the event that this bond is taken and is solvent, the provisions of the act for the giving of notices by lienors are suspended. The procedure for the enforcement of liens by court action is retained for enforcing claims against the bond in the interest of simplicity and equity.

The misapplication by the owner of the proceeds of a construction loan, with intent to defraud, is made a criminal offense and so also is the misapplication of funds by contractors, subcontractors, and others to whom they may be paid and while such persons have outstanding debts incurred on the construction. Here again intent to defraud is an element of the offense. The giving of a false statement under oath to the owner by the contractor, with intent to defraud, is likewise made a criminal offense. It is the conviction of the committees that these penal provisions will have a salutory effect upon unwholesome practices in the industry.

In order to perfect his lien, the lienor is required to file for public record a prescribed formal claim of lien. This must be filed within three months after the final performance of the lienor's services. It may be amended or supplemented. A copy is required to be served upon the owner by methods prescribed in the act and a failure to serve a copy renders the claim of

SPECIFICATION ISSUED FOR HIGH-VOLTAGE INSULATORS

The British Engineering Standards Association has issued a specification, dealing with bushing type insulators for indoor and outdoor use, including cableterminating bushings, suitable for the range of declared voltages from 600 volts to 200 kilovolts. In general arrangement, the specification is similar to that dealing with insulators for overhead lines.

An important difference, however, is that the "rating number" assigned to each bushing is equal to the voltage, expressed in kilovolts, used in the 1-minute dry test, whereas in the specification for insulators for overhead lines the rating numbers are based on the voltage used in the 30 seconds' rain test. For this lien voidable to the extent that the owner may have been prejudiced by failure of service.

The lien must be enforced by court action within one year after the claim ci lien is filed for public record, and if a sale of the property is required to satisfy liens the liens of laborers are preferred to all others and among themselves are on a parity. After satisfaction of the liens of laborers, the proceeds of sale are applicable to the liens of other lienors on a pro rata basis.

The act provides for the assignment of liens and the method of assignment, and also for the methods of discharging liens. A cash deposit or a bond may be furnished by the owner to free his property from liens under stated conditions. Lienors may demand of the owner or contractor information regarding the terms of the contract or subcontract in the performance of which they may be engaged, and the owner is given the reciprocal right of demanding information as to the status of the account of any lienor.

Liens under the act may be waived in writing except by laborers.

The committees believe that credit practices in the industry would be improved through the enactment of these principles as it is necessary that the lienors give the owner timely notice before their right of lien accrues. The number of irresponsible contractors would also be reduced since their credit standing will be subject to careful scrutiny before they may obtain materials necessary to prosecute their contracts or before they may obtain a bond under the provisions of the act.

Various provisions of the draft act have already been enacted into law in different States, having been adapted from earlier tentative drafts.

The interest on the part of the industry has been marked throughout the course of this work and the reaction has been generally favorable and commendatory. The act is generally considered a matter of standardization that is highly desirable and one that is destined to be beneficial.

The National Conference of Commissioners on Uniform State Laws, at their annual meeting in Atlantic City early in September of this year, considered the text of the act and it received the tentative approval of that body by an overwhelming favorable vote. Under the practice of that body the act will now lie over for one year and will receive final attention at the annual meeting in 1932.

and other reasons it is clearly stated in the specification that it must not be assumed that for a given transmission system the same, or nearly the same, rating number will represent both the approximate bushing and line insulator.

Each rating number is associated with certain test voltages, and information regarding the selection and application of bushings is given by means of notes and bushing selection tables. The notes deal with such matters as the relative strength of bushings and associated apparatus, the effect of details and conditions of installation, and the corrections to be applied for conditions of installation, and the corrections to be applied for conditions other than the standard service conditions.

SIMPLIFIED CALENDAR CHAMPIONED IN INTEREST OF TRADE

Need for Uniform Units of Time for Comparisons in Business

By ARTHUR CAPPER, Senator from Kansas

During October there is to be held at Geneva an international conference of government delegates to consider the simplification of the calendar. Our Government has been invited to participate and has accepted this invitation. Dr. Charles F. Marvin, chief, United States Weather Bureau, has been designated to represent this Government at the conference.

With the question of what to do about the economic depression uppermost in the minds of most people, I have been asked why bother at this time about the calendar. On first thought, the simplification of the calendar does seem to be a matter not to worry about until the economic distress has been relieved and the financial equilibrium restored, but there is a relationship here between the calendar and our economic life which, to my mind, makes this question of calendar improvement of real importance at this time and a reason for going ahead with it as rapidly as possible.

The relationship is one that is not vividly realized until one gives some reflection to it. It is this: Our economic life—commercial, industrial and financial can make no intelligent decisions or solve any problems without knowledge of its past performance. It must have an accurate record to examine and must compare it with conditions at present. It must determine the directions of the economic currents. It must know whether progress is being made, how fast and how much. It must be able to observe the trends.

There is only one way to do this and that is to make comparisons in units of time, which is to say, by means of the calendar. What were bank clearings this week compared with those last week and a year ago, or this month compared with last month or this month a year ago? What were car loadings, steel orders, coal production, and the scores of other indices of our economic progress? Again, in our own individual businesses, what were costs, what were sales, what were profits last month compared with the same month a year ago, or with some other month this year? It is from the answers to questions like these that we determine whither we are going—toward better times or worse. The use of the calendar is indeed a fundamental necessity for our economic life.

But we find in making these absolutely necessary comparisons that the principal unit of the calendar—

HICKORY GOLF SHAFTS

The commercial standard for hickory golf shafts, which has been in effect since November 1, 1929, was reaffirmed on August 20, 1931, for another year. This action was taken upon the recommendation of the standing committee after considering the results of an adherence survey undertaken in cooperation with the makers of hickory golf shafts. The report summarizing the results of the survey

The report summarizing the results of the survey was based on replies from 11 producers, 4 of whom indicated 100 per cent adherence to the requirements of the standard. The average unweighted adherence the month—varies in length and is variable as to the kind of days it contains. Some months sometimes have fewer working days than others, or fewer days of distinctive economic value one way or another. Again 11 of the 12 months will not contain a complete number of weeks which are also an important time unit. Again holidays change each year either to different week days or different dates. Again no week this year is exactly the same as the "corresponding week" a year ago. The whole scheme is a hodgepodge.

We do indeed manage to make comparisons, but innumerable instances of deceptive data result, and in order to get a true picture, laborious computations are necessary. Why should we not have a calendar of uniform months which shall be an exact multiple of the week and as nearly as possible an exact submultiple of the year, and with the days of the weeks fixed to the same dates in every month?

If we could have such a calendar immediately, it would put an end to these difficulties and facilitate the accurate compilation of the comparative statistical information which we are examining more closely in this critical period than ever before. It would be a real aid to the restoration of our economic progress.

Such a calendar, based on the present calendar year, can be realized by the adoption of the plan which divides the year into 13 equal months of four weeks each, with a "year day" to take up the odd day at the end of the year, a "leap day" for the extra day in leap years, and the new month between June and July. This, I may add, is the only plan which will make the Gregorian calendar as nearly uniform and fixed in every respect as the astronomical facts permit.

I hope that the forthcoming conference at Geneva will agree to recommend this plan for adoption, and that it will be adopted as soon as possible. To be sure the change can not practically be put into effect this year or next, but in any case, the adoption of a calendar which so well meets all the conditions of our changed civilization not only will have immediate beneficial effects upon our economic life, but bring permanent benefits in every field of activity.

of those reporting was, however, 53.9 per cent as a number were unable to confine their production to the standard grades under present conditions. Seven reported benefits from the establishment of the standard.

A form for semifinished or "B form" shafts, used widely by golf-club makers, is established by this commercial standard, and a standard method is specified for grading them by mechanical means into four commercial grades according to stiffness of the shaft. Certain other requirements as to moisture content, straightness, and dimensional tolerances are also covered.

THE ROMANCE OF MEASUREMENT

A Measuring Stick Is a Scepter in the Hand of Science

By HENRY D. HUBBARD, National Bureau of Standards

What scope and sweep there is in measurement, from stars to atoms, timing radio echoes from distances beyond the moon, measuring temperatures on other planets, measuring the rate of cooling of our sun, measuring the age of our earth—measuring almost everything. The slow rise of the art of measuring gave no sign that in this century it would rise to a commanding place in human affairs.

In the days of old a poor man asked a wise man, "Why am I poor?" The wise one cut a staff thigh high, cut notches upon it a hand's width apart, and said:

I give you the scepter of succes3—a measuring stick—for measures rule the world. They come in pairs; the measure of the sandal must niatch the measure of the foot. Always two matched measures. So all things are made to measure, Let this stick measure what you make, measure it well for its use. Three loops of cord will make the stick a balance to weigh what you buy or sell. Set it upright in the sun and the stick will measure the shadow hours of time; allot them to thy tasks. Tune thy life to its circling shadow. When noon shadows are long it is time to plant. Measure your share and your brother's. Make wisely, measure truly, trade justly, and you will prosper.

Down the ages came the measurer's art by which things are dimensioned for use, by which time and place are measured for every fact and act of man. A measuring stick is indeed a scepter in the hands of science, a tool of discovery, record, and use of exact knowledge. Measures do miracles when we match the measured curvature of glass to the measured defect of the eye and thus restore sight to age and perfect the vision of youth.

Commerce is the exchange of measured things. Every transaction involves five measures: Quantity, quality, value, place, and time. All are measured. Quantity in number and unit; quality in measures of its properties; value in terms of weight of gold; place east or west of Greenwich, north or south of the Equator, up or down from sea level; time in terms of the turning earth—the clock—and its trip around the sun; the calendar.

Success is matching a measured need by a measured means—shoe to the foot, glove to the hand, girder to the bridge, powder to the cartridge, inlay to the tooth, key to the lock. Key and lock may be measured to a thousandth of an inch, but some measures are not made in units. Without a unit a singer matches by ear the pitch of her voice with the measured pitch of the piano. Without a unit the violinist varies the notes to produce perfectly pitched melody. If a boy is to jump a ditch he first measures it with his eye, not in inches but effort, which he matches with his own effort to clear the ditch. His jump is as truly measured as if he used a unit.

The shoemaker of Old Pekin makes shoes with no unit of measure, no measuring scale—a strip of blank paper and his thumb nail are his measuring tools. He transfers the foot measures to his paper strip, using his thumb nail as a marker. He transfers the measures to his leather to make perfectly fitting shoes without a unit of length. The Chinese have units but they differ for each trade and place. A cloth merchant may buy and sell at the same price. He buys by a long measure, sells by a short one, and thus makes a profit. The Chinese travel unit of distance, the "li," is longer on easy roads, so that downhill to town may measure fewer "li" than the uphill trip home. The Chinese rice weight unit is the "catty" but the "catty" unit becomes smaller and smaller from rice field to tidewater as the coolies carry the rice. The reason is simple, each coolie takes out his pay in rice. The rice bags reach seaboard lighter for the tax, but weighing the same number of "catty" as when they started.

Crude measures pass and modern measures are uniform and accurate in comparison. Scientists measure how things happen in nature and experiment—at what heat and pressure a crude oil cracks into gasoline, carbon dioxide becomes "dry ice," or air becomes a liquid and flows like water.

Science makes vast numbers of such natural measurements—melting points of solids, weights of atoms, lengths of light waves, properties of materials. In such measures lie latent the means to alter nature almost at will and make it serve our purpose with almost magical power. Such measures build civilizations. They are the numbers which rule the world of enterprise.

Measuring tools evolve from simple origins—a stick, a shadow, a gourd, a stone—to-day measuring devices number thousands and give man new senses, enabling him to detect "invisible" light, to feel magnetic forces, to sense a thousand things otherwise unknown. With the Bose crescograph one can see the movements of growing plants. A lens and mirror device is used to measure the diameters of stars, a feat comparable to measuring a quarter dollar by an observer 50 miles away.

The radioactivity of radium is measured by the movement of an electrified strip of gold foil. Electrified quartz threads are sent up 10 miles to measure cosmic rays. A 6-ounce device rises in a balloon 16 miles to bring back automatic weather records of temperature, pressure, and humidity. We measure air moisture by the stretch of a hair. In the Antioch Light fog-signal device, 100 human hairs are so set that in fog dampness they stretch and turn on the fog signal.

Ingenuity in measuring rarely excels the bit of genius by which we can literally hitch our wagon to a star. An automatic device in Paris catches a star's image at meridian, turns its light pulse in an electric pulse, amplifies it, and broadcasts it as a radio time signal.

Time and tide wait for no man. But a marvel among measuring devices takes 37 measured facts set into its mechanism to predict years ahead the height and time of day of all tides for every port of the world. Mathematically minded, this device turns the measures of yesterday in prophecy for tomorrow to guide ships unbuilt on voyages undreamed. Sound and radio are used to measure ocean depths, the thickness of glaciers, or the height of the radio ceiling of our air. Radio impulses go up with the speed of light and echo back from the magnetic layer of our atmosphere over a hundred miles up. By timing the echo we measure the ceiling, which may rise 50 miles in a magnetic storm. Echo times indicate that some radio echoes come from far beyond the moon. Sound waves are sent to sea bottoms and their echoes timed to measure ocean depths for marine charts in aid of navigation. By similar means the thickness of glaciers is measured by timed echoes through the glacier from the rock beyond.

Measures are tools of discovery. One bright story tells how the mystery of the breeding place of the Atlantic eel was solved by measuring. Out from the rivers swarm the eels every autumn to be lost to sight at sea. Where they bred, no one knew. Catches of eels were measured from millions of square miles. Measuring their way in all directions along lines of shortening eel lengths to the size of the baby eels, all trails led to the Sargasso Sea, which proved to be the cradle waters of their infancy—a mystery solved by measuring lengths.

