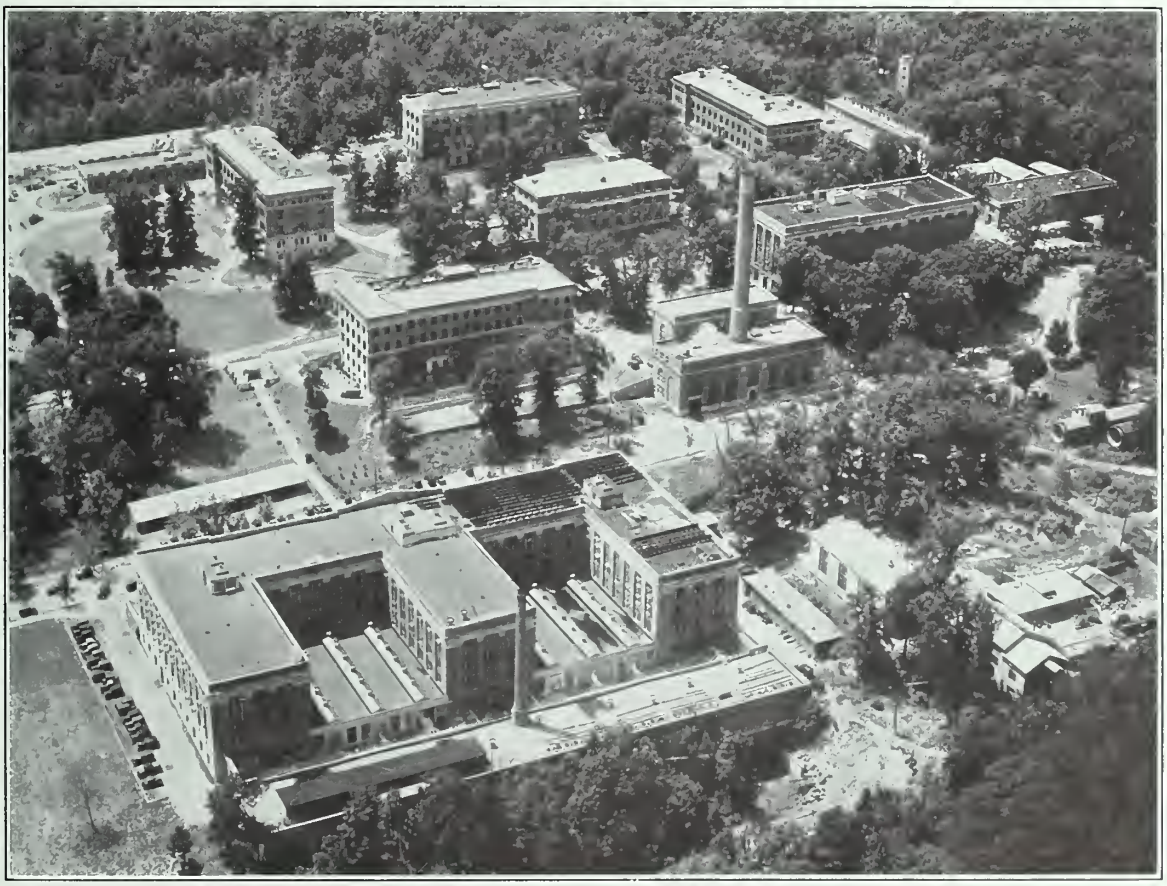
COMMERCIAL STANDARDS MONTHLY

A Review of Progress in Commercial Standardization and Simplification



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AIRPLANE VIEW OF BUREAU OF STANDARDS (LOOKING SOUTH)

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

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

BUREAU OF STANDARDS
GEORGE K. BURGESS, Director

COMMERCIAL STANDARDS MONTHLY, S. F. Tillman, Editor

The Commercial Standardization Group

DIVISION OF SIMPLIFIED PRACTICE

Edwin W. Ely

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

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

BUILDING AND HOUSING DIVISION

J. S. Taylor

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

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

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

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

DIVISION OF SPECIFICATIONS

A. S. McAllister

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

DIVISION OF TRADE STANDARDS

I. J. Fairchild

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

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

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

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

COMMERCIAL STANDARDS MONTHLY

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VOLUME 8 WASHINGTON, D. C., MAY, 1932 NUMBER 11

SUBJECT ANALYSIS

AN INVITATION TO VISIT THE BUREAU OF STANDARDS

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

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STANDARDS YEARBOOK

1932

THE STANDARDS YEARBOOK for 1932 outlining the activities and accomplishments of not only the Federal Government but also those of States, municipalities, and trade associations, is just off the press. It is the sixth annual issue of a publication devoted to the great and ever-growing field of standardization in its broad aspects. It gives a summary of progress the world over.

Included among the special articles for the 1932 Yearbook is a symposium on standardization in communication. Experts in the many lines of communication have contributed articles to the symposium.

Industry has become a vast complex of measurements controlling the design, making, and use of its products. Broadly, standardization is the measured control of industrial evolution. Hence, it reaches out to touch every field of human activity. It includes simplification and "rationalization" as parts of a system designed to place the measurements of science in the controlling positions of industry. Its achievements are of interest and concern to business men and manufacturers as well as to engineers. To the technician the Yearbook is full of example of methods and results of suggestive and stimulating value. To business men it discloses trends which deeply concern their interest.

Copies of this publication may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at $1 each.

SCHOOL-BUILDING CONSTRUCTION

Bureau of Standards Contributes to Solution of Many of the Problems Encountered

By James S. Taylor, *Bureau of Standards*

A school building to a passer-by is all too frequently just a school building. Neither the patient planning of those who conceived it nor the problems within—especially of turning out intelligent citizens, 5, 10, or 15 years hence—is given more than a passing thought. Yet to produce it clay may have been dug and molded and subjected to seething flame, rock may have been ground, sifted, and burned in fiery kilns, molten steel may have poured from huge ladles, and woodmen's axes may have rung out in the forests of Alabama or in the high Sierras.

In less spectacular fashion the problems that are attacked at the Bureau of Standards also have their interest. What establishes how large floor joists should be, what helps to make a brick wall resistant to a driving rain storm, what sort of material is good to use on steps to prevent slipping, how can light be persuaded to enter and stay in the schoolroom, what is a good sort of table top to use in a chemical laboratory, how can those annoying echoes in the lecture hall be subdued and made to behave? These are questions that have considerable interest.

One of the major problems of the educator is to provide adequate space for the ever-increasing number of pupils. With the insistent parent on the one hand expecting service and the frowning taxpayer (often the same person) on the other talking economy, this task is not an easy one. Great ingenuity has been shown in meeting the situation with improved administrative methods. However, possible savings in construction deserve attention.