Nature does not annihilate her past. She leaves a record in which we may read history through measurements. Tree rings thousands of years old reveal the growing weather of climatic history of ancient times, year by year. How the rise and fall in tree growth in 11-year rhythms were matched by similar rise and fall in the number of suspects is an interesting story, for phenomena which vary in parallel reveal cause and effect connections of profound importance.

Measures are great teachers, reducing error, diffusing truth. They dispel error by teaching, for example, that a pint is not a pound the world around, and never was anywhere; in America, that the needle is not true to the pole; that the so-called "solar constant" is variable; and there are no fixed stars. Measures

SPECIFICATION FOR SHIPS' CARGO-LIFTING BLOCKS

Shipowners, shipbuilders, and all engineers concerned with lifting gear generally will be interested in the publication of a specification for ships' cargolifting blocks, by the British Engineering Standards Association. The work of preparing the specification has been carried out by a committee of makers and users in collaboration with the home office. It lays down requirements concerning the materials from which the various parts of the block should be made, details regarding workmanship and manufacture, the test loads to which blocks are to be submitted, and recommendations as to the sizes of sheaves for use with wire ropes made in accordance with the British standard specification.

One of the most important matters covered by the specification is the inclusion of a standard definition embodying what is the safe working load of a given block, together with particulars of a standard method of marking blocks, indicating the maximum safe working load for which the block may be used. This attempt to simplify the existing diverse methods of marking should be universally welcomed and the hope may be expressed that all interests concerned will cooperate in its immediate adoption. tell how much a pint of a liquid weighs, by how many degrees the needle wanders from true north, how the solar constant (sun's radiation) varies, and how many miles a second the fixed stars are moving. Measures teach truth with vividness. We all con-

Measures teach truth with vividness. We all conceive the atom as very small, but we learn how small an atom really is when 30 methods of measuring them tell us that a billion atoms in a line measure an inch, or more startling still that if all atoms in a thimbleful became tennis balls they would cover the United States hundreds of feet deep.

Again, we all have some idea of the Gulf Stream, but how vastly more vivid it becomes when measures tell us that the volume flow of the Gulf Stream off Miami is 14 cubic miles an hour, or equal to 1,000 Mississippi Rivers in one.

Men who measure do not lack devotion. Countless cases might be recalled of courage, suffering, even death, among the army of measurers who in laboratory, observatory, or in other parts of the world gather measured descriptions of nature and her phenomena. Galileo, "the father of laboratory science," was its first victim. In the great Tokyo earthquake of 1923 the Japanese experts stuck to their work of measuring the earth movements while outside they beheld their own homes going down in ruins and up in flames, a devotion which gave the world its most accurate scientific narrative in earthquake annals.

The engineer puts measures to work in skyscrapers, bridges, and other structures. Measures flow through his pencil to scale drawings making each point a location, each line a length to be translated into steel or stone, matching measured strength for measured stress. By means of measures of strength and dimension the engineer builds his dream of stability into structure and the architect actualizes his dream of beauty. When the cathedral stands finished, strong and beautiful, we forget the measures, but they remain forever the strength and beauty of the cathedral.

SPECIFICATION FOR SAMPLING AND ANALYSIS OF COAL

The work of preparing British standard specifications for the sampling and analysis of coal and coke, which was commenced in 1927 at the instigation of the Department of Scientific and Industrial Research, has been advanced a stage by the recent issue of the British Standard Specification for the Sampling and Analysis of Coal for Inland Purposes.

The sampling section of the specification is, at present, confined to coal passing through a 3-inch diameter perforated plate screen, and full particulars are given of the method of collecting the gross sample from chutes, conveyors, and wagons; the method of reduction is also closely specified. The methods of analysis specified are those used in sound commercial practice at the present time, and deal with the determination of moisture, volatile matter, ash, calorific value, sulphur, and arsenic. The sampling large screened coal and run-of-mine coal is still under consideration, and committees are also dealing with the determination of the agglutinating value of coal and the sampling and analysis of coke. The specification for the sampling and analysis of coal for export was issued in December, 1930, and German and French translations of the specification are now available.

Cooperation of 'Technical Societies, Trade Associations, and Consumer Groups Essential

By A. S. MCALLISTER, National Burcau of Standards

The certification plan herein referred to involves the compilation and distribution of lists of manufacturers desirous of obtaining contracts based upon certain selected nationally recognized specifications, and willing, when requested to do so, to certify to purchasers that the commodities delivered are guaranteed to comply with the requirements and tests of the specifications.

Perhaps the most significant indorsement of the certification plan was that received from Secretary Michael J. Hickey, of the National Industrial Council, which is a federation of National, State, and local industrial associations organized under the leadership of the National Association of Manufacturers "to foster constructive industrial legislation and to oppose the enactment of class laws." Under date of August 8, 1928, Secretary Hickey stated:

As I have observed this whole effort by your department, I believe it carries with it one of the most effective media for combating questionable or unethical merchandising and production practices ever conceived.

Its strictly voluntary character, in my opinion, is one of the most constructive works any branch of the Government is carrying on—and it is bound to prove a million times more effective than dictums or panaceas such as indigestible truthin-fabrics laws could or would accomplish.

Technical societies favor certification plan.—Before the certification plan was placed in operation, it was brought to the attention of all organizations believed to be interested in such an undertaking. Correspondence conducted with the officers of technical societies and trade associations showed that all technical societies familiar with the formulation of specifications look with favor upon the certification plan as an effective method of bringing specifications to the attention of the interested producers and consumers. With few exceptions, the officers of trade associations (many of whom might have been assumed to be opposed to the plan, at least initially) are actually very favorably inclined toward it.

The application of the certification plan has been extended to include a total of 335 Federal specifications and 21 commercial standards with about 14,000 formal signed requests for listings, as shown by the accompanying table.

Statistical summary of willing-to-certify lists as applied to Federal specifications and commercial standards

	Total number of -		
Commodity groups		List- ings	Firms
A brasives and polishing materials	92	113 596	54 596
Brushes and brooms	48	945 33	179
Cement, Portland Cotton gauze and bandages	1 5	69 34	69 11
Dental and surgical supplies Electrical supplies	1 14	$ \begin{array}{c} 16 \\ 220 \end{array} $	16 153
Fire extinguishers and liquids Floor coverings	35	78 32	51 19 52
Goggles and helmets	$\frac{1}{7}$	58 58	14

Statistical summary	of willing-to-certify lists as applied to Fed	eral
specifications	and commercial standards-Continued	

		Total number of –		
Commodity groups	Specifi- cations	List- ings	Firms	
Heat-insulating materials Inks Insecticides Leather goods Liquid-measuring devices Lumber Masonry cement and concrete materials Nonferrous metals Office supplies Packing and gaskets Padlock s		$58 \\ 114 \\ 28 \\ 103 \\ 145 \\ 21 \\ 3, 142 \\ 76 \\ 1, 221 \\ 72 \\ 162 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 17 \\ 1$	30 43 18 81 87 21 1, 850 71 327 57 66 17	
Paints and paint materials_ Paper Pipe and pipe fittings Refractories Ribbons, typewriter Road and paving materials Roofing, bituminous, and waterproofing materials Rope, wire	$ \begin{array}{r} 29 \\ 28 \\ 7 \\ 3 \\ 3 \\ 7 \\ 16 \\ 1 \end{array} $	3,004 557 83 108 93 121 571 15	$ \begin{array}{r} 305\\126\\64\\60\\36\\48\\106\\15\end{array} $	
Rubber matting	$\hat{1}$ 1 1 1 1 1 1 1 1 33 1 1 33 1	$ \begin{array}{r} 13 \\ 3 \\ 7 \\ 33 \\ 14 \\ 562 \\ 7 \\ 598 \\ 598 \\ 12 \end{array} $	13 3 7 33 14 158 7 191	
Tubing, metallic Commercial standards Total	$ \begin{array}{r} 1 \\ 4 \\ 21 \\ \hline 356 \end{array} $	12 61 689 13, 956	12 49 628 5, 789	

Without exception organized consumer groups are definitely in favor of the application of the certification plan, as shown by statements from the officers of these groups. Included among these, in addition to the Federal agencies, are the American Hospital Association, American Sanatorium Association, Educational Buyers' Association, the Governmental Purchasers Group, International City Managers' Association, National Association of Public School Business Officials, the National Association of Purchasing Agents, the National Education Association, the National Municipal League, and the National Tuberculosis Association. It is not an exaggeration to state that the certification plan for facilitating the use of specifications is fully approved by governmental and institutional purchasers, Federal, State, county, and municipal.

Industry requests cooperation of bureau.—In the case of commercial standards Nos. 1, 2, 4, 7, 8, 9, 13, 15, 16, 17, 18, 26, 28, 29, 30, 31, 32, 33, and 35, the general conferences of representative producers, distributors, and consumers voted formally to request the National Burean of Standards to apply the certification plan to the approved commercial standards. In the case of other commercial standards, no formal votes on this matter were taken at the general conferences, but the producers have expressed their desire to be listed by the National Bureau of Standards as willing to supply commodities guaranteed by them to comply with the requirements of the commercial standards.

Federal Specifications Board.—The 335 Federal specifications to which the certification plan has been applied represent almost exactly one-half the total number of specifications prepared by the Federal Specifications Board—the largest and most nearly up-to-date group of nationally recognized commodity specifications in successful use at the present time.

Up to January 1, 1930, the Federal Specifications Board had formulated and promulgated a total of 651 "United States Government Master Specifications" of which 228 had been revised one or more times in the earlier nine years. Since June, 1930, all of the master specifications then in existence have been reviewed by the technical committees responsible for their formulation for the purpose of making such revisions in substance as might be found desirable and of placing them in the standardized "purchase form" for inclusion in the Federal Standard Stock Catalogue. Two hundred and thirty-eight of the master specifications have been placed in the final form for use in the Federal Standard Stock Catalogue since January 1, 1930. Moreover, 60 new specifications have been promulgated since that date.

A few of the original specifications have been canceled or consolidated, leaving at the present time a total of 698 effective Federal specifications, of which 362 (52 per cent) have been revised one or more times since 1921.

About 50 per cent (173) of the Federal specifications to which the certification plan has been applied and nearly 60 per cent (8,307) of the requests for listings relate to building materials.

Willing-to-certify manufacturers.-In the work of applying the certification plan to Federal specifications No. 24, based on National Hardwood Lumber Association rules, and No. 533a, based on American Lumber Standards set forth in Simplified Practice Recommendation No. 16 for hardwood and softwood lumber, effective assistance has been received from the National Lumber Manufacturers' Association and its affiliated organizations, namely, the California White and Sugar Pine Manufacturers' Association, California Redwood Association, the National Hardwood Lumber Association, the Northern Hemlock and Hardwood Manufacturers' Association, the Northern Pine Manufacturers' Association, the Southern Cy-press Manufacturers' Association, the Southern Pine Association, the West Coast Lumbermen's Association, and the Western Pine Manufacturers' Association. All of these organizations have cooperated not only in the formulation of the standards but in making them effective through the medium of the certification plan of the National Bureau of Standards and their own inspection services. Several of the asso-ciations have been of direct assistance in compiling the lists of willing-to-certify manufacturers of American Standard softwood lumber and in giving wide publicity to our plans in connection therewith.

Both the Hardwood Manufacturers Institute and the National Hardwood Lumber Association have been of definite assistance in the compilation of lists of willing-to-certify manufacturers of hardwood lumber complying with Federal Specification No. 24 supplied under the grading and inspection rules of the National Hardwood Lumber Association.

Effective assistance has also been received from the only organization representing the wholesale lumber dealers-the National American Wholesale Lumber Association.

The retail lumber dealers throughout the country are being reached through the very helpful cooperation of the National Retail Lumber Dealers Association and 28 regional associations affiliated therewith. Many of the regional associations have supplied us with mailing lists of their dealer members. Among the State associations are those of California, Florida, Illinois, Indiana, Michigan, New Jersey, Ohio, Pennsylvania, and West Virginia. Other regional associations are the Mountain States, Northeastern, Northwestern, and Western. The Ohio Association of Retail Lumber Dealers has placed at our service its mailing facilities for reaching 13,676 dealers in all sections of the country.

The National Association of Builders Exchanges, the National Association of Purchasing Agents, and the National Builders Supply Association have placed on record officially their indorsement of the grade marking of lumber for the benefit of the purchaser and the protection of the seller.

Very effective cooperation has been received from President Walton, of the Sand-Lime Brick Association, in the application of the certification plan to Federal Specification No. 505 for sand-lime brick. Through his aid we have been placed in communication with every known sand-lime brick manufacturer in America, both members and nonmembers of the association. With two possible exceptions, every operating American sand-lime brick manufacturer has expressed to us his desire to be listed as a source of supply of brick guaranteed to comply with specification No. 505. The willing-to-certify manufacturers of sand-lime brick represent at least 95 per cent of the total number of sand-lime brick manufacturers and possible 98 per cent of the sand-lime brick actually manufactured in America.

Helpful cooperation has been received also from the Common Brick Manufacturers Association, which has supplied complete lists of clay-brick manufacturers, both members and nonmembers, and is using strenuous "follow-up methods" to obtain 100 per cent representation of the association membership on the bureau's list of willing-to-certify manufacturers. This list now contains the names of 544 of the 1,200 American common-brick manufacturers, including the great majority of the members of the association. This association checks the quality of brick manufactured by its member firms. The American Face Brick Association has ap-

The American Face Brick Association has appointed a committee on grading rules as a first step toward the establishment of specifications for face brick to be handled as the Sand Lime Brick Association and the Common Brick Manufacturers Association have handled the specifications for sand-lime and common brick.

Officers of the Associated Metal Lath Manufacturers have placed before the members of that organization the proposal that the certification plan be applied to Federal Specification No. 553 for metal lath "along the same lines as the brick and lumber manufacturers are working." On March 17, 1931, the Associated Metal Lath Manufacturers voted to request that metal lath be included in the certification plan.

The Structural Clay Tile Association, which has been basing its quality labels on the standards of the American Society for Testing Materials, has made plans to include a suitable reference to the Federal specifications, and to act as an inspection agency in "policing" the labels. On March 28, 1931, the secretary sent the National Bureau of Standards a list of the members of the association with the following comments:

Every one of these manufacturers has indicated his willingness to subscribe to the certified quality identification label plan and, in fact, most of these manufacturers are using this identification label at this time. Furthermore, we as an association are willing to extend this service to other manufacturers providing, of course, that their product will fulfill the requirements imposed by the American Society for Testing Materials and the Federal specifications.

The entire membership of the Asphalt Shingle and Roofing Association unanimously signified their willingness "to certify to purchasers that the commodities supplied by them under Federal Government master specifications, have been tested and found to comply with these specifications."

Under date of April 11, 1931, the secretary of the Gypsum Association expressed his intention "to write to each member of the Gypsum Association who has not adopted the certification plan and to fully acquaint him with it."

The active interest being taken in the certification plan by the officers of the Cast Stone Institute was set forth in a letter dated May 6, 1931, which contained the following request:

Will you please send 25 copies of the pamphlet describing the nature and scope of the willing-to-certify plan? We are having a meeting of cast-stone manufacturers in Cleveland on May 11 and 12, at which consideration will be given to the adoption of this plan to cast stone, at least in so far as Government work is involved.

Commodity standards must be clear to be effective.— As the result of experience during the past few years, many technical societies, trade associations, and consumer groups have concluded that in order to make most effective use of commodity standards, those standards must be understood and accepted by consumers as well as by those concerned with production and distribution.

Among the consumer groups that have placed on record their attitude toward the movements designed to encourage manufacturers to produce commodities identified as complying with accepted standards and specifications are the American Home Economics Association and the National Association of Purchasing Agents.

At its meeting on February 16, 1931, the National Association of Purchasing Agents executive committee took the following action as shown by the official minutes of that meeting: "Unanimous approval was given the proposal to indorse and encourage the Bureau of Standards' program for certification and labeling of material," and "Unanimous approval was given to the program of the Division of Simplified Practice to secure identification of simplified sizes, etc., in catalogues, price lists, and other literature, to assure their selection without difficulty. The recommendation also applies to commercial standards."

At its annual business meeting in Detroit, June 25, 1931, the American Home Economics Association adopted the following resolution:

The association has for some time been cooperating with manufacturers and distributors through the Departments of Commerce and Agriculture and the American Standards Association in the development of standard specifications as to the composition, construction, and performance of household goods. It is frequently true that standards now available are not used by retailers in selling over the counter because they do not realize the value of accurate information to the household buyer. The association can perform a valuable service by establishing contacts between progressive retailers and home-makers desirous of increasing the efficiency of their buying.

Resolved that the members of the association cooperate in every way with the retailers in their own communities to further the purchase and sale of consumers' goods labeled according to standards set up through the American Standards Association, the Bureau of Standards of the United States Department of Commerce, or the Bureau of Agricultural Economics of the United States Department of Agriculture, or labeled in some other way with accurate measurements as to quality and performance.

LABELS DISTINGUISH SUPERIOR SHINGLES

In an effort to distinguish easily the highest grade of commercial shingles, the Red Cedar Shingle Bureau has adopted a definite and distinctive label for the guidance of its consuming trade. The label contains a guaranty by the Shingle Bureau which is based on a definite specification of quality known as Commercial Standard, CS31–31 for red cedar shingles, which was established by the industry in cooperation with the Division of Trade Standards of the National Bureau of Standards.

The label is primarily for the guidance of architects, builders, home financing agencies, prospective home owners, and insurance companies, many of whom have recognized the utility and beauty of wood shingles, but who have had some difficulty in the procurement of the proper grade for maximum service.

The commercial standard grade includes only the choicest red cedar shingles that are edge grained, all heartwood, and without defect, and the presence of the label guaranteeing conformity is the buyers' assurance of a satisfactory product.

surance of a satisfactory product. In order to assure full compliance to the standard, those mills using the Red Ceclar Shingle Bureau official label are under license agreement with that bureau, and a corps of inspectors are constantly seeing that the high quality standards specified are maintained by all mills. If perchance some manufacturer deliberately attempted to defraud by the use of labels on substandard shingles his license would be revoked, and he would be prohibited from the use of the shingle bureau label.

The total annual sales of red cedar shingles amounts to approximately \$20,000,000, and one can appreciate the significance of the importance of the commercial standard and the guarantee label when he learns that practically 95 per cent of the machine capacity of the industry has signed acceptances of the standard as a guide to their everyday operations. Arthur Bevan, secretary of the Red Cedar Shingle Bureau, announces that many manufacturers that were never members of that bureau in the past have signed the contract licensing them to the use of the official label.

In addition, he reports that the commercial standard for quality shingles has received the general support of the retail trade. To continue in Mr. Bevan's own words:

All of this leads us to believe that if the program is carried through impartially, with favors to none, it will eventually be successful and help to reestablish red cedar shingles on a sound basis.

The conclusion is quite logical, for experience of the past indicates that most people thought of wood shingles in terms of the poorest ones they encountered. Now the trade has a definite and unmistakable specification which is a basis of operations for manufacturers, a guide and sound sales argument for distributors, and an assurance of quality and service to consumers and those specifying roofing materials.

INDUSTRIAL UTILIZATION OF AGRICULTURAL WASTES

By WARREN E. EMLEY, National Bureau of Standards

Products of the farm have always been considered in the light of supplying man's two greatest needs food and clothing. Unfortunately, in the language of industrialists, both of these markets have definite saturation points. One can not eat more than a certain amount of food. Because of the demands of fashion, most of us have more clothing than there is any real reason for, but the buying capacity of the market has a definite limit, which is easily attained.

For things other than food and clothing, the market does not seem to have any such definite limitations. If the selling price of a certain article is decreased, or if the general prosperity of the country is increased, it seems possible to sell more and more of these articles. The saturation point is not a function of the number of people only, but depends also on temporary economic conditions.

Agriculturists have devoted their efforts to the product on of food and clothing. They have bred corn for the maximum quantity and quality of the grain, cotton for the fineness and length of the fiber. But the grain forms only half of the corn plant. The other half, consisting of roots, stalks, leaves, and cobs. has only recently come under the scrutiny of the technologist and marketing specialist to see what can be done with it. The romance of the cottonseed is frequently cited as an outstanding example of how a waste which threatened to become a nuisance was converted into valuable products. But even in this case, the field has not broadened beyond the original purpose. The linters are used chiefly for making rayon (clothing), the oil is used for human food, the meal and bran for cattle food or fertilizer.

There is no reason why the market for agricultural products should be confined to food and clothing. The modern public has become familiar with such marvels as lacquer made from corn and goblets made from milk. Cotton is now used for many things other than clothing—it is an article of major importance in the manufacture of automobiles and dirigibles. If forestry is a branch of agriculture, then the billion dollar paper industry is the greatest example of the industrial utilization of agricultural products.

Industry should be able to use that part of the produce of agriculture which can not be marketed as food or clothing. This means not only the surplus of corn over and above that required for food, but also the cornstalks, cobs, etc. If such an arrangement could be brought about, the farmer would have a market for his whole crop, instead of half of it, and the market would not be limited by a definite saturation point.

With these thoughts in mind, Congress provided funds for the National Bureau of Standards to see what could be done. As a result of four years' work, insulating boards from cornstalks are now in commercial production, maizolith (a material having properties similar to those of hard rubber) has been made from corncobs, and xylose (a rare sugar) has been made from cottonseed hulls.

Investigations now under way include the manufacture of a lumber substitute from cornstalks and paper from wheat straw, improvement in the process of making paper from southern pine, and adaptation of sweet potato starch to the uses of the textile industry. In this work we have had cooperation from Iowa State College, University of Alabama, Alabama Polytechnic Institute, and the Swann Corporation. Many other investigators are working along similar lines, all fitting in to the general program of finding industrial uses for agaricultural wastes. Because of the dual nature of these problems, the Departments of Commerce and Agriculture are both interested. An additional appropriation which is available to the Department of Agriculture during the present fiscal year will aid materially in the progress of the work.

This work has brought to light the imperative need for fundamental information. Little was known about the chemical or physical make-up of the cornstalk. There were no statistics on the quantity produced. Harvesting machines had not been perfected, and the cost of collection could not be closely estimated. There were no freight rates or insurance rates, and the keeping qualities of the stalks were unknown. To-day, most of these questions can be answered for cornstalks, but for many similar products the information is still nonexistent.

The American manufacturer has reached into the air, into the sea, and even a mile underground to find raw materials for the multitudinous products of his factories. There still seem to be great possibilities lying hidden in the millions of tons of raw material in the form of agricultural waste.

GRAIN GRADING

Numerical Grades Accurately Describe and Classify Different Qualities of Grain

By H. J. BESLEY, United States Department of Agriculture

Grain grading is an American development beginning about the time of the Civil War. During recent years other countries have adopted grain grades patterned after the United States and Canadian grades, and still others have investigated our grain grades with a view to changing their marketing methods. American grain grades are, in effect, brief descriptions of different kinds and qualities of grain which enable persons to trade in grain or representative samples. Numerical grades take the place of specifications or descriptions and definitely fix the quality of grain which may be delivered on a contract.

Grain grading represents an attempt to classify or group grain according to quality or condition. The usual method of expressing values for grain has been, and still is, to assign numerical grades, which, in the main, accurately and satisfactorily describe different qualities.

The first grain grades were established by grain exchanges located in the large grain markets and at the ocean ports from which grain was shipped abroad. Later the States in which the larger grain markets were located passed laws providing for official grades and inspection. This still left the large commerce in grain between the States and the export trade without any central control. There were numerous systems of grades and a general lack of uniformity in inspection. This caused complaints from foreign purchasers and dissatisfaction on the part of local buyers of grain. Unsuccessful attempts were made by trade organizations to bring about the general adoption of uniform grades, but it became evident that it was impossible to get satisfactory uniformity in grading between markets.

As a result, the United States grain standards act was passed August 11, 1916, establishing a single system of grain grades for the entire country and providing for supervision of grading and appeals from inspectors' grades. This act authorizes the United States Secretary of Agriculture to investigate grain handling and transportation and to establish grades for grain. Grades for wheat, shelled corn, oats, rye, grain sorghums, and barley have now been established under this act. The act requires that grain sold by grade shipped to or from an inspection point must be inspected. Such grain is always graded by inspectors who are employed by States or grain exchanges, or who inspect for fees, and they are not employed by any organization.

Inspectors are licensed by the Secretary of Agriculture under the grain standards act, and are not Federal Government employees. The Federal supervisors grade such grain shipped to or from inspection points only when an appeal from the grade assigned by the original inspector is requested by some one interested in the transaction. The appeal privilege furnishes immediate protection and protects persons interested in the grain from incorrect grading due to inspectors' errors. The United States grain standards act is administered through a field organization working under the direction of an officer in charge of general field headquarters, located at Chicago, Ill., and for the west coast particularly, under an officer in charge of a field headquarters, located at Portland, Oreg. Boards of review are located at Chicago and at Portland for the purpose of entertaining appeals from grades assigned by supervisors located in the various grain markets. These boards also interpret the Federal grades and review large numbers of samples to determine whether the grades are being uniformly applied throughout the country. The department maintains an investigational project for the establishment and improvement of grain grades.

An inspection efficiency project is maintained to bring about uniformity in grading between inspection points. Division supervisors located at Chicago, Indianapolis, Kansas City, and New York maintain general supervisory contacts with trade organization, supervision offices, and licensed inspectors, for the purpose of maintaining uniformity in grading. District supervisors located at 35 grain markets throughout the United States supervise the work of all licensed grain inspectors and handle all original appeals from inspectors' grades. The North Dakota inspectors are under the supervision of the Minneapolis supervisor, and inspections made at Duluth and Minneapolis are supervised by officers located in each of these markets.

Some of the advantages of definite grades uniformly applied follow:

1. Definite grades offer a better opportunity for making transactions between the buyer and seller, especially when the grain can not be actually examined by the buyer.

2. Buyers, especially foreigners, will pay a better price for grain for future delivery if they know, even before the harvest, that only grain of a specified quality and condition can be delivered.

3. The producer of good and superior grain receives a better price than the producer of inferior grain.

4. The disposition of carloads of grain is greatly facilitated through a grading system.

5. There is a distinct advantage in having definiteness in descriptive terms in that this makes for a better understanding of the grading rules.

6. It is possible to handle grain in bulk in large terminal elevators in the present economical manner only when it is graded. Otherwise it would be necessary to keep each lot separate, thereby adding to the expense of handling.

7. On the basis of grain inspection certificates, warehouse receipts may be issued and used as collateral for the purpose of financing transactions.

8. Certificates of grade enable shippers to obtain credit from banks to practically the full value of the grain when it is loaded and shipped.

9. Organized marketing of grain on a large scale, especially for export trade, as during the war period

by the United States Grain Corporation, is made possible through grain grading.

10. Grain grading makes "hedging" possible, whereby owners of grain are insured against market fluctuations. The exporter sells grain for future shipment and protects his interests by buying the grain in a future market. The miller sells flour for deferred delivery and hedges the wheat. 11. A definite grading system necessitates employing expert disinterested inspectors for the purpose of assigning grades in connection with transactions.

12. Establishing definite, stable standards reduces the hazard of the grain business and permits the purchasing, handling, and shipping of grain on a smaller margin.

STRUCTURAL CLAY TILE STANDARDIZATION

Certification and Labeling Adopted by the Structural Clay Tile Industry

By S. F. TILLMAN, National Bureau of Standards

Selling structural clay tile products to the primary building market means selling to architects, allied engineers and general building contractors and those employed by them—and in many cases also the owner—who must reach an agreement in the selections to be made.