Safety in construction is, of course, essential; but when safety plus a resonable margin is exceeded, waste enters. It has been the privilege of bureau experts and cooperating committees to explore that nebulous region where safety ends and waste begins.

Specific things for which to watch might be pointed out. Through increased knowledge of building materials gained by testing, greater working stresses have become possible. A few years ago 16,000 pounds per square inch was the commonly accepted basic stress for steel. To-day, 18,000 pounds has general acceptance. The consequence is that smaller columns and beams may be used and savings made. Here again one must check the local building code. Perhaps it has been revised to permit the 18,000-pound stress. Bearing walls are another feature to watch. Their thickness is often greater than necessary. Dead-end corridors, a place where pupils may be trapped in case of fire, may be eliminated with skillful designing.

Other economies not concerned with safety are possible. Perhaps suspended ceilings can be omitted, leaving masonry floor joists exposed without apology. Perhaps exterior ornamentation can be cut down. Perhaps individual vents of plumbing fixtures can be changed to a group system of venting resulting in less piping and fewer gadgets. The educator has a right to discuss all these matters and to get a reasonable explanation for what is done.

Let us take an imaginary pupil, follow him through his day of study and play at school, and see at how many points something done at the Bureau of Standards may affect him. Patient research along many lines has developed facts which have been freely available to architects, contractors, material producers, and others and have been accepted voluntarily because they were unbiased and useful.

Our pupil ascends the school steps and enters the corridor, all unmindful of the fact that the chances of his slipping on various flooring materials have been investigated. If it is a wet day and the corridor floors have become coated with moisture, this does not matter. Such conditions have been taken into consideration. Research Paper 204 at the bureau gives the results of experiments with various kinds of shoe soles and floor surfaces. It offers means of obtaining data through tests which could be used for a rough classification of walk-way materials according to their relative safety under different service conditions.

Then, too, the janitor can make short work of the mud and grime by the use of scouring powders for floors described in Circular 370, just as he can make the rest of the building interior spic and span through hard work and the aid of Circular 383 on washing, cleaning, and polishing materials. We had an associate work for a year or two on the single problem of removing from marble such stains as ink. Our own publication (division of building and housing) on Care and Repair of the House, which has its appeal as a means of practical education in home maintenance and in vocational training, also helps in the school by baring the secrets of the dripping water faucet and telling how one can overcome the exasperations of a sticking door lock with a little amateur work. To those who have a mental picture of bureau publications as limited to scientific treatises containing nothing lower than fourth power equations, this helpful little booklet will come as a surprise. Many bureau publications, it is true, are technical in nature, as would be expected in the case of a institution internationally famed for its scientific attainments; but many are also prepared especially for the average citizen who wants to get useful facts undiluted by propaganda of any sort.

As he entered, the pupil was perhaps guarded from danger of collapse of the building due to the weight of the furniture, his own weight and that of other pupils, because certain minimum load figures had been used in designing the floors. The local building code perhaps set forth such figures. Perhaps nobody knew exactly from whence they came. But it is true that in many municipalities they have been adopted as a result of recommendations made by the Building Code Committee of the Department of Commerce, which functions in connection with the division of building and housing of the bureau. To get these figures, furniture and other contents were weighed and the loads to be expected in various occupancies were determined.

The determination of the loads where there is rhythmic movement, as in connection with school children, was a very difficult problem in that connection.

If the building is modern and built in accordance with well-recognized practice, there is little chance that the pupil will be injured by fire. A species of legalized arson has been carried on at the bureau by its fire-resistance section whereby the contents of typical rooms have been deliberately set on fire and the results scientifically recorded. By artificially creating fire of equal intensity and observing the effects on various building materials, the kind and thickness necessary to resist the destructive effect of fire for given periods has been obtained. In addition, definite recommendations have been made as to the heights to which school buildings made of various materials should be built and the frequency with which they should be divided by fire-proof walls to limit the spread of fire as a ship is divided by water-tight bulkheads. For instance, our building code committee has recommended that such walls should be provided for every 5,000 square feet of floor area in the case of a 2-story school building of ordinary brick wall and wood joist construction.

In some States and municipalities fire resistive or incombustible construction is required for schools of more than one or two stories. In other jurisdictions the authorities responsible for the construction of new schools, realizing some of the advantages which accrue from the additional safety of such construction, are using it without the compulsion of law or ordinance. The researches on the properties of building material and construction conducted by the Bureau of Standards during the past decade or two have assisted building designers and constructors in obtaining a needed degree of fire resistance at minimum cost and without sacrifice of other desirable properties as heat and sound insulation.

The fire safety of school auditoriums of large size, especially where theatricals are promoted, requires the installation of automatic sprinklers over the stage loft and an incombustible, fire-resistive curtain for the proscenium opening. The curtain should also be arranged for automatic operation in the event of an outbreak of fire when no attendant is present for the lowering of the curtain. The regulations recommended by the Bureau of Standards based on tests of the principal types of proscenium curtains serve as a guide in providing fire-resistive curtains for schools.

Our pupil is now seated in his place expectantly awaiting his daily quota of knowledge. Probably the desk at which he sits is finished with a color that has been agreed upon as standard by manufacturers, distributors, and school authorities meeting under the auspices of the division of simplified practice at the bureau. At such meetings a range of color tones has been established that simplifies the stocking of school equipment for the manufacturers and makes possible quicker and more satisfactory delivery. This decision to limit stock colors for certain types is contained in Simplified Practice Recommendation R111–30.

The blackboard upon which he will presently have to solve some classic mathematical problem bears evidence of the bureau's activities. Manufacturers, distributors, and users have again decided to limit stock sizes to certain dimensions, and their findings have been registered in Simplified Practice Recommendation 15, on Blackboard Slate. Incidentally, it might be remarked that blackboards, like human beings, grow gray with age and that so far the problem of dealing with aging blackboards has not been met in any more satisfactory manner than with people. It appears to fall into the same class as trisecting an angle or squaring the circle.

Light streams into the schoolroom from windows whose size and relation to floor area have been worked out by illuminating engineers with whom the bureau has maintained close contact and shared its accumulation of knowledge. Artificial lighting for dull days has also come in for attention. With 22 per cent of the students in public schools and 40 per cent in the colleges reported to be suffering from defective vision, any improvement in lighting conditions becomes of vital concern. To get just the right amount of light, to prevent glare, to work toward better spectral quality in artificial light, all for the general purpose of preventing eye strain and enabling a pupil to perform his work with maximum efficiency, is work worth doing. Standards of school lighting are even now under revision as a project of the American Standards Association and bureau experts are cooperating in this. Recommended values for illumination of school interiors will be given. Incidentally, some of the findings of the bureau that are negative are of value. For instance, considerable study has been devoted to a new kind of window glass which transmits beneficial ultraviolet rays. While a number of these new glasses are shown to transmit a reasonable amount of ultra-violet, attention is called to the fact that two minutes exposure to direct sunlight is better than some 15 to 20 hours' exposure at a distance of 16 feet from a north window of a schoolroom, assuming that a minimum beneficial intensity of rays is obtained. No great difference would be made in the comparison if the light came through a south or west window unless the pupil sat in the direct sunlight. Such facts need to be known in order to pass intelligently on the usefulness of such glass for schoolrooms and the wisdom of going to extra expense in providing it. In that connection the bureau has undertaken a study of radiators and radiator valves and means of individual control of heat in rooms in connection with the new Federal Government program. The results of that are not entirely completed.