Obviously, all such important factors as quality, fitness, availability of supply, manufacturers' engineering and delivery services and cost economies are considered. Recent action of the Structural Clay Tile Association in the field of standardization and quality-identification markers, has served to enlarge its service to the ultimate consumer. The scope of the program of the industry is briefly reviewed here for readers of Commercial Standards Monthly, as it touches on principles of simplified practice, standardization, and certification.

With the assistance of the National Bureau of Standards, the industry has promulgated several simplified practice recommendations. Thirty-six varieties of hollow building tile were reduced to 20; 827 varieties of structural slate for plumbing and sanitary purposes were reduced to 138; and others.

Several months ago the industry revised its simplified recommendation for white glazed tiles and unglazed ceramic mosaics, and at the same time took the opportunity of changing the name to clay tiles for floors and walls. The revision of the recommendation enlarged the program to include all clay tiles for floors and walls, and eliminated the commercial grade of tile and adopted "standarad grade" and "seconds" as the only grades of tile to be manufactured and marketed. It was decided to discontinue the package grade certification, and to include new minimum grade specifications for colored glazed tile, and to revise the minimum grade specifications for ceramic mosaic.

Closely associated with the industry's work in the field of simplified practice is its interest in standardization. The industry has long been a leading supporter in this field. Standardization in the structural clay tile industry is more than a medium of securing economy and efficiency. It is essential to the best service and the most rapid progress. A 7-year research program instituted at the National Bureau of Standards by the Structural Clay Tile Association, has resulted in certain beneficial standards, as well as a reduction in insurance ratings.

To supplement this standardization work, the association has now established a very thorough research program at the engineering experiment station of the Ohio State University in Cleveland. Results of the tests are transmitted to the manufacturers so that they may make such changes as may be necessary in size, design, and components of clay to increase the crushing strength and fire resistance of the tile in question.

To supplement its research and standardization work, the association has developed a most comprehensive program of certification. This is handled through a label service and is directly controlled by the association. The label is pasted on a certain number of tile in every shipment, and by so doing, the manufacturers certify that every piece in the shipment comes up to the rigid requirements established by the American Society for Testing Materials.

When this plan was first started it was limited to members of the Structural Clay Tile Association, but several months ago the executive committee of the association instructed the association's secretary to follow the recommendations of the National Bureau of Standards in their entirety with regard to the association's certification quality identification labels. Thus the association is willing to extend this service to nonmember manufacturers provided the products of the nonmember manufacturers will fulfill the requirements imposed by the American Society for Testing Materials and the Federal specifications.

An inspection and certification service for structural clay tile has also been developed by the Underwriters' Laboratories. The purpose is to assist the industry in maintaining a product of standard uniform quality and to supply such information as may be needed by regulatory and insurance rating bodies throughout the country concerning respective manufacturers of the material.

Certificates are not applicable to buildings or constructions in which material not conforming to the requirements is used in the same assemblies in conjunction with material conforming to the requirements. Where a factory or field inspection discloses features in the material not complying with requirements claimed for acceptance, and if a certificate is issued it will be subject to cancellation on detection of such failures in the material.

To make its program more binding on the members of the industry, the structural clay tile industry, under date of August 29, 1931, accepted the ruling of the Federal Trade Commission on its (the industry's) rules of business practice, which provides that there shall be no "false disparagement of grade or quality of goods of competitors," and no "deviation from established standards of the industry."

MASS PRODUCTION OF RADIO CABINETS

Carefully Prepared Specifications and Rigid Inspection Required

By ARCHIE W. RICHARDS¹

Radio cabinets in the beginning were merely boxes to house the various component parts of the radio receivers, speakers, etc., and it is only within the past few years that the radio industry conceived the idea of a complete piece of furniture to house all of the mechanism of the radio receiver. The tremendous demand created for these compact, artistic outfits, as well as the low-selling price, called for deep study and intensive experimenting in the manufacture of wellmade low-priced cabinets.

The furniture industry is one of the oldest in existence, and while low-priced furniture has been made, the lesson learned in mass production of other products did not seem to be accepted by the industry. Hence our company found it necessary to build a complete cabinet plant which would combine the most modern production methods and machinery.

Rather strangely the development was made, not by experienced woodworkers of the old school, but by ingenious and resourceful production engineers, who were inspired by their chiefs to undertake and creditably to master the best way of producing attractive, efficient, and salable radio outfits. It is one of the instances that demonstrates that trade knowledge is much less essential to success than is the thorough production experience of technical engineers combined with a tremendous market demand for the product.

In May, 1928, a plant consisting of four buildings with approximately 375,000 square feet of manufacturing floor space was leased from one of the General Motors subsidiaries in Chicago, and rapidly during the subsequent 60 days woodworking machinery and equipment were installed, and the production of cabinets was under way while the previous tenants were moving out. By the first of July production had reached 1,500 complete radio cabinets per day, which was increased at the rate of 500 per day every two or three weeks until by the first of September the maximum possible production of 3,500 cabinets per day was reached.

À number of far-reaching decisions were made at this particular time, and the wisdom of these decisions has been fully justified by the subsequent success and efficiency of the cabinet plant. In the first place, although the plant, which was leased, contained the necessary dry kilns and storage space for handling rough lumber, it was decided to purchase the lumber already dried and cut to the exact dimensions and size necessary for the particular cabinet designs which had already been decided upon. As this material is received in matched sets in each car, a great deal of storage space is saved because the parts can be started through the mill immediately upon receipt. The purchase of dimension stock makes necessary a rigid inspection of incoming materials, to be certain that each piece is exactly suitable for the particular part of the cabinet for which it is intended, and to eliminate at least half of the mill operations, allowing them to be performed nearer the sawmill in a cheaper labor market, thus saving freight on all waste material.

Plywood specifications were also carefully developed so that the exact sizes required could be shipped in matched sets, and immediately be started through the manufacturing department, with a minimum amount of waste and machine work.

At the time these decisions were made there were no manufacturing units large enough to handle the quantity of material required so that specifications were scattered among a number of manufacturers. It soon became obvious that it was necessary to minimize the number of suppliers, and the best of the suppliers were inspired to increase their facilities to a point which in some cases meant three or four times their previous maximum production.

Every piece of material used in the cabinet is specified exactly, not only as to size and manufacturing tolerances, but as to kind and quality of wood, kind of glue used, amount of moisture, as well as other requirements.

Working with the plywood manufacturer, reasonable limits were also developed for the veneer figures, so as not to limit the purchase of materials while still obtaining the beautiful effects necessary to make the cabinets a work of art. This required close cooperation with the suppliers and a tremendous amount of work by all organizations, but this has been thoroughly justified by the results as evidenced by the fact that production was stepped up to 5,000 units per day the first of May, 1929, without its becoming necessary to increase the number of suppliers or enlarge the plant.

Inasmuch as the cabinets were designed before production was started, it was possible to select the exact equipment required to perform each operation, and to arrange so that this equipment would be in opera-tion 22 hours per day. The economy of this continuous operation is obvious. In the majority of cases the operators are working on the same piece and operation day after day, which makes for quality and low cost. Material is brought to them and taken from them in a steady flow, and in most cases passes through an inspection before moving from one department to the next for further operations. All material thrown out by the inspection department is taken to a separate department and is either brought up to standard or discarded by this department. This eliminates all delays and congestion that would result from "backtracking" material for salvage in the manufacturing department. It also puts the salvaging under the supervision of an expert whose whole thought is to prevent waste of material.

All machines are individually driven by electric motors so that shafting and belts are entirely eliminated. This permits great flexibility in the arrangement of machines, preserves headroom for mechanical handling, distributes natural and artificial light more

¹ Factory manager, Grigsby-Grunow Co., Chicago, Ill.

advantageously, and reduces dirt and noise. A complete blower system of the most improved type and ample capacity has been installed so that there is a minimum of shavings and dust. Every machine and operator in the plant is scheduled by the production department and the production of every department is checked each hour to see that the "rate" is maintained. Reports are submitted to the operating heads each hour, and upon failure of any department to make its "rate," investigation is started immediately to determine the cause and remedy.

Ten per cent of the employees of the cabinet plant are inspectors reporting to a chief inspector, who reports only to the factory manager, and no foreman or department head other than the chief inspector and the factory manager is authorized to override the inspector's rejection. Inspection is based on the standards set up by the engineering department. It is obvious that it requires close cooperation between the production, operating, and inspection departments in order that harmonious relations, as well as the highest efficiency, be maintained. In all departments the battery system of production is used so that intensive supervision and intelligent inspection is possible.

The various departments of the plant are classified as follows:

Stock room.—In this department is vested the responsibility for the unloading and storing of all raw and semiraw materials used, and also from this department issue the "rations" of raw materials according to time schedule set up by the production department.

Mill room.—This department is responsible for all necessary machine work, on dimension lumber and plywood.

Sanding department.—The work of this department is to polish (in the white) each part separately so that there is required the minimum amount of handsanding after assembly.

Clamp department.—In this department all individual parts are assembled and clamped into a case or cabinet.

Cabinet room.—Here all of the doors are fitted and hung, hardware put on, and all necessary hand finishing and sanding of molding, trim, etc., is done.

Finishing department.—To this department come all assembled units and parts in the "white," where they are stained, filled, sprayed, rubbed, and polished.

FEDERAL SPECIFICATIONS

Nine Specifications Acted on by Board

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

The new specifications submitted for revision bear the new designation in accordance with the system used in the Federal Standard Stock Catalogue. Following this operation, each cabinet is inspected carefully, and is gone over by a trained finisher, and if found necessary, each cabinet is polished up by hand.

Assembly department.—The cabinet is then carefully reinspected and turned over to the assembly department, where are installed the radio receiver, speaker, and hardware fittings on the exterior and in the interior of the cabinet.

Testing department.—The final test and inspection of the receiver and speaker after assembly are under the direction of the engineering department, and each completed job is checked carefully to see that every part functions properly.

Packing department.—The assembled and tested units are then turned over to the packing department, where the complete assembly is packed in a special packing case, and is again inspected and forwarded to the shipping department.

Shipping department.—In this department is installed a 1,500-foot mechanical conveyor which has a capacity for loading 35 cars per day.

All material is handled on trucks up to the clamp department, after which it is slid over specially prepared hardwood floors or carried by overhead conveyors from one operation to the next.

It is of interest that the manufacturers have no large warehouse for raw materials. A continuous inflow of materials is maintained and used at such a rate that many items of these materials are shipped out in the finished product within a few hours after they are received. Practically no item is kept in an unfinished state more than two days.

To the furniture manufacturer and woodworker, the figures below will be of interest. In the present production of 5.000 radio sets per day approximately the following materials are used weekly:

Carloads of plywood	18
Carloads of dimension lumber	18
Carloads of lacquer	3
Carload of nails and screws	1
Carloads of packing cases	48
Tons of glue	5
Yards of silk grill cloth	2,500
Lineal feet of molding	150,000
-	

There are 40 cars required for each day's shipment of finished radio receivers.

Specifications to be revised

r.	. S. D.
New designation	No.
JJ-H-601 measuring sizes of hosiery	92
UU-P-151 paper, carbon, black, lightweight (for type-	
writer use)	425
UU-P-156 paper, carbon, black, standard weight (for	
typewriter use	426
GGG-S-101 scissors and shears, office	361a
DDD-T-501 towels, cotton, glass	616
Gasoline, aviation, domestic grade	2
Gasoline, aviation, fighting grade	2

Specifications proposed

Tape, linen-finish, red_____ Pipe fittings, bronze (threaded), 250 pounds_____

ACTIVITIES OF THE AMERICAN STANDARDS ASSOCIATION

Development of Safety Code for Construction Industry in Progress—1931 Edition of National Electrical Code Approved by A. S. A.

The following current information concerning developments in standardization projects under the auspices and procedures of the American Standards Association has been furnished by that association;

Safety code for construction work.—The sectional committee on the Safety Code for Construction Work, under the sponsorship of the National Safety Council and the American Institute of Architects, has just been organized, and the personnel and scope of the committee were approved by the Standards Council of the American Standards Association at its meeting on September 10. The purpose of the committee is the development of a safety code for the construction industry, which at the present time has an accident rate nearly twice as high as the average accident rates of all other industries, according to figures compiled by the National Safety Council. The following scope for the work of the committee has been agreed upon:

Construction, demolition, and repair of buildings, including excavation, foundation work, steel erection, scaffolding, lighting, openings, temporary floors and stairs, in relation to accident hazards to employees and to the public.

The committee which has been appointed to develop the code represents manufacturers of materials and equipment, employers, employees, insurance interests, governmental officials, and technical experts.

Preliminary drafts of the revisions of the American Institute of Electrical Engineers standards covering alternating-current machinery, direct-current machinery, induction machinery, alternating-current and direct-current fractional horsepower motors, and synchronous converters, which were submitted to the American Standards Association for approval, have been issued by the sectional committee on rotating electrical machinery, under the sponsorship of the American Institute of Electrical Engineers and the National Electrical Manufacturers Association. The revisions will be brought up for consideration and discussion at a meeting of the committee to be held in the near future.

Edition of the National Electrical Code, 1931.—The 1931 edition of the National Electrical Code has been approved by the American Standards Association, following its submittal by the National Fire Protection Association, sponsor for the sectional committee in charge of the revision of the code. This edition represents the fifteenth revision of the original National Electrical Code as first published in 1897. The committee in whose hands the revision rests includes 43 technical representatives of 26 national, State, and local associations, inspection departments, and other organizations proving a complete cross section of the electrical industry in so far as it is concerned with the scope of the code.

The scope includes "requirements for the installation of electric wiring and equipment for light, heat, and power, as they affect the fire hazard and for signaling systems, so far as they may involve such hazard." The code also includes "equipments affecting the life hazard in numerous applications and uses." While in general the majority of the changes in the code are of an editorial nature. However, some important new material has been included.

New definitions are given for the terms appliance, general use switch, grounding conductor and isolating switch.

A new section shows what has been considered good practice for mounting requirements and a change has been made in one of the sections to convey the approval of outdoor Christmas tree lighting outfits.

Changes in the article on service and service equipment, permit under special permission buildings having a multiple occupancy to have more than one set of service conductors and in addition approve the use of new forms of multiple conductor service cables. This article also contains one of the most important changes in the code which permits the utility meter to be placed ahead of the service switch and the service fuse under certain conditions, and a second change which applies when the first is in effect permits the use, with various safeguards, of branch circuit breakers in place of the main service switch.

A change in the section on armored cable requires protection to insulation at the cut ends of the armor.

Changes in the section on electrical metallic tubing, accomplish a broader recognition of this new raceway. Two new sections cover wireways and busways and auxiliary gutters. These together with the existing section on bare busbars and risers, were made necessary by industrial development and the practically universal use of electricity.

In the article on conductors, certain changes in nomenclature and classification have been made. The allowable current in wire installed with rubber or varnished cloth is now permitted in several of the smaller sizes of wire with other types of insulation.

Many changes were made in the article on automatic overload protection of circuits and appliances; these involved a rather complete structural revision of the chapter. The section covering motors and circuits has been materially revised. New subdivisions apply to feeders of motor branch circuits and to secondary circuit conductors for wound-rotor alternating-current motors. Detailed provisions for conductor sizes and automatic overcurrent protection of conductors and motors have been modified in many respects.

Improvement in the correlation and cross referencing of the article on grounding have been made, and changes in the section on grounding portable equipment, effect better protection in portable appliances at voltages higher than 150 and in permanently moist locations.

The article on transformers and capacitors, contains a new subparagraph calling for certain name-plate data on transformers and capacitors.

A complete new text for the article on storage batteries, is provided.

The article on lightning arresters, is completely revised and made applicable to industrial stations. In the article on hazardous locations, a new paragraph defines class 4 locations as places where ignitable combustible fibres are stored or handled.

A new section of the article on motion-picture studios, covers wiring in connection with sound recording and reproduction for the first time.

An analysis of the 1931 revision of the National Electrical Code compiled by Mr. A. L. Abbott and containing in detail all of the differences between the 1930 and the 1931 editions, has been published by the National Electrical Manufacturers Association as its publication No. 31–11, dated August 1931.

A paper on the standardization work of the Bell Telephone System featured a meeting of the ASA Standards Council held at the Westinghouse Lighting Institute in New York on September 10, with Cloyd M. Chapman, chairman of the Standards Council, in the chair. The paper was presented by Dr. H. S. Osborne, transmission engineer of the American Telephone & Telegraph Co.

The American Institute of Electrical Engineers has submitted the following standards for consideration by the electrical standards committee :

Recommendations for the Operation of Transformers; Constant Current Transformers of the Moving Coil Type; Capacitors; Sixty-Cycle Test Voltage for Standard Bushings for Transformers; Transformers, Induction Regulators and Reactors; Electric Railway Control Apparatus. The last mentioned is a revision of that part of ASA Standard C36–1928, Railway Control and Mine Locomotive Control Apparatus, which deals with electrical railway control apparatus.

CHARTS FOR MARINE NAVIGATION

Standard Chart Enables Navigator to Pilot His Ship Safely and Accurately Across Waters

By R. S. PATTON, Director United States Coast and Geodetic Survey

Of the four main classes of transportation—rail, water, highway, and air—it can be said that the rail is the only one which has reached real standardization. The highway is making rapid strides in that direction but it will probably be many years before water transportation reaches the high degree of standardization the railroad now enjoys. It will be still longer in the case of the newest means of travel by air.

by air. The question may well arise as to why water transportation, one of the earliest methods known to man, has not yet reached the degree of standardization of the railroad and that which we can forsee for the highway. One of the reasons is that the ocean liner has no well-defined path to follow along the shortest practicable route as the express train or the automobile.

Instead, on each of its journeys a new path must be determined and, under unfavorable conditions, this is seldom the shortest practicable route and quite frequently not the safest. If an automobilist passes a crossroad from which he should have turned off, he is only slightly inconvenienced, but should the navigator at some critical point along his route determine and steer an erroneous course, the result would undoubtedly be disaster with possible loss of life.

The principal aid to the navigator in keeping his vessel on the track which he desires to follow and on one which will avoid the numerous dangers that beset his path, is his chart. The extent to which his chart serves this purpose depends upon the detail and accuracy of the information shown thereon, and in this respect much is demanded by the present-day scientifically equipped navigator.

When modern science rendered practicable the accurate measurement of the velocity of sound in water and developed echo sounding, it furnished the mariner with an extremely valuable tool. Without reducing the speed of his vessel it is now possible for him to have a continuous record of the depths over which he is passing. If the chart shows the configuration of the bottom accurately and in sufficient detail, these records can be used in fixing the position of his ship even under conditions which render other methods of no avail.

On the other hand, if the chart does not portray a true contour map of the bottom, the position of his ship becomes uncertain. This uncertainty means greater precautions, slower voyages, delayed arrivals, and increased operating expenses. It can readily be understood then why it is that the development of echo sounding has accelerated the demand not only for more accurate and more detailed surveys, but also for the extension seaward of such surveys.

To accomplish the surveys necessary to furnish standard data for a modern offshore chart is not always a simple matter. For every practical purpose a sounding must be considered as having three dimensions. A measurement of depth is of value, not simply in proportion to the accuracy with which it was made, but equally in proportion to the accuracy with which we locate the point on the ocean's surface from which it was made.

A group of accurate soundings plotted on the chart in their correct positions relative to each other will give an accurate indication of a submarine valley or any other characteristic feature suitable for use by the mariner as a landmark. The same soundings incorrectly placed with reference to each other may give a seriously erroneous picture.

Therefore, in order to bring our charts in keeping with the resources of modern science, it has been necessary to devise new and improved methods of surveying those extensive areas which lie out of sight of land but still fall on the shelves which border our coasts.

On the Pacific coast these methods have been well standardized and rapid progress is now being made toward the completion of a new series of standard charts. On the Atlantic coast the standardization of methods has been somewhat slower, but this process is now reaching the final stage and we can foresee, within a few years, the same rapid progress that is being made on the Pacific coast.

SPECIFICATIONS IN THE OIL FIELD

A. P. I. Standards Clarify Confusion Caused by Varieties in Equipment in Oil-Field Operations

By CARL A. YOUNG 1

Belting, boilers, and drilling tools; taper joints, line pipe, and derricks; casing, wire rope, and drill pipe; pumps and sucker rods, engines and clutches, line shafts and bits and tubing, rig irons and pump parts, tanks and miscellany—such are the commodities found in oil fields.

Imagine the confusion at an isolated oil well location with all these pieces of essential drilling equipment available, but certain parts are missing, others have special threads, and some have been built to one specification and others to another. Hence, they are useless for assembling into a complete, practical working rig. The material undoubtedly is good and the workmanship generally excellent, but the failure of thread to match thread, of part to mate with part, offsets any inherent quality there may exist, and disrupts the practical usefulness of the equipment.

The above was typical, rather than an extreme example, of the situation the producing oil man faced less than a decade ago. Perhaps it was what he said to those temperamental pieces of equipment which, lacking in uniformity and interchangeability, just would not always work together that established his reputation for possessing a vitriolic vocabulary. Anyway, multiply the one well by 20,000, the number drilled annually in this country, and add a few thousand more for those in foreign fields, and the picture of confusion assumes international proportions and provides pardonable incentive for a great deal of decidedly uncouth language.

However, the oil man did more than talk. He took those prima donnas of oil-field equipment and standardized them. The hundreds of gages required for cable drilling tools were reduced to a few. The nearly 200 different sizes of derricks were curtailed to 11 by adoption of standard dimensions for majoring parts previously manufactured in countless nonuniform sizes. Boiler sizes, ratings, and fittings lost their infinite variety and pipe threads were put on a diet of standardization that shrank their differences to a point where two pieces of pipe of the same size, meeting in any oil field, would fit together without question. When the trucks and trailers of to-day dump their cargoes of equipment at some oil-well location far beyond the pale of machine shops, supply houses, railroad sidings, and even the ordinary means of communication, the oil-well driller stands a good chancebetter than his 3 to 1 odds on finding oil, in factthat each and every piece, although built by different manufacturers and never before assembled, will unite in a complete, efficient drilling rig that works as well as if set up for a sales demonstration.

The changed situation was made possible by belief in the idea of standardization, nine years hard labor, expenditure of millions of dollars and devoted effort on the part of hundreds of volunteer workers. It was one of the first big jobs undertaken by the American Petroleum Institute, national association of the petro-

¹ Secretary division of production, American Petroleum Institute, 250 Park Avenue, New York City. leum industry. The idea was in mind when the institute was organized in 1919. It embarked on the venture in 1922, calling upon manufacturers, engineers, and users to cooperate in a nation-wide movement, since become world-wide, for the standardization, simplification, and improvement of oil-field equipment. The chief objectives were to obtain a uniformity of proper minimum or maximum chemical and physical properties, interchangeability of material and improved workmanship.

Topical committees began a study of the possibilities of standardizing 10 commonly used classes of equipment and pushed the work forward so rapidly that in 1924 the institute formed a division of standardization to direct and correlate their activities. The work gradually was expanded and the scope of the plan broadened. The 10 committees, organized on a national basis, were subdivided to facilitate consideration of individual problems in the five main oil-producing districts of this country, and to permit handling the vast amount of detail work.

The work is still going on. The committees have from the start included in the membership representatives of both manufacturers and users of oil-field equipment. Service has been purely voluntary. Many members and most national officers have served from the beginning, conducting innumerable investigations, making exhaustive tests and giving liberally of their abilities and time without remuneration. For the services they have rendered the petroleum industry there never has been, and probably never can be, adequate compensation, but they have built a unique and lasting monument to their endeavors. It is a book, known as the "API Handbook of Standards," read around the world and used wherever oil fields are developed. Considering the time and abilities generously contributed to its compilation, and still being contributed to keep standards abreast of current developments, it is estimated conservatively to have a value of not less than \$1,000,000. Another \$1,000,000 has been expended on comprehensive sets of master gages.

Perhaps the way in which the 20 specifications contained in the handbook have been developed can be best shown by telling the story of the standardization of pipe. Now pipe is probably the most important item of material used in an oil field. Without it no wells could be drilled or cased, nor would the hundred and one other operations incident to production and transportation of oil be possible. But a section of pipe is of little use in an oil field unless it can be joined to another section, and the fact that to-day two sections of oil pipe of the same size, although made by different manufacturers, can meet and mate in any oil field of the world is representative of the victory and value of standardization.

Fen years ago a certain type of thread was specified for each size of oil pipe. In fact, it was not uncommon to find several types of thread for the same size pipe. Even threads of the same nominal pitch, diameter, taper, etc., on identical sizes of pipe could not safely be interchanged in the field because of differences in manufacturing practices. To-day, however, specifications on pipe, or tubular goods, are so complete as to cover not only size and threads, but chemical and physical properties, workmanship and finish. Threads have been completely standardized. Through the cooperative work of experts from the manufacturing plants, the petroleum industry's own engineers, the National Bureau of Standards, gage makers, and others, it has been possible to develop a specification for master gages for each thread and a system of master gage control that insures equal accuracy among all pipe manufacturers.

Complete dimensions have been established on each gage element, its pitch diameter, major and minor diameter, form of thread, taper and lead. These dimensions, with allowable tolerances, are expressed in ten-thousandths and hundred-thousandths of an inch. Every gage is certified for accuracy by the National Bureau of Standards, the National Physical Laboratory, of Teddington, England, or the Physikalisch-Technische Reichsanstaltt, Berlin, Germany. Every manufacturer who produces tubular goods to API specifications, and marks the API monogram thereon, must provide himself with a set of master plug and ring gages, for each size pipe. Even uniform methods of using the gages and testing the products have been established to insure uniformity throughout the various mills.

But it was considered insufficient that such equipment should be built to standard, for purchasers and users sought not only quality and workmanship in standard materials, but proof that they actually were standard. To meet this need it has been required that each piece of pipe be marked with the manufacturer's name, or trade mark, the weight per foot, test pressure, and, in addition, with the API monogram.

The monogram, composed of the letters "API" in a circle, means "Standard" in oil fields throughout the world. Its use is licensed to each manufacturer upon receipt of his sworn statement that he will place it only on material built strictly in accordance with API specifications. More than 400 manufacturers have been licensed and the number is increasing. Each subscribes to an affidavit, before the license is granted, that "the use of this monogram is a representation that material so marked complies with all of the conditions and specifications contained in the official publication of the institute—including any amendments or modifications that may hereafter be adopted." The manufacturer further agrees that "no material which fails to comply with such specifications shall be so marked." In return the institute grants the manufacturer a certificate of authority to use the official monogram, reserving the right to revoke the license for any reason satisfactory to the institute's board of directors. Consequently the monogram has become an insignia of prestige, as well as of standard quality and interchangeability, whose value is not to be ignored.

The detailed care given the preparation and enforcement of specifications and standards for oil country tubular goods and the use thereon of the official monogram has been applied to other items of equipment as well. Belting specifications cover six types, and include minimum and maximum stipulations on initial elongation, or stretch, and minimum requirements on tensile strength. A complete procedure for belt testing has been adopted, and test laboratories are open to purchasers who wish to make verification.

Boiler specifications stipulate that the necessary chemical and physical properties of material and general workmanship shall conform with the American Society for Mecanical Engineers Boiler Code. Six sizes, ranging from 30 to 125 horsepower, with fittings, interchangeable stacks, etc., have been adopted as standard. A standard method for computing horsepower has been adopted, so that boilers of different manufacturers may be compared on the same basis.

Standards and specifications for cable drilling tools cover complete thread details for 13 sizes of joints, with their master gages. There has been established an elaborate system of control of these master gages in order to maintain interchangeability. One set, known as the "grand master," is deposited with the National Bureau of Standards at Washington for use in case of dispute. Three sets, known as "regional grand masters," are deposited with custodians at Pittsburgh, Pa.. Dallas, Tex., and Los Angeles, Calif. Once yearly manufacturers licensed to use the API monogram must send their reference master gages to a custodian for comparison, and correction is required if they are found beyond permissible limits of accuracy.