In connection with ventilation one must turn to the Public Health Service in the Treasury Department, the Bureau of Standards not having gone into that subject extensively.

The degree with which the pupil can concentrate and the wear and tear on the teacher's nervous system are also affected by the way in which sounds are controlled. Happy, childish chatter may have attractiveness, but when it is magnified and mingled with the sound of marching feet and the mixture goes billowing down the building corridors, attentiveness becomes dulled and discipline relaxes. No doubt many persons can cite instances of assembly rooms and lecture halls where reverberations take command and leave a speaker competing with his reflected self. There are ways of reducing noise that are comparatively inexpensive and efficient. Correct design of rooms and treatment with special sound-absorbing materials result in mastery of the problem. One of the bureau scientists who has been studying sound tells an interesting fact.

In cases where especial attention is paid to the soundproofing between a room and a hall, often the benefit is more than lost because the door is not closefitting, a gap of half an inch at the end of the door may admit more sound noises than the door keeps out. Sometimes in the construction of partitions a very inexpensive change will result in much less noise being transmitted from one room to another. Circular 396, entitled "Architectural Acoustics," summarizes facts that have been gathered over a period of years by various investigators. Teachers of physics know that the sound of the human voice is absorbed to a very considerable extent by clothes at the same time that the statements are reaching the hearers' mental processes, and that the absorption effect per person is something like sixteen times as great as that of the wooden chairs in which the listeners sit. Such effects have been measured at the bureau. In the publication to which I have referred it is pointed out that a rectangular room has much better acoustical properties than one whose walls and ceilings have curved surfaces; and that outstanding authorities favor the use of sound-absorbing materials, such as special fiber board and plasters, in that part of the auditorium occupied by the audience, leaving the walls and ceiling around the stage untreated.

Plumbing is another element of building construction that has come in for much attention at the bureau. Manufacturers are now making their products to definite sizes, in definite qualities, and with definite means established by which the consumer may find out what he is getting as a result of agreements reached under bureau auspices. For years the problem of fixing upon the right sizes of pipes for given conditions has been under investigation. Unlike water-supply lines, plumbing stacks and drains seldom run full. They contain a mixture of air, water, and waste matter in varying proportions. To provide sizes that will do the work properly but with no unnecessary expense is a nice problem in calculation. If the system does not contain the right balance of air and water the seals in fixture traps may be sucked out, thus allowing sewer air to enter the toilet rooms, or back pressure may be created which will cause an inundation and much mopping-up work for the janitor. Recommendations of use to designers and for plumbing codes are to be found in the publication Recommended Minimum Requirements for Plumbing. This contains some comparatively simple diagrams with which a great many architects and engineers are unfamiliar. They therefore may be prescribing systems that are unnecessarily costly.

Probably more research on brickwork has been done at the bureau than in any other laboratory. Several research associates from brick manufacturing associations have been stationed here during the past few years, and the facilities for testing have been made available to them. Bricks have been measured, they have been boiled, they have been frozen, they have been crushed flatwise, edgewise, and endwise. Mortars have undergone equally rigorous treatment. Walls have been constructed and have been destroyed in the implacable jaws of the bureau's 10,000,000-pound testing machine. Other walls have been bathed for hours in flames to determine their resistance to conflagrations. Those ugly white patches that sometimes appear on brickwork after it has been built for some time have been studied. Out of all this has come much definite knowledge about strength, weathering, fire resistance, and other qualities. An apparently simple thing like the casual furrowing of a mortar bed by the point of a workman's trowel has been found to reduce the strength of the wall materially below that of one where the mortar beds are left flat and smooth. Numerous publications have been issued in connection with these researches and are available at small expense. The diabolical ingenuity with which water finds its way through solid walls, to the ruin of plastering, is still under investigation.

A natural question to raise wherever I have mentioned definite qualities and grades of materials is: Where can these be obtained and how can the purchasing authority be sure of what he is getting? This angle has not been overlooked. The division of specifications in the bureau has compiled lists of manufacturers who are willing to certify that their products conform to definite Federal specifications or to certain recognized commercial standards. Such lists are available to school or municipal officials. Among building materials they cover brick, building tile, lumber, builders' hardware, cement, concrete materials, electrical supplies, fire extinguishers, and heat insulating materials.

If nothing is specified it is now possible to get grade-marked lumber, so that anyone connected with the school department can check up and see if the lumber is up to standard, and if one wants a check on whether the correct lumber is being standard, neither too expensive a grade nor too poor a grade, he can obtain information from the Department of Agriculture or the National Committee on Wood Utilization at the Department of Commerce.

Assuming that it is now time for the students to depart, they pass through corridors and stairways whose dimensions and locations are prescribed by exit requirements prepared by committees to which bureau experts have contributed their knowledge. The doors swing outward, as they should under the provisions of these exit requirements, so the pupil and his fellows, if they should get jammed up at the doorway, may not be unable to get the doors open against the pressure of the crowd. The pupil departs. The janitor locks the doors with a lock no doubt conforming to Commercial Standard 22–30, Builders' Hardware, and we take leave with the consciousness that in an unobtrusive way the bureau has contributed something to the sum total of the efficiency and agreeableness with which the day has passed.

WOODEN BUTTER TUBS

Simplified Practice Recommendation R135–32, covering wooden butter tubs, has been accorded the required degree of acceptance by the members of the industry, according to an official statement of the Bureau of Standards.

This recommendation, which was proposed and developed by the industry, provides dimensions for the inside diameters of the top and bottom, the inside vertical depth, and the outside length of stave for the 10, 33, and 63/64 pound tubs. The recommendation is to be considered effective as of May 10, 1932.