Specifications for rig irons and rigs and derricks are primarily dimensional, but those for rigs and derricks include chemical and physical properties of material to the extent that strength computations require use of unit stress figures. An API derrick has standard base, height, and opening through the water table, and bears a name plate giving safe load, wind load, and gin pole capacities, information particularly important when the heavy loads necessary to deep drillings are imposed.

Complete specifications have been adopted for all taper threaded joints used in rotary drilling, both right hand and left hand, and their accuracy is maintained through controlled master gages. Other standards and specifications cover sucker rod joints, oilwell pumps and parts, internal-combustion engines and clutches, polish rods, pull rods, counter shafts for belted pumping units, reduction gear pumping units, methods for rating rotary counterbalances, screen pipe openings, electric induction motor performance tests, tanks with riveted shells and bolted tanks. New standards are established and specifications written or revised as developments warrant.

The work, however, has progressed far beyond the preparation of specifications and the establishment of standards. It actively has entered the fields of promulgation of the standardization idea and education in the use of standard equipment. The division of standardization last year was absorbed in the institute's new division of production, and standardization is applied whenever and wherever practicable and possible in the work of the new and larger organization. Effort is being constantly made to induce all purchasers of oil-field equipment to buy standard material. Only recently the board of directors adopted a resolution commending the standardization work and calling upon oil-company executives not only to support the use of API standards in current operations, but to instruct their purchasing departments to specify whenever possible and practical, that materials supplied comply with the API standard and bear the API monogram. The specifications and standards, published to fit a pocket-size loose-leaf binder and distributed to more than 5,000 working oil men, engineers, manufacturers, and others, are kept up to date. New material is mailed to handbook owners upon publication.

But it has been realized that the adoption of standards in the manufacture of oil-field equipment and the

CENTRALIZED PURCHASING BY MUNICIPAL AGENCIES

Consumer Often Misled by High-Pressure Salesmanship and Advertising—Definite Specifications Should Insure Certain Standards of Quality

By Joseph W. Nicholson¹

The practice of centralizing the purchase of materials, supplies, and equipment for industrial plants and public utilities has been generally followed for more than 20 years. Industrial leaders would not employ this method of procurement for the sake of carrying out a mere theory, especially when it involves the expenditure of some of their earnings to maintain a central purchasing department.

That the system of making purchases centrally is based on sound economic principles is evidenced by the fact that practically all industries and public utilities to-day have a central department of purchases. And these same leaders of industry, having satisfied themselves that substantial savings can be effected through this efficient method of procurement, have prevailed upon their elected officials to establish similar methods of purchase so that the taxpayer may be relieved of a portion of this burden.

What are some of the advantages of centralized purchasing for municipalities as compared with the decentralized system? A few of the most outstanding advantages may be stated as follows:

The stimulation of competition through the soliciting of sealed bids for supplies to be furnished to municipalities from all interested in selling these commodities, whether they be taxpayers of the municipality or not, assures each community of receiving a fair market price for the commodity desired, except in cases of collusion between bidders, which is rare.

If goods are purchased at the right time, as determined by current market prices and in the proper quantities to insure the obtaining of wholesale prices, savings will ultimately result. Any community seeking to purchase a certain commodity should endeavor to make that purchase when the market price is favorable. While this can not always be done, there are many opportunties to purchase necessary commodities when prices are low. If, for example, paper is purchased in sufficient quantities so that the case or carload price is obtained there is a reduction to the purchaser. The same is true of many other commodities, such as gasoline, sewer castings and white lead. There are but few exceptions to this rule. Yearly contracts can be let for incandescent lamp bulbs. cement, coal, wire, and cable when prices are right, and deliveries can be made as required. The sliding scale of discounts on lamp bulb contracts benefits the purchaser in proportion to the amount purchased on his contract.

identification of such equipment are only preliminary steps toward efficient operation. Proper use and care in the field also are essential. To meet this need a

number of codes of recommended good practice for

handling such equipment have been prepared. These are published in bulletin form to fit loose-leaf binders,

and also are condensed in the form of posters suitable

for placing on the walls of warehouses, bunkhouses,

and other conspicuous field locations where they may

be read and studied by the workmen.

The third advantage is in standardizing on certain types and sizes of tools, stationery and equipment, and by reducing types and sizes used to a few, fewer individual purchases are made and the quantities are larger. Fewer purchase orders, requisitions, and checks will be required, and if the commodity bears a sliding scale of prices depending on the quantity purchases there will also be the advantage of lower prices.

To illustrate further, a number of years ago the city of Milwaukee used 40 different kinds of motor oil. It was found that a 3½-ton Sterling truck in one ward yard used one kind of oil, while in another ward yard an identical truck had to have some other dealer's oil. Each foreman believed that his truck would not run properly on any other kind of oil, and it was reported that many bearings had been burned out where other kinds of oil were substituted.

This condition was probably brought about through high pressure salesmanship and strong newspaper and magazine advertising. In one particular instance the instruction plate on an air compressor stated that only a certain make of oil was to be used. The superintendent in charge of the machine insisted that this particular oil be furnished. Without saying anything to him there was substituted a barrel of motor oil complying with city specifications and passing tests in city oil testing machine. This barrel carried the name and trade-mark of the brand which the superintendent insisted on having. After two months' time he was asked whether the oil being used was satisfactory or not, and he stated that it certainly was and that he did not wish to have any other oil substituted. Upon being told that he had used the city specification oil he was incredulous and from that time on he has not seen fit to question the make or grade of oil sent to him for his use.

As a result of the study made on motor vehicle lubricants, the kinds of motor oil which the city of Milwaukee uses has been reduced to four in number—heavy tractor oil, heavy motor oil for motor trucks, medium motor oil for passenger cars, and medium nonchatter

¹ Purchasing agent, city of Milwaukee, Wis.

oil for the old style Ford cars having transmission bands. The cost of this oil has been reduced from prices which ranged between 58 to 75 cents per gallon in drums for 100 per cent pure Pennsylvania oil, to around 45 cents for the same oil in bulk carload lots. The annual gasoline bill of the city was similarly reduced by the installation of bulk storage tanks on a city-owned railroad siding where carload lots are received from which the gasoline is distributed by city trucks to tanks of various departments, boards, and commissions.

The centralization of municipal buying affords an opportunity to set up definite specifications and to study the relation between quality and price of commodities. A buyer soon learns that the price cutter does not always offer "dollar for dollar" value. In the majority of cases where there has been no general market decline, a reduction in price indicates a skimping in quality. Therefore a definite specification should insure a certain standard of quality. This standard must be met by all bidders. To insure protection to the buyer and to all bidders, adequate inspection must be made of the articles delivered to insure their compliances with specifications. This inspection is very important, as no matter how carefully the specifications for bids may be drawn, an unscrupulous vendor who bids low may try to "get by" on poor quality goods.

Much can be saved out of the municipal scrap pile through the proper classification of metal scrap and the sale of these metals at the time when the market is high. Mixed scrap brings a low price at all times, but when properly sorted into various metals such as cast iron, steel, red brass, yellow brass, copper, aluminum, etc., higher prices can be obtained for each by watching the scrap market. This should be a function of the purchaser.

Prompt payment of bills will save thousands of dollars annually if featured in requests for bids. The city of Milwaukee has brought its cash discounts up to \$48,000 last year as compared with \$1,600 in 1922. The annual purchases have increased from \$2,500,000 tc \$5,250,000 during that time which would account for a partial increase in cash discounts but the greatest increase has been brought about through the adoption of methods leading to the offering of 10 days cash discounts by bidders whose terms for payment have heretofore been net 30 days.

In what manner can these suggestions be applied to purchases for the smaller municipalities, towns, and villages in a practical and economical manner? In some small cities, the buying has been done by the city clerk as a part of his other duties. Unless the city clerk is interested in such technical work as purchasing, it would seem more logical to delegate this work to the city engineer, if there be such, as he could procure and devise suitable specifications, the selection and preparation of which require some specialized knowledge of chemistry and physics, as well as certain practical experience in the use of the articles which are to be purchased. If there is no city engineer, the buying could be placed in charge of the chief fiscal officer as a part-time duty.

Unless a city of 5,000 population or less owns and operates its public utilities, I doubt whether it would be profitable to employ a full-time purchasing agent. The total annual purchases of materials, supplies, and equipment would offer a definite indication of its practicability. A department employing a full-time purchasing agent with the necessary clerks and inspectors should cost not more than 1 per cent of the total purchases. If the purchases are large enough and the work is properly handled, a saving of from 10 per cent to 15 per cent will result from such an arrangement.

Assuming that the small city or village directs that all of its purchases shall be made by a responsible administrative official in its employ, what procedure should be followed to conduct this work in the most economical manner? The following is a rough outline:

First. No purchases should be made without the filing of a requisition and the placing of an order by the proper officer.

Second. Purchases made in previous years should be analyzed, the items classified according to commodity, such as hardware, plumbing, electrical, automotive, dry goods, foodstuffs, etc. Schedules should then be prepared for the taking of bids, these prices to protect the city against increase in price for a period of time to be determined by the purchaser, be it three months, six months, or a year.

Third. Suitable and definite specifications should be prepared for all goods to be purchased. These can be obtained from the Federal Specifications Board at Washington, the National Association of Purchasing Agents in New York, the American Society for Testing Materials, etc. The National Bureau of Standards will furnish with certain Federal specifications lists of vendors stating that they are willing to certify that their goods comply with the specifications.

Fourth. Full and complete competition should be obtained through the soliciting of sealed bids from all interested. Newspaper advertising can be dispensed with provided the purchasing officer is required to send bid blanks to complete lists of vendors.

Fifth. After bids are received, they should be opened publicly at a stated time and place, then tabulated, and the awards made to the lowest responsible and competent bidder who can furnish goods suitable for the purpose intended.

Sixth. Deliveries should be tested before acceptance. If a chemical or physical test is required, and the municipality does not have the proper facilities for making these tests, samples can be sent to one of the universities or colleges, which have signified their willingness to conduct these tests. A list of these schools can be obtained from the National Bureau of Standards.

Seventh. Payment should be made promptly when goods have been accepted in order to save the cash discount. If vendor has not agreed to allow a cash discount it is advisable to withhold payment for 30 days and to advise the firm why this was done. This has the effect of showing the vendor the importance of quoting a cash discount. Another way which has brought results has been to specify on bid blank sent to prospective bidders that unless bidder states otherwise in his bid, the city will deduct a cash discount of 2 per cent from all invoices paid within 10 days after receipt and acceptance of goods.

In conclusion it may be stated that it has proven to be entirely practicable to purchase coal for city departments on a heat value basis, all payments for deliveries being based on the composite analysis of a month's deliveries at each receiving point. Thus the city is paying a fixed price for heat units, instead of so much per pound for coal which contains varying quantities of ash and moisture.

Motor vehicles and equipment can be purchased for municipal departments on the basis of the vital units entering into their construction. A questionnaire to

STANDARD MEDICINE CHESTS FOR MARITIME CRAFTS

The Publication "The Ship's Medicine Chest and First Aid at Sea" Issued by the Public Health Service

By ASSISTANT SURGEON GENERAL F. C. SMITH, United States Public Health Service

Since 1798 the Public Health Service has given medical treatment to American merchant seamen in the marine hospitals and other relief stations. It also publishes a book, the Ship's Medicine Chest and First Aid at Sea, for use aboard ship and as a textbook in preparing pilots, masters, and mates for the examination in first-aid proficiency required by the Steamboat Inspection Service.

Although the act of June 7, 1872, requires a "chest of medicines" and "lime or lemon juice and also sugar and vinegar or other antiscorbutics" to be carried on American vessels bound to foreign ports "or around Cape Horn" or engaged in whaling or sealing, the contents of the chest of medicines were not described.

The Public Health Service recommends three medicine chests of various sizes: A, for use on large oceangoing vessels; B, for coastwise and lake freighters; and C, for small vessels with crews not exceeding 18 men. Simple remedies, the use of which is taught to ship's officers, appear in the list of contents for the ship's medicine chest, and when exchanging radio messages with a ship at sea asking for medicine service

NEW PUBLICATIONS

Block sizes for calcimine brushes.—The printed pamphlet on "Simplified Practice Recommendation No. R121-31," covering block sizes for calciminet brushes (Dutch, semi-Dutch, and baby Dutch), is now available. Prior to the approval of the simplification program by the industry these blocks were fabricated in 47 widths and 34 thicknesses. The program, as recommended, effects a reduction to 10 widths and 8 thicknesses. Copies of the pamphlet can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents a copy.

Cotton fabric tents, tarpaulins. and covers.—The printed pamphlet entitled "Cotton Fabric Tents, Tarpaulins, and Covers, Commercial Standard CS28–32" has been released and was distributed to acceptors of record and others interested on September 9, 1931.

The standard as established by the industry to eliminate undesirable practices, requires that tents. tarbe filled in by bidders could show the number of bearings, and other vital parts, location, dimensions, and kind of material used. A chart can be prepared from these questionnaires so that a direct comparison can be made part for part. This eliminates much highpressure sales talk and gives the purchaser more information about each fire engine, motor truck, or concrete mixer bid upon than a salesman can obtain about his competitors' machines.

the medical officer in charge of a marine hospital assumes that these supplies are aboard. The American Marine Standards Committee cooperated with the Public Health Service and published cuts and descriptions of these chests.

The contents of medicine chests for ship or shop are controversial among physicians and laymen. Some selections might have been made for the gargle, stimulant, cathartic, antiseptic, and remedies for cramps, toothache, etc. Others are described in the Ship's Medicine Chest and First Aid at Sea, which each vessel presumably carries, and list A for large vessels contains many items omitted from lists B and C.

A ship's doctor is never employed on coastwise vessels and lake freighters and is found only on the large transoceanic passenger boats, but coastwise vessels usually make short voyages and are seldom very far from a port. For this reason the Public Health Service selected few and simple remedies for this chest, believing that while many are useful for minor diseases and injuries, none is specific.

paulins, and covers, whether of waterproof treated or untreated fabric, shall be marked to show the weight of the gray goods in ounces per square yard to the nearest one one-hundredth of an ounce and also to show the type of fabric used, such as single-filling duck, double-filling duck, numbered duck, and drill. It further recommends that no marking or advertising in connection with tents, tarpaulins, or covers be used to indicate the treated weight. Definitions for the more frequently used fabrics and conversion tables showing the weight to be marked on the goods, as computed from the mill designations of the various fabrics, are given.

The pamphlet includes a list of acceptors and the membership of the standing committee appointed to consider periodically comment or suggestions relative to the standard, in order that it may be kept in harmony with the needs of the industry.

Copies of the publications may be obtained from the Superintendent of Documents, Washington, D. C., for 10 cents each (stamps not accepted).

ECONOMIES IN OPERATION OF A TELEPHONE SYSTEM

Bell System Has Saved Millions Through Application of the Principles of Simplification and Standardization

The standard construction practices of the Bell System are based upon the use all over the country of standard types of construction material, This standardization of materials makes it possible for the purchasing organization to buy very large quantities of a relatively small number of types of material with resultant large savings in cost. Also with a shifting of needs, men engaged in construction work can transfer easily from one part of the system to another. It is a common practice in cases of emer-gency due to large storm damage or other causes, to concentrate temporarily in one small area construction gangs from a number of different operating companies. These men have no difficulty with the work in a new area because of the uniform construction practices in use throughout the country. Further-

more, in severe storm emergencies the fact that the material needed has been standardized makes it possible to obtain it quickly in great quantities from the many points where it is stocked throughout the country.

By stocking standard units the delivery intervals on certain types of central office and private branch exchange equipment have been greatly reduced in the past few years. For example, the delivery interval for certain private branch exchange equipments

was reduced from six months to one month.

One of the routine accounting jobs which lends itself to standardization is that of keeping the accounts of customers and rendering bills for service. The value of standardization for this routine work is readily seen in that, in the Bell System, accounts are kept with approximately 11,000,000 customers, and more than 125,000,000 bills for exchange service are rendered each year. More than 1,250,000,000 charge tickets are handled annually in order that charges for service may be properly made against telephone users. Nine hundred million of these charge tickets are for toll service, of which 750,000,000 must be entered separately on approximately 71,000,000 toll-service statements.

Telephone directories have offered an important field for standardization in spite of the fact that no two directories are entirely alike.

The general arrangement of material in the book is standard, standard alphabeting rules are followed in listing names, standard page sizes used, standard sizes of space offered for advertising, and standard types used in printing. In the clerical work of compilation, standard practices are followed. From this standardization have resulted not only a uniformity in appearance and ease of reference, but also large economies in compilation and manufacturing cost. It is estimated that without the standardization of directory paper and the bulk purchasing which this permits, the same quality of paper would cost the Bell. System about \$800,000 more per year.

System about \$800,000 more per year. The effect in reduction of costs can be illustrated by the single item of black lead pencils, the purchase of which on an average amounts at the present time to more than \$150,000 a year. Prior to simplification 55 different brands were in actual use, while at the present time only three types are used, these providing a range of quality, with one of these grades covering 93 per cent of all requirements. The saving from simplifying the variety of black lead pencils is estimated at \$50,000 per year.

How the Bell Telephone System, by applying the methods of industrial standardization and simplification on a vast, nation-wide scale to almost every phase of its operations and equipment, has effected savings of millions of dollars annually and has reached a new level of efficiency in business functioning, was described by H. S. Osborne, transmission engineer of the American Telephone & Telegraph Co., in a paper presented before a meeting of the standards council of the American Standards Association on September 10 in New York. The Bell System's standardization and simplification program has extended from the most complicated automatic switching equipment to lead pencils—with a saving of \$50,000 annually on this last item alone—and to the phraseology used by operators in answering calls. By standardizing the paper used in telephone directories, Mr. Osborne said, the system saves \$800,000 each year. It is not an exaggeration to say that the telephone service of today could not be given at the same cost, without this high degree of standardization and simplification.

In the installation of the telephone sets on subscribers' premises, numerous requests are received for wiring plans by which telephones may be switched from one line to another, special ringing arrangements may be provided, and extension stations may be associated with the line. The extent to which simplification

in practice may be advantageous is illustrated by the results from a single operating company of a review some time ago of their wiring plans. In this one company it was found that whereas 540 different plans were in use, the requirements could be met by 28 standard plans, and of these 28, 16 took care of all but a few exceptional cases.

In the design of buildings for the new manufacturing plant at Kearny, N. J., a uniform column spacing is maintained throughout all multistory buildings. A great many advantages relating to occupancy have been realized from this standardization. An example is a reduction in cost of approximately 50 per cent in constructing and erecting metal partitions.

The use of standards not only simplifies the work of making the manufacturing layouts, but it also simplifies the introduction of the manufacture of new products in the shop, as the operating people are already acquainted with these standard processes and have the necessary materials and equipment already available.

These plans do not retard the work of the development engineers in effecting improvements in design. Improvements and changes, however, are made on an annual basis unless the advantage of the improvement makes it expedient to introduce it at once. This facilitates the introduction of new designs and minimizes the effect on stocks and schedules.

Before a completed equipment is turned over to the telephone company certain standard final tests are applied by the installers to assure its satisfactory performance. This insures that a certain circuit will be tested in the same manner and must meet the same requirements whether installed in New York or on the Pacific coast.

CENTRALIZED PURCHASING FOR SCHOOL SUPPLIES

The State comptroller of New Hampshire has recommended to the governor of that State the centralized purchasing of school supplies for the State. He estimates that a yearly saving of \$50,000 would result.

Establishment of a system of centralized purchasing of school supplies, exclusive of textbooks, would seem to assume a net saving of at least \$50,000 a year. he said in his recommendation to the governor. The total amount expended annually by the public schools of this State for scholars' supplies, as distinguished from textbooks, now aggregates in excess of \$150,000. Purchases for each school district are generally made by the individual superintendents.

A group of representatives became interested in this matter several years ago and made some investigation of the possibility of centralizing purchasing. It appeared at that time that the many advantages which would accrue from substituting a single purchasing agency for virtually 62 would give a saving estimated at 40 per cent.

The subject was discussed with the then commissioner of education and certain members of the State board of education. It was generally agreed that prices on the small units of purchase were substantially higher than might be obtained. However, it was held that it was not feasible to provide for purchasing in large quantities, since this would necessitate obtaining considerable storage space, presumably in Concord, and also provision for a force of shipping clerks.

It would seem that a net saving of at least \$50,000 per year could be effected on this one class of expenditures through centralized purchasing in large quantities, with standardization of materials and printed forms and a proper inventory control.

MISLEADING FOOD LABELS

There are tricks in all trades, and a few unethical food manufacturers label their products with statements and photographs which are misleading but not necessarily illegal under the Federal food and drugs act.

A picture of an Italian olive tree on a label, for example, does not necessarily indicate that the product is Italian olive oil. Sirup in a can bearing a picture of a maple sugar camp may be maple sirup, or it may not. The consumer may assume that "Golden Corn" is Golden Bantam corn, which may or may not be the case; and the word "Yolkin" may give the impression that the product—perhaps made of soybean lecithin is egg yolks. The careless label reader may infer that "Pineapple Hearts" are a superior kind of canned pineapple, but this term as used by one canner meant pineapple cores. A label "Pure Vegetable Oil Flavored with Olive Oil " may have the words " olive oil " in prominent letters, giving the casual label reader the idea that the product is pure olive oil. It may seem that "Natural Tomato Sauce" is not artificially colored, but the label, further on and in small letters, may declare that artificial coloring is used.

The moral of all this is, "read labels carefully."

BRAZIL TO INSPECT AND STANDARDIZE EXPORTS

Inspection and standardization of all Brazilian exports has been entrusted to that country's Department of Commerce, according to an announcement by the Minister of Labor, Commerce, forwarded to the United States Department of Commerce in Washington, by Commercial Attaché Carlton Jackson at Rio de Janeiro.

This process is described as "fiscalizing" exportation. This means that an office of inspection will be established, to the end of establishing and maintaining official standards of types, grades, and classifications of export products, extending to uniformity in packaging, marking, documentation, etc. These operations will not be confined to export points, but will also be applied at places of origin, as in the entrainment stations of coffee, maté, cacao, hides, etc. Such procedure, responsibly attested, will facilitate the issuance of certificates of origin, quality, sanitation, and other requirements.

The Brazilian National Department of Commerce has initiated a study for harmonizing and synchronizing existing State, Federal, and municipal regulations and laws, procuring the enactment of new dispositions, if necessary, or modifying old ones. Conferences for discussion and suggestions will be held with various official and voluntary organizations for their ideas, including the Conselho Nacional de Cafe, the Service of Agricultural Inspection and Improvement, the Biological Institute for Agricultural Defense, the Service of Pastoral Industry, the Cotton Service, the Junta of Commercial Brokers, and others.

These organizations are making recommendations which will be coordinated and embodied in a report to be published by the Brazilian Department of Commerce, for study and comment by competent authorities in production and export organizations, such comment and recommendations to cover not only general dispositions but also details in each line of export commodities.

TRENDS IN MODERN DISTRIBUTION METHODS

The introduction of new processes of preservation of perishable goods is characterized as one of the most important trends in domestic distribution in a summary of recent trends contained in "Distribution in the United States," published by the Chamber of Commerce of the United States. The introduction of these processes is tending to minimize the effect of seasonal variation in production, to standardize manufacturing processes and to simplify distribution operations, thus making for greater regularization of production and employment, according to this report.

Standardized quality, standard packages, etc., are bringing more and more classes of goods into the category of staples, thus lessening the necessity of personal selection and inspection before purchase and the amount of sales work required, and permitting of mail and telephone buying by consumers. The con-sumer is becoming a more competent buyer, through intelligent advertising and through education in budgeting expenditures, largely due to domestic-science training in the schools, home-economics discussion in magazines, and widespread home economics extension work of national organizations in rural areas.

These statements are a part of a section summarizing trends in distribution, in which the evolution tak-ing place in the country's distributive organization and methods is discussed. All phases of distribution, including the consumer market, market factors, distribution by the retailer, the wholesaler, and the manufacturer, warehousing, advertising, transportation and communication, the industrial market, and a review of market information services are discussed in this comprehensive review of present-day distribution.

Most of the statistical data used is taken from reports of the Bureau of the Census and other research agencies. Copies of the report, "Distribution in the United States," are available from the Chamber of Commerce of the United States, Washington, D. C., for 25 cents.

ECONOMICAL MUNICIPAL MANAGEMENT

Acting under instructions of the recent session of the General Assembly of the State of Connecticut, which prescribed the use of a uniform budget by municipalities having boards of finance, the State tax commissioner has prepared for distribution standard forms for such a budget, and also a manual explaining the budget's application and use.

Sponsored by the Connecticut Chamber of Commerce, the legislation directing such a course is de-signed to bring about standard terminology in town financial records, and, it is hoped, result in more efficient and businesslike management of municipal affairs, according to the commissioner.

"When so brought into use by a number of towns," he said, "comparison may be made of their expenses, item by item, so that economical management as well as wastefulness and extravagance, and even tendencies toward extravagance, may be shown with certainty. To attain these ends will be an accomplishment. I regard the enactment of this statute and its acceptance by the towns of the State as being the longest step forward toward the goal of sound conduct of local government which Connecticut has taken in many years."

COLOR HARMONY IN THE HOME

When color in home decoration invaded the bathroom and kitchen, unique problems of color matching and harmony presented themselves. In selecting draperies, upholstery, and floor coverings available in great variety of color shades, the homemaker, by shopping around, has eventually been successful in finding color combinations that produce desired and pleasing effects. Plumbing fixtures in color, however, presented difficulties. Owing to the nature of the commodity and the capital involved, distributors can not stock pulmbing fixtures in the wide variety of choice represented by draperies, for example, and the only way to produce pleasing effects is by close matching of color. Different manufacturers had different ideas as to what is blue, green, or even black, and the combination of a bathtub, for instance, from one fac-

tory and a lavatory from another, that almost, but not quite, match in color, usually produces effects that are far from pleasing.

In order to rectify the chaotic condition that threatened to end prematurely the era of colored bathrooms, some of the leading monoline manufacturers of sanitary ware got together and, with the cooperation of the National Bureau of Standards, established as standard six colors that all manufacturers can produce. The home maker can now exercise full choice as to design, material, and finish, with the assurance that an orchid bath tub manufactured, say, in New Jersey, and an orchid lavatory shipped from Illinois will be of the same shade.

Manufacturers of other home furnishings soon began to show interest and the division of trade standards of the National Bureau of Standards is receiving letters from unexpected sources that indicate a deep interest in the project. The following is quoted from a letter of the National Electrical Manufacturers Association:

Your communication of March 20, 1931, attaching "Recommended Commercial Standard for Colors for Colored Sani-tary Ware," has been referred to our Refrigeration Di-vision. Upon the recommendation of their Teachnical Com-mittee, the Refrigeration Division at its July 15th, 1931 meeting approved in principle the work being done in standardizing colors for colored sanitary ware and directed that the division of trade standards, National Bureau of Standards, Washington, D. C., be so informed.

Standardization to a certain degree is thus shown to be of aid to the esthetic as well as the utilitarian aspects of life.

\$150,000,000 ANNUAL WASTE OF STATIONERY

Insignificantly small individual wastes rapidly become large wastes when added together. Much has been done in the factory to lessen needless waste. For example, when tools are purchased those giving the longest run or producing the greatest number of pieces between grinds are chosen. "Why not purchase office supplies in the same way?" asks the magazine "Why not purchase Review of Reviews for August, 1931, in an editorial on "Small-Change Economies."