STANDARDIZING SIZES AND RATINGS BY MEANS OF PREFERRED NUMBERS

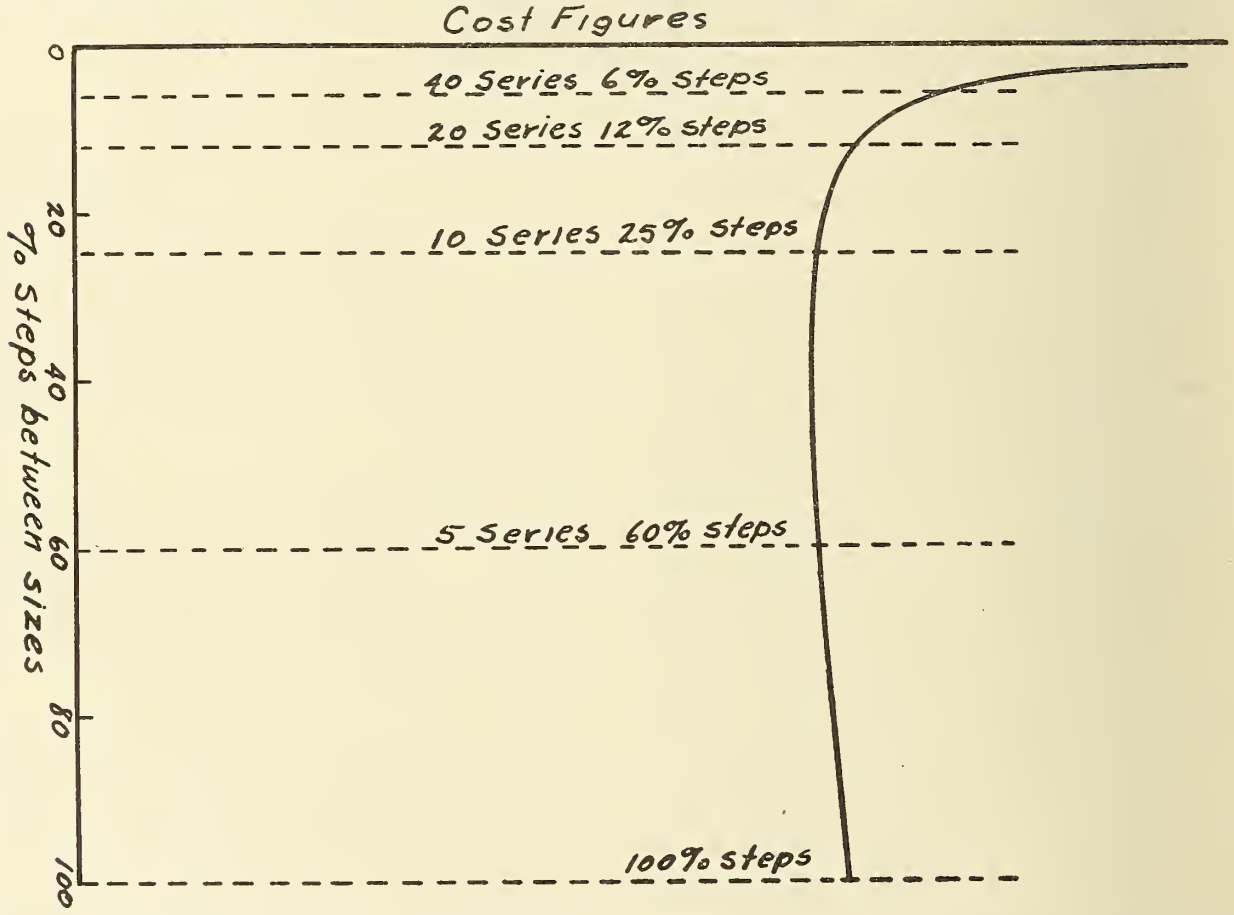
Most Practicable Basis for Standardization of Sizes and Ratings Is That of Preferred Numbers

By R. E. Hellmund [1]

The economic advantages of standardization are obvious and rather generally recognized, and yet standardization as far as it relates to styles, colors, etc., is frequently difficult to accomplish due to the differences in tastes of both producer and user, to which differences it is, of course, necessary to make some concessions.

On the other hand, standardization of sizes and ratings is not subject to this same handicap, and if the progress which is being made in this direction is disappointingly slow it is merely due to the lack of proper methods of procedure and recognition of the fundamental economic factors entering into it. The principal difficulty arises from the fact that when new types of articles are brought out, it is usually impractical for the various manufacturers to get together and establish certain standards before proceeding with manufacture, and as a consequence each of them establishes sizes and ratings more or less independently of the others. If later a national standardization is attempted, such efforts are greatly handicapped by the clashing of individual interests, which is perfectly natural because of the investments made by the various manufacturers for tools, stocks, etc.

It would, therefore, seem that if there were some general standardization scheme available to all before any manufacture was started, many of these difficulties would be eliminated. The best and most practicable system so far suggested for this purpose is that of "preferred numbers." These numbers are simply certain numbers arranged in so-called 5, 10, 20, and 40 series to give uniform steps of 60, 25, 12, and 6 per cent, respectively, between any two numbers of a series. These series of numbers may be used for dimensions, cubic contents, ratings of all kinds; in fact, for anything on which standardization is desirable. A more detailed account of the system and its application can be found elsewhere. (American Machinist, Nov. 5, 1931; also Mech. Eng., April, 1931; A. S. A. Bulletin, January, 1931.) With such a system of several series of numbers available, it remains, of course, to decide which series is the best one to use for a given case. In this connection, certain fundamentals which enter into the choice of smaller or larger steps between standard sizes as offered by the system have to be recognized and will be briefly discussed in the following.



[1] Chief electrical engineer, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

Let us assume that a consumer or user of an article finds that a certain size or rating will fill his requirements. With but a limited number of standard sizes or ratings available, he probably will have to use a size or rating next larger than the one he needs. This means that he has to pay for a certain excess of material and labor. He may also find that on account of using the larger size he will have to incur certain increased consequential expenses; for instance, if he buys a motor larger than needed for his purpose, he will have to put in a larger foundation and possibly heavier wiring and control apparatus. It is therefore evident that the availability of but a limited number of sizes means definite increases in costs to the user; in fact, the smaller the number of sizes available or, in other words, the larger the steps between standard sizes, the greater the total of such increases in costs to the consumers at large.

There are, however, certain other costs which increase with the number of sizes manufactured. First among these are expenses for development and tools, as each additional standard size usually involves additional costs for these items. Furthermore, there are certain costs which are incurred every time the manufacturing set-up is changed from one size to another, and the total of which, therefore, increases with the number of sizes. Again, there are expenses for stock keeping in the warehouse of the manufacturer and his dealers, as well as for the stock and spares kept at the plant of the user, which increase with the number of sizes and ratings. Similar expenses are involved in certain routine and bookkeeping activities, in issuing publications, entering of orders, and many other items. All of these costs must, of course, be distributed over the total number of articles sold, and they therefore enter in some way or other into the price paid by the users and thus are of just as much importance to them as any other costs, although they frequently fail to appreciate this fact.

The whole problem therefore resolves itself into one of finding the size of steps which will result in the minimum total cost to the user. If certain basic factors, such as the activity of the article, development costs, cost of stock keeping, etc., are known or can be reasonably well estimated, it is possible to solve this problem analytically. (A rather complete method and discussion of doing this is given in Electrical Engineering, January, 1932.) Such an analysis, if carried through for any given set of conditions, leads to a curve which shows rather high cost values if the steps chosen are too small; with increased size of steps the cost decreases, but if the size of steps is increased too much the cost curve rises again. An example of such a curve is given in the accompanying illustration. With the information and data resulting from such an analysis it is usually very easy to decide which series of preferred numbers should be used. In making such a decision, certain factors other than costs may have to be given due consideration.

The utility of an article may be greatly increased if it completely fills a given space; for example, it may be desired to use as large a kitchen range as possible in an available space. In view of this, it is obvious that a line of ranges consisting of many sizes will have greater general utility than a line composed of fewer sizes. As a result it may be advisable to use somewhat smaller steps than indicated by the cost curve. Again, in certain cases of machinery, operating efficiency or other performance factors may make it desirable to choose a number of steps larger than indicated by the cost analysis. On the other hand, if a new type of apparatus is being developed and there are uncertainties regarding the design and various commercial factors, it may be well to choose in the beginning steps larger than indicated by the cost curve. Frequently, especially when the necessary data for an analysis are not available, an initial line following the 5 series is the best choice until there is definite evidence that a change to the 10 series is absolutely necessary. Fortunately the entire system of preferred numbers is so arranged that a change from one series to another can easily be made by introducing additional steps without a change in the initial sizes.

In the space here available it has been impossible to treat all the conditions which may be encountered in the great variety of industrial products; each case will be somewhat different and therefore various methods of attack will have to be used. The principal purpose of this brief outline is to stimulate interest in this important subject of standardizing sizes and ratings. The fundamentals mentioned are intended merely to assist in a more rational solution of the problems. If they are judiciously applied, together with an increased adoption of preferred numbers, marked economies to both the consumer and the producer of industrial products undoubtedly will result.

NEW ZEALAND CREATES BOARD TO AID SECONDARY INDUSTRIES

The New Zealand Parliament has set up a Development of Industries Board, whose function it will be to assist in stimulating secondary industries in New Zealand. The board is composed of nine men, representing technical societies, chambers of commerce, trade associations, educational institutions, manufacturers, merchants, the unemployment board, and the Department of Scientific and Industrial Research. It is designed to give sound, practical advice, particularly on questions of Government affecting industry. The Government will cooperate with the board by extending appropriate assistance and placing its advisory resources at the disposal of industry.

In announcing the establishment of the board, the Right Hon. G. W. Forbes, Prime Minister of New Zealand, outlined the steps that had been taken to stimulate secondary industries in New Zealand. He stated that the primary industries had been developed with remarkable success and had been standardized to a large degree. The packing and the grading of food products were honest, and the purchaser would rely on what he was buying.

He said further that " any product we sell we should keep at the highest standard, and we should see that it is equally high all through. Secondary industries must go hand in hand with primary industries. In many of the manufacturing plants in New Zealand the team spirit has been established and with it must come the concentration necessary on any particular article for its production at the lowest price. That is a duty which the public has a right to expect from industries that have received a measure of protection."

STANDARDIZING AND INSPECTING FIELD-CROP PRODUCTS IN CALIFORNIA

By L. M. Jeffers [1]

By the provisions of the California field crops inspection act the director of agriculture is authorized to establish grading standards and to provide an inspection service. The standards established under this law are for inspection purposes only and do not in any way restrict the sale, shipment, or use of any of the commodities, regardless of the quality or conditions. The law is not compulsory in any sense and the use of these standards and the inspection service is entirely optional.

All of the grading standards officially applicable to California field crop products are the same as the Federal standards. Those standards established for corn, wheat, oats, rye, barley, and grain sorghums are the same as established by the United States Government under the provisions of the United States grain standards act. This law, from a Federal standpoint, is compulsory, and no other grading standards for these grains can be used in interstate or foreign commerce.

Optional Federal standards have been established for hay, beans, and rice and by promulgation of the director of agriculture have been made the official grading standards for California. The use of all of these grading standards by State, commercial organizations, or private inspectors is dependent upon a license issued by the United States Department of Agriculture. Therefore, all of the inspectors employed by the California Department of Agriculture are licensed by the Federal Department of Agriculture.

The factors of condition and quality which are considered in the establishment of these grading standards and serve to fix the grade of the particular lot of the commodity under consideration are the same factors which apply practically in the minds of producer and consumer in establishing the value of the commodity. The presence of extraneous or foreign material and the prevalence of damaged portion of the commodity is sure to reduce the actual value of the same.

In the marketing of these commodities on the basis of grading standards and through the use of official inspection certificates, the presence of these damaging factors is measured on a definite basis, while in the all too prevalent method of bartering or selling on an "as is" basis these same factors are measured with a variable standard.

The department of agriculture has established inspection offices and employed capable inspectors for the purpose of rendering an inspection service on the field crops products of California. Official inspection of the grain can be secured from State offices at Sacramento, Stockton, San Francisco, and Vallejo.

Hay inspection is available in the Imperial Valley, Antelope Valley, San Francisco, Los Angeles, and through the Sacramento and Stockton offices for the area in the central part of the State. Bean inspection certificates may be secured from Los Angeles, Stockton, San Francisco, and Sacramento. Rice inspection is available at Sacramento and San Francisco.

It is impossible, of course, to give an inspection service on hay except by personal examination of the particular lot. On the other commodities it is possible to submit representative samples to the respective offices and secure from them what is called a sample inspection certificate.

This certificate indicates the grade on the sample as submitted. Official inspection certificates are secured by having the particular lot sampled by an employee of the department. In this case the grade designated on the certificate represents the grade of the lot.

The question might arise: Why do we have this Federal and State activity in connection with the marketing of our agricultural products? It is a proper question and perhaps conditions in some of the local communities will offer the answer.

While farming has often been described as the ideal occupation because of the independence and health, yet it is probable that most people want to add a third rather important item, and that is profits. A farmer may be producing a commodity which finds the ultimate consumer hundreds or even thousands of miles away from the home ranch.

Farmers are somewhat dependent upon their local buyer or medium of distribution for information as to market conditions. Their commodity is weighed or measured on a basis with which they are familiar and which is uniform throughout the State and the United States. Their product may be superior or inferior as compared with the crop marketed by a neighbor. If they are attending to the details in order to be certain that they are getting proper returns from their crop they should know the basis upon which the value of their commodity is fixed.

The State department of agriculture and the Federal Department of Agriculture have established standards and maintain inspection services as the result of laws which have been passed in order that farmers may have a disinterested official agency to examine their commodity and establish the grade or relative value thereof on the basis of standards which are definite and used throughout the Nation. This is a method which is in no way different from our national money system, and it is equally essential to the proper marketing of commodities.

From an agricultural standpoint California can not exist to itself. It must depend upon the consuming population of the United States and of the world to take the products of its soil. In order to put these commodities in the world's markets on a competitive basis they must be marketed on a standardized basis. It has been clearly demonstrated that quality must be maintained and to do this a penalty must be exacted from the grower who attempts to put on the market a low-quality product. Of the field crop products there are being shipped from the State alfalfa hay, rice, beans, barley, and seeds. In these commodities the State is competing with other producing areas

[1] Chief, bureau of field crops, department of agriculture, State of California.

on the basis of quality. It is quite true that there is imported into the State practically as much wheat as is grown in California and it is worth while to remember that this imported wheat is sold to Californians upon a definite grade basis.

A very sincere wheat grower once said to us in no uncertain terms that he " was not going to pay the State a fee to have them tell him how much dirt was in his wheat." Sometimes it is the truth that hurts, and in this particular case it did hurt his pride to learn that his wheat contained over 7 per cent of foreign material for which he would not be paid when selling his wheat on a quality basis. Unfortunately the average price is too prevalent in the marketing of wheat and barley. The same applies to a certain extent to all of the field crop products. If the grain grower of California is going to market his commodity in an intelligent way he must sell on a quality basis which is the same basis on which the value is ultimately determined in the market, and he must have definite market news information. Without a proper grading system the market price can not be properly and definitely established, and without the same knowledge as to grade being placed before the seller as is now placed in the hands of the buyer their commodity can not be marketed to the financial advantage of the grower.

The field crop products of California are important. The wealth produced thereby is tremendous. It is necessary to recognize that there is a variation in quality. This variation in quality influences the returns to the grower. The application of definite grading standards and the marketing of these commodities on a definite grade basis, with the value of each grade established through open market competition, would do much to create better marketing conditions and return a premium to the producer of quality goods, whereas at the present time too heavy a tonnage is being sold on the basis of average price. The growers, dealers and consumers of the field crop products have an official standardization and inspection service available. The use of this service is dependent upon the interested parties. The value of the service increases as there is an increase in the use of the service.

ORIGINAL METHODS USED IN HOME-IMPROVEMENT CAMPAIGNS

Unique methods are being employed in various cities throughout the country to initiate immediate home improvements, according to reports received by the committee on reconditioning, remodeling, and modernizing of the Presidents' Conference on Home Building and Home Ownership. At the present time active modernizing campaigns are in operation in 92 cities and planned for 142 others. It is estimated that by the end of June the total expenditures for labor and materials resulting from these campaigns will amount to approximately $25,000,000.

Two outstanding examples of original and energetic campaigns are being carried on in Beaumont, Tex., and Buffalo, N. Y. In the former city which has a population around 60,000, the campaign is under the supervision of an organization of young business men. It is organized on military lines, the city being divided into northern and southern sectors, each having an " army." The commander in chief of both " armies " is general chairman of the campaign, with each of the " armies " having its full quota of officers and privates recruited by voluntary enlistment. Many of the officers and privates of the " armies " are women. Each worker was given a schedule of prices of more than 100 jobs which was used as a guide when furnishing estimates on jobs. The cards covering work obtained each day are passed to the lieutenants who in turn deliver them to their captains. They are then passed along to each of the other officers and finally reach headquarters where they are turned over to the Federal employment bureau. The results from the Beaumont campaign have been gratifying, more than 400 odd jobs having been developed.

In Buffalo, the home-improvement campaign has been under the supervision of the American Legion and has been carried on by means of a house-to-house canvass. Pledges received have already reached a total of more than $2,000,000. A follow-up campaign to check up on these pledges was conducted by a force of men composed of unemployed salesmen working under the direction of three business executives who gave their full time without remuneration. At the end of three weeks, work under way resulting from this campaign amounted to more than $500,000, improvements including carpentry work, painting, building of driveways, plumbing installations, etc.

The committee of reconditioning, remodeling, and modernizing was established in the Department of Commerce for the purpose of assisting home owners, local organizations, and others interested in home improvements through educational work. It will furnish information on request in connection with modernizing campaigns now being conducted in various cities, together with suggested publicity material.

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RECOMMENDATION ON WHEELBARROWS RECEIVES APPROVAL OF INDUSTRY

The revised simplified practice recommendation covering wheelbarrows, originally proposed by industry in 1928 and subsequently approved the following year, has received the required degree of acceptance from all interests in the industry. The revision program is known as simplified practice recommendation R105–32, and has been in effect since April 1, 1932.

It was decided by the members of the industry at the revision meeting that some uniform system for designating the wheelbarrows contained in the simplification program be drafted and made a part of the recommendation. By designation is meant the use of distinctive terminology for the same size and type of wheelbarrow, which when adopted by the entire trade, would eliminate much confusion of the customer. Accordingly, it was decided that the wheelbarrows contained in the recommendation should be termed S1, S2, etc., in order of their appearance in the simplified list.

Forty-one sizes and types of wheelbarrows were listed in the original simplified practice recommendation. In the revised program this number was further reduced to 27.

COMMUNICATION OF STANDARD TIME SIGNALS

By Lieut. Marcy M. Dupré, *United States Navy (in charge of Naval Observatory time service)*

The accepted standard of time measurement is the period of the earth's rotation on its axis. This rotation causes the stars to appear to cross the sky from east to west in the same manner as the sun. If a person located on the earth's equator measured the time interval between two successive passages overhead of a very distant star, he would in that manner measure the period of the earth's rotation. If he then made similar measurements on the sun instead of a star, he would obtain a result about four minutes longer than before. This is because of the earth's orbital motion around the sun, which continuously changes the apparent place of the sun among the stars. While the earth is rotating on its own axis, the sun appears to move slowly to the east among the stars, so that the earth must rotate through more than 360° in order to bring the sun overhead again. Even if the earth did not rotate at all on its own axis, the sun would journey around it. The stars are not within the rise and set once during the year because of the earth's orbit. They are so far distant that their apparent positions are only very slightly affected by the earth's orbital motion. The positions of the stars are commonly reckoned from a point in the sky known as the vernal equinox. That point moves very slowly among the stars. The period of the earth's rotation measured with respect to the vernal equinox is called a sidereal day, although it might better be named an apparent equinoctial day. The period measured with respect to the sun is called an apparent solar day. Unfortunately the speed with which both the sun and vernal equinox move among the stars is not uniform, as a result of which the apparent solar and sidereal days are of variable length. In order to overcome this objection, mean time has been devised. Mean solar time, which is universally used in ordinary life, is sometimes ahead of and sometimes behind apparent solar time, but on the average it is the same. The difference between these two kinds of time is called the equation of time. Its maximum value is a little over 16 minutes. The difference between mean equinoctial and apparent equinoctial or sidereal time is called nutation. Its greatest value is only a little over a second, and its greatest daily change is a little more than a hundredth of a second. On account of the fact that this difference is so small, sidereal time has generally been used by astronomers. In recent years a few observatories, including the Naval Observatory, have begun to employ mean equinoctial time in computing the rates of precision clocks.

Standard time.—Since the sun does not cross the meridian in different parts of the world simultaneously, it is evident that the various parts of the world have different solar times. In order to reduce confusion, standard time zones have been created. All the points in each zone use one uniform time which is generally different from their local times by not much over half an hour, and in some places is almost the same. In general the times of these zones differ from Greenwich, or zero meridian time, by some whole number of hours. In the continental United States there are four time zones. Eastern standard time is the local time of the seventy-fifth meridian and 5 hours less advanced than Greenwich time, central standard time is the local time of the ninetieth meridian and 6 hours less advanced than Greenwich time, mountain standard time is the local time of the one hundred and fifth meridian and 7 hours less advanced than Greenwich time, and Pacific standard time is the local time of the one hundred and twentieth meridian and 8 hours less advanced than Greenwich time. The Naval Observatory is thus able to furnish one time signal which will provide time for all zones. The signal sent out at 3 hours, Greenwich time, serves as a 10 p. m. signal in the eastern zone, a 9 p. m. signal in the central zone, an 8 p. m. signal in the mountain zone, and as a 7 p. m. signal in the western zone. Since the object of the time zones is mainly one of convenience, the boundaries between the zones have been placed where they will be the source of the least inconvenience, rather than along exact meridians. For instance, if the lines were straight the people in one corner of a small district might be using different time from their neighbors, and the railroad trains might have to make time changes at inconvenient points rather than at terminals. The Interstate Commerce Commission holds hearings concerning the placing of these division lines, and all inquiries on the subject should be addressed to that commission. The Hydrographic Office, United States Navy, sells a map showing the time zones of the world. The map is No. 5192, and the price is 50 cents.

Time determination.—For the purpose of time determination the Naval Observatory uses small telescopes known as transit telescopes. These are mounted with great rigidity and pivoted so that they can be rotated from north to south, but not to the east or west. Thus, an astronomical object is visible to such a telescope only when it is near the celestial meridian; that is, on a line in the sky which passes through the zenith and the north and south points. The sidereal time at which each star will cross the meridian is known by previous calculations. Stars are selected which cross the meridian near the zenith at Washington, and the positions of which are closely known. The observer operates a micrometer apparatus which causes interruptions in an electric circuit as the star passes certain points in the field. The interruptions are recorded graphically by an instrument known as a chronograph on the same sheet with records of the standard clock ticks. By making measurements on this sheet and applying certain corrections for several errors of the telescope, it is possible to determine the time, according to the clock, when the stars cross the meridian. The difference between the times at which the stars are predicted to cross the meridian and the time at which they are observed to cross, according to the clock, indicates the error of the clock. In order to maintain a continuous record of the standard clock corrections, on every clear night, a list of stars is observed on one or more telescopes at the Naval Observatory.

Standard clocks.—The standard clocks at the Naval Observatory are rated to sidereal time. They are maintained in a vault under constant temperature and

air pressure. At present a new clock vault is under construction, which will accommodate seven clocks. These clocks are specially manufactured for precision purposes. Since it is desired to leave them undisturbed, they are never reset or interfered with in any manner, except as necessitated for repairs. The actual rates of such clocks are not important, so long as they are constant, or so long as they change slowly enough to be checked by astronomical observations. The short period variations in the rates of the present standard clocks are such that on the average the clock rates may be predicted within about a hundredth of a second per day. Until recently all the standard clocks at the Naval Observatory were made by the firm of Riefler in Germany. That firm had long enjoyed the highest reputation as a maker of precision timepieces. During the last few years considerable research has been conducted by a number of investigators with the purpose of devising improved clocks. Conspicuous among the results of this work is the Shortt clock, made by an English firm, and the quartz clocks which depend on the oscillation of quartz crystals for their time standards. As rapidly as conditions permit, the Naval Observatory is increasing its number of standard clocks, by the addition of modern equipment.

Time signals.—Although sidereal time is convenient for use in rating the standard clocks, it is not suitable for the purposes of the general public. The mechanism for the transmission of time signals is therefore rated to mean solar time. Immediately before time signals are sent out, the error of the transmission apparatus is determined by comparison with the standard clocks, and the proper corrections are made. In making the comparisons an electric chronograph is used permitting measurements to a small fraction of a second. Allowance is made for the continuously changing difference between sidereal and solar time, and also for the error of the standard clock. The transmission of signals always begins at 55 minutes 0 seconds of some hour and continues for five minutes. Signals are transmitted on every second during that time, except that there is no signal on the twenty-ninth second of any minute, nor on certain seconds at the ends of the minutes, as shown in the following:

Minute	Second										
	50	51	52	53	54	55	56	57	58	59	60
55	—		—	—	—						—
56	—	—		—	—						—
57	—	—	—		—						—
58	—	—	—	—							—
59	—										—

The dashes in the above indicate seconds on which signals are transmitted. The seconds marked "60" are the zero seconds of the following minutes. All seconds from 0 to 50, inclusive, are transmitted except the twenty-ninth second, as explained above. The dash on the beginning of the hour (shown as 59 minutes 60 seconds above) is much longer than the others. In all cases the beginnings of the dashes indicate the beginnings of the seconds, and the ends of the dashes are without significance. It will be noted that the number of dashes sounded in the group at the end of any minute indicates the number of minutes of the signal yet to be sent. During the transmission of the signal an automatic record is made at the observatory, showing the signal ticks at the observatory, the ticks of one of the standard clocks, and the signal as received by radio back from the sending station.

Signal distribution.—Effective October 1, 1931, the regular hours of time signal transmission are as follows:

Greenwich civil time	Eastern standard (seventy-fifth meridian) time
23h 55m to 0h 0m	6.55 p. m. to 7 p. m.
2 55 to 3 0	9.55 p. m. to 10 p. m.
4 55 to 5 0	11.55 p. m. to midnight.
7 55 to 8 0	2.55 a. m. to 3 a. m.
16 55 to 17 0	11.55 a. m. to noon.
20 55 to 21 0	3.55 p. m. to 4 p. m.

During the transmission of the signals the radio stations listed below are automatically controlled by the Naval Observatory transmission apparatus. In the case of Arlington and Annapolis the control is by land wire, and in the case of San Francisco the control is by radio. All frequencies are not operated on each signal, but only as shown under the heading "Hours of ending of signals."

Station	Call	Frequency	Wave length	Power	Hours of ending of signals (Greenwich civil time)
		kc	*m*	*kw*	
Navy yard, Washington; Arlington, Va.	NAA	113	2,655	5	3 8 17
		690	435	1	3 17
		4,015	74.9	1	5 8 17
		4,205	71.3	10	3 17
		8,410	35.7	10	3 8 17
		12,615	23.8	10	3 17
		16,820	17.8	15	17 21
Annapolis, Md.	NSS	17.8	16,854	350	3 5 8 17 21
		8,030	37.4	1	0
San Francisco, Calif.	NPG	42.8	7,009	100	3 8 17
		66	4,545	40	3 8 17
		108	2,778	2	3 8 17
		8,590	34.9	25	8
		12,885	23.3	5	3 17

kc=kilocycles. m=meters. kw=kilowatts.

All the frequencies listed above are continuous waves, except NAA 690 kc, which is modulated.

In case of failure to transmit the signals on any hour, or in case the transmission is garbled, an effort will be made to send them out on the hour next following. In addition to the stations listed above several naval radio stations send out time signals which are not directly controlled by the Naval Observatory. The 17.8 kc signal sent via Annapolis is very powerful, but owing to its low frequency (long wave length) special apparatus is required for its reception. The 113 kc Arlington signal is fairly strong and with a first-class receiving set may be heard in most parts of the United States. The 690 kc signal is in the radiophone broadcast band, but owing to its low power it is not satisfactory for reception, except near Washington. The high-frequency signals (4,015 kc or greater) may be received with simple short-wave equipment and may be heard at great distances. Owing to the skip distance of the higher frequencies, some of them are not receivable at points within the region of the skip, but there is practically no place where some of these frequencies may not be received. The noon signal is distributed by telegraph into almost all the cities and towns in the United States. The West-

ern Union Telegraph Co. has entered extensively into the distribution of Naval Observatory time signals on a commercial basis.

Errors of signals.—During the transmission of each signal automatic chronographic records are made at the Naval Observatory which show both the time at which the signal leaves the observatory and the time of its emission from the radio stations themselves. Since apparatus is not available to record all the frequencies on which the signal is transmitted, some of them are omitted. The 17.8 and 113 kc frequencies are recorded on all signals and in addition one or more of the high frequencies. By measuring up these records it is possible to determine the times of actual emission according to the standard clock. The corrections to the standard clock are then recomputed, using star sights both before and after the signals. These computations indicate that the average error of the time signals, as sent from Arlington, is a little less than three hundredths of a second. The 17.8 kc Annapolis signals lag approximately a couple of hundredths of a second behind Arlington, and San Francisco lags still more. Comparisons between time signals sent out by several different national observatories generally indicate errors of greater magnitude than those computed by each observatory from its own data. The cause of these discrepancies is not entirely understood. Between America and Europe there is evidently considerable variation between winter and summer, and a study of the differences between Washington and Greenwich has given some indication of connection with meteorological conditions. For the purpose of studying these questions the Naval Observatory regularly records time signals from foreign observatories.

Time-signal correction sheets.—For ordinary commercial and navigating purposes the time signals are sufficiently accurate as issued. However, there are many scientific and technical uses of the time signals which require accuracy to the hundredth of a second. Unfortunately, methods of transmitting with that degree of precision have not yet been perfected. In order to meet the needs of such work, the Naval Observatory distributes time-signal correction sheets without charge to those who request them. Two kinds of corrections are issued. The regular correction sheets give the standard mean-time corrections to all signals, as actually emitted by radio, and also the Washington local sidereal times of the signals. They also give the nutation, so that persons who so desire may convert the sidereal, or apparent equinoctial time, to mean equinoctial time. These sheets are issued to cover periods of approximately one week at a time. After the end of any period there is a delay of several days in sending out the corrections, because it is necessary to take additional star sights, to make the necessary computations, and to mimeograph and mail the sheets. In order to meet the needs of those who require more rapid service, the Naval Observatory also sends out immediate corrections. These do not give the times of the signals on an absolute basis, but only their times of emission according to one of the standard clocks. Since the standard clocks are never reset, they are generally considerably in error, and the immediate corrections are consequently useless for work requiring a knowledge of the absolute times of the signals. They are very useful, however, in work involving only rates; that is, when it is sufficient to know the time intervals between successive signals. The immediate corrections are issued three times weekly, and give data for signals up to and including those transmitted on the date of issue. In doing work requiring the use of either type of corrections, one important precaution must be observed. When tuning in the radio time signals, especially when automatic recorders are used, great care must be exercised to insure reception of the beginning of the signal on each second. Apparently the 17.8 kc Annapolis signals build up in strength each time the circuit is keyed, the process requiring several hundredths of a second. If the signals are faintly received, the recorder may operate with considerable delay. The obvious remedy is to increase the amplification, so as to insure operation at the beginning of each signal. In the case of the high-frequency or short-wave signals, a different difficulty exists. Although the signals on each second begin full strength, there is evidently a slight shift of frequency taking place each time the circuit is keyed. A sharply tuned receiver may appear to receive the signals perfectly, when, as a matter of fact, it is out of tune with the beginnings of all the signals, and consequently operating with a delay of several hundredths of a second.

Use of time signals.—The Naval Observatory time signals were first sent out in order that navigators might check their chronometers before leaving harbor. They have since become the basis of the standard time used in the United States, and are employed generally by navigators at sea in checking chronometers. The Naval Observatory has no special agreement with any telegraph company, but furnishes time signals free to all firms and individuals who provide wires for the purpose to the transmitting room. Many special uses of the signals have arisen. These include longitude determination for precise surveying and map making, and gravity determination by means of which minerals and oil are located, and geodetic questions are investigated. Radio monitoring stations use the signals in checking the frequencies of transmitting stations, while seismologists use them in coordinating earthquake records. In fact, since time is one of the dimensions of the physical universe, it is obvious that an accurate knowledge of time is generally necessary to the investigation of physical problems. The Naval Observatory is lending aid to the meeting of many of these needs, and at the same time is continuing to supply time for navigation and commerce.

SINGLETREES, DOUBLETREES, AND NECK YOKES

Simplified Practice Recommendation R134–32, covering singletrees, doubletrees, and neck yokes has been accorded the required degree of acceptance by industry, and will be considered effective as of April 1, 1932, according to official announcement made by the Bureau of Standards.

This simplification recommendation, which is concerned with sizes and types of these commodities, was proposed and formulated by industry in the latter part of 1931, in accordance with the procedure developed under the auspices of the Bureau of Standards.

SCREW-THREAD STANDARDIZATION

Program of National Screw Thread Commission Widely Adopted by Manufacturing Industry

By H. W. Bearce, *Secretary, National Screw Thread Commission*

During the past 12 years the National Screw Thread Commission (N. S. T. C