The editorial states that "typewriter ribbons and carbon paper 1 may easily be purchased on the basis of 'maximum impressions for a cent.' But how often are the total number of impressions of typewriter ribbons recorded for their purposes? Second sheets for the carbon copies are usually bought on the basis of the cost per thousand, whereas a sheet much thinner but slightly more expensive in first cost may increase the capacity of each file drawer 100 sheets or more.'

It is not the first cost of paper alone but the cost of paper plus the additional cost of filing cabinet and floor space that really determine which paper is the more economical. Another consideration arises from the fact that some second sheets wear out a carbon paper much more rapidly than others. Only tests can determine which of any number of sheets at different prices is the most economical in this respect.

The editorial in question points out that worthwhile savings also become possible through standardization of office supplies.²

¹"What is Writing lnk?" by C. E. Waters, National Bureau of Standards, appeared iu June, 1930, issue of COMMERCIAL STANDARDS MONTHLY. Kindred articles written for the COMMERCIAL STANDARDS MONTHLY by the same author are: "Testing Typewriter Ribbons," July, 1930, issue, and "Government Standards for Carbon Paper," August, 1930, issue of COMMERCIAL STANDARDS MONTHLY. ² See "Economics in Operation of a Telephone System" in this same issue of COMMERCIAL STANDARDS MONTHLY for data on this subject.

"Pencils, erasers, rubber bands, memo pads, and an almost endless array of office supplies can be standardized," according to the editorial writer of the Review of Reviews, adding that in this way "costs are lowered by the purchase of larger quantities, and inventory can be minimized. One survey showed that 20 standard grades of paper will usually suffice, even for use within large organizations. Yet as many as 278 have been found to be in use in a single company. An analysis made of 92 organizations brought out the fact that they were spending \$1,000,000 a year needlessly for paper. It has been estimated that \$150,000,-000 is the annual waste of stationery in this country half a million dollars per day."

UNIFORM GRADES FOR PECANS BENEFIT GROWERS

The adoption of United States standard grades for pecans on the part of the National Pecan Marketing Association has made it possible for growers to be paid on a quality basis for nuts delivered to the association, according to an announcement of the Federal Farm Board. The association has equipped its local plants with improved machines, including suction apparatus to take out light, shriveled, and inferior pecans.

The statement of the Federal Farm Board pointed out that under the grading, packing, branding, and advertising program of the association, it is obtaining the support and cooperation of dealers in an effort to widen the market for pecans and return to the growers a larger share of the price consumers pay.

Growers in nine Southern States established last year the National Pecan Marketing Association with 15 local branches. The national association received approximately 3,000,000 pounds of pecans from the 1930 crop. There now are 24 local branches with 3,000 grower members who are expected to deliver to the central sales agency more than 10,000,000 pounds from the 1931 pecan crop, the announcement said.

SIMPLIFICATION BRIEFS

Packaging salt.—Simplified Practice Recommendation No. 70, covering salt packages, has been reaffirmed by the standing committee of the industry, without change, for another year. This recommendation has been in effect since May 1, 1927, and has resulted in reducing the variety of containers used in packaging salt from 35 to 19, or approximately 46 per cent.

Carbonated beverage bottles.—A sufficient number of signed acceptances having been received from members of the industry to insure the general adoption of the program, Simplified Practice Recommendation No. R123–30 covering the capacities, heights, diameters, and weights of glass for carbonated beverage bottles may now be considered as in effect.

Die-head chaser.—Simplified Practice Recommendation No. 51–39, covering die-head chasers (for selfopening and adjustable die heads) has been reaffirmed by the standing committee of the industry, without change, for another year. It is estimated that this recommendation has been instrumental in effecting a reduction of approximately 75 per cent in the number of stock varieties of this product.

Wire insect screen cloth.—The required degree of support having been received from the industry, Simplified Practice Recommendation No. R122–31, covering wire insect screen cloth may be considered effective on October 15, 1931. The recommendation establishes wire sizes, width and length of roll, mesh, and method of packing steel wire and copper and commercial bronze wire, and recommends a reduction of the number of varieties of this commodity from 360 to 154, or approximately 57 per cent.

One-pound folding boxes for coffee.—The simplified practice recommendation covering 1-pound folding boxes for coffee is now in effect. This action was prompted by the division of simplified practice of the National Bureau of Standards upon receipt of sufficient signed acceptances to the recommendation from producers, distributors, users, and others interested to insure the general adoption of the program by the industry as a whole. Two sizes of boxes are listed in the simplified schedule. They are a 43_8 by 23_4 by 6 inch box having a capacity of $72\frac{3}{16}$ cubic inches, and a 43_8 by 23_4 by 61_2 inch box which has a capacity of $78\frac{13}{64}$ cubic inches. Formerly more than 100 varieties of this type of box were in use.

Ladies' suit cases.—A summary report of the general conference which approved a simplified-practice recommendation for ladies' suit cases was recently mailed by the National Bureau of Standards to all interests in the industry for their consideration and written approval. The simplified schedule is based on outside measurements of the uncovered box and establishes four regular and three wide stock sizes of cases. If the industry approves, the recommendation is to be made effective as of July 1, 1932.

Glassine bags.—Simplified Practice Recommendation No. R107-31 covering glassine bags may be considered effective October 15, 1931, a sufficient number of signed acceptances having been received from manufacturers, distributors, users, and others interested, to insure the general adoption of the program by the industry. Uniform sizes for both flat and square bags for specific purposes, such as for packaging bread, pies, and cakes, and sizes of general-purpose bags of capacities from 1 ounce to 2 pounds, as used in the confectionery trade, are recommended in this simplification program.

Packaging overhead electric railway equipment.— Simplified Practice Recommendation No. R65–31 covering the packaging of 20 items of overhead electric railway equipment has received the required degree of acceptance and may now be considered as in effect. This simplification program recommends the packaging of a specified number of units of each of the following materials: Protecting trolley armonr, pole bands up to and including the 6 inch, pole bands 7 inches and over, fork bolts with insulator one-half inch in diameter, angle cross-arm braces, flat steel cross-arm braces, crossings of crossovers, trolley wire clinch oars, trolley frogs, straight line hangers, cap and cone insulators, section insulators, strain (Globe & Giant) insulators, wood strain insulators, feeder pins for steel cross arms, straight line suspension pull-

overs, soldered splicing trolley wire sleeves, mechanical splicing trolley wire sleeves, and line section switches.

STANDARDIZATION BRIEFS

Standard milk ordinance.—The establishment of a standard milk ordinance in 19 cities in Missouri has resulted in a material increase in consumption of pasteurized milk, increasing sales more than 100 per cent, according to the United States Public Health Service. Sanitary quality of the raw milk retailed in cities under the standard ordinance has increased 54 per cent. The Public Health Service has long advocated the establishment of such uniform ordinances.

Labels for turkeys.—Fifty Vermont turkey growers, representing more than 7,000 birds, recently formed a state-wide organization "to secure efficient, economic, and uniform methods in grading, marketing, and advertising Vermont turkeys and turkey products." Almost 12,000 Vermont birds have been sold under the New England quality label during the past two years. Throughout New England about 58,000 labels have been used on turkeys.

Varnished cotton cloth.—British Standard Specification No. 419–1931, recently issued, relates to yellow and black varnished cotton cloth—sheet, strip, or tape—as used for the insulation of electrical machinery and apparatus. After pointing out the difference between the yellow and black material, the specification deals with the dimensions and tolerances, the requirements with regard to joints, rolling and packing, the electric strength, tensile strength, tearing strength, and aging. The methods of test are fully described in a number of appendices to the specification.

Hosiery.—The National Association of Hosiery and Underwear Manufacturers, through its research associate at the National Bureau of Standards, has indicated its desire that the division of trade standards assist in the establishment of a commercial standard for hosiery in accordance with standards developed by the association. According to present information, the scope for this standard includes measurements, methods of measuring, sizing, and labeling of all men's, women's, misses', boys', children's and infants' hosiery.

Standardization in Czechoslovakia.—How considerable savings are made through standardization and rationalization in Czechoslovakia is told in an article, "The Hitherto Prevailing Success of Rationalization in Czechoslovakia," published in the June, 1931, issue of the Hdi-Mitteilungen of the Union of German Engineers in the Czechoslovakian Republic. One of the examples cited in this article is that of automobile tires; a saving of 7,500,000 kronen (900,000 German reichsmarks) was realized; another example was the standardization of paper sizes, which also resulted in considerable saving.

Signaling rules for protective systems.—The new edition of the Signaling Rules, as promulgated by the National Board of Fire Underwriters and which will presently be available, will contain a separate set of rules for proprietary and isolated fire-alarm and night-watch systems. These new rules are welcomed by all who have been interested in the promotion of proprietary and isolated systems. For 11 years the members of this industry had been working unsuccessfully to secure for these systems proper recognition in the regulations of the National Board of Fire Underwriters.

Colliery conveyor troughing.—A specification for conveyor troughing for use underground in mines has been issued by the British Engineering Standards Association. This specification, which has been agreed to by all British makers of shaker conveyors, has been prepared with a view to securing interchangeability between the troughing used for the various types of shaker conveyors underground. A specification is also included for the material of the steel plates used in the manufacture of the troughing. Three capacities of troughing have been standardized, but the types have been so designed that all three can be manufactured from a single set of dies. It is hoped that this will considerably cheapen the cost of the troughing to the users.

Tubular traction poles.—A new edition of its specification for tubular traction poles has been published by the British Engineering Standards Association. The revised publication differs from the 1927 edition in that it is extended to cover poles 33 feet in length, whereas previously only poles 31 feet in length were included. This extension has been rendered necessary on account of the increasing use of the trackless trolley omnibus, for which the longer poles are required in order to provide better support for the greater number of contact wires to be supported. Three strengths of 33-foot poles are provided for; namely, medium, heavy, and extra heavy, and dimensions for outside diameters, lengths of section, and minimum thickness are given, while details of the drop tests and bending tests are also included.

Cast-iron pipe.—A revision of the British Standard Specifications for cast-iron soil, waste, ventilating. and heavy rain-water pipes has been issued in one pamphlet, to supersede two specifications first issued in 1912. The pipes and fittings dealt with satisfy the requirements of the London County Council drainage by-laws and the Model By-laws of the Ministry of Health. The specification provides for three grades of British standard pipe. Pipes and fittings made in accordance with the specification will be interchangeable with those formerly made, and pipes made by the various methods of manufacture, at present in use, will also be interchangeable. The specification, in draft form, was circulated to public authorities throughout the United Kingdom, and a general readiness to adopt the new specification has been widely expressed.

Compliance with Dutch standards.—In the August, 1931, issue of Normalisatie published by the standards committee of the Netherlands, there is given a list of firms who manufacture products in accordance with certain Dutch national standards.

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COMMERCIAL STANDARDS MONTHLY

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

The Secretary of Commerce in the first issue of this new journal said: "Certain standards, such as those used for weights and measures, * * * have been fixed by legislative enact-

ment. Mandatory standards of this character, however, are few in number when compared with the large and steadily growing volume of standards developed by industry and commerce and voluntarily maintained. * * The activities of the Commercial Standardization Group of the Bureau of Standards are concerned with standards adopted by voluntary agreement."

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THE UNITED STATES DEPARTMENT OF COMMERCE R. P. LAMONT, Secretary of Commerce

"* * * this department * * * is devoted solely to aiding and fostering the development of higher standards of living and comfort of our people * * * its ideals are clear: That by cooperation and not by compulsion it should seek to assist in maintaining and giving the impulse of progress to commerce and industry in a nation whose successful economic life underlies advancement in every other field." -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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AERONAUTICS BRANCH, CLARENCE M. YOUNG, Assistant BUREAU OF MINES-Continued. Secretary of Commerce for Aeronautics.

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

BUREAU OF THE CENSUS, WILLIAM M. STEUART, Director.

Taking censuses of population, mines, and quarries, water transportation, and religious bodies every 10 years; censuses of agriculture and electrical public utilities every 5 years; and a census of manufactures every 2 years. Compilation of statistics of wealth, public debt and taxation, including financial statistics of local governments, every 10 years; annual compilation of financial statistics of State and municipal governments.

Compilation of statistics of marriage, divorce, births, deaths, and penal and other institutions annually, and of death rates in cities and automobile accidents weekly. Compilation quarterly or monthly of statistics on cotton,

wool, leather, and other industries; annually of forest products.

BUREAU OF FOREIGN AND DOMESTIC COMMERCE, F. M. FEIKER, Director.

The collection of timely information concerning world market conditions and openings for American products in foreign countries, through commercial attachés, trade commissioners, and consular officers, and its distribution through weekly Commerce Reports, bulletins, confidential circulars, the news and trade press, the monthly Survey of Current Business, and district and cooperative offices in 65 cities. The maintenance of commodity, technical, and regional divisions to afford special service to American exporters and manufacturers.

The compilation and distribution of lists of possible buyers and agents for American products in all parts of the world and publication of weekly lists of specific sales opportunities abroad. The publicity of statistics on imports and exports.

The study of the processes of domestic trade and commerce.

BUREAU OF STANDARDS, GEORGE K. BURGESS, Director.

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

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

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

BUREAU OF MINES, SCOTT TURNER, Director.

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

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

Research on helium and operation of plants producing it.

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

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

BUREAU OF FISHERIES, HENRY O'MALLEY, Commissioner.

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

BUREAU OF LIGHTHOUSES, GEORGE R. PUTNAM, Commissioner.

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

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

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

BUREAU OF NAVIGATION, ARTHUR J. TYRER, Commissioner.

Superintendence of commercial marine and merchant seamen.

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

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

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

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

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

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

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

RADIO DIVISION, W. D. TERRELL, Chief.

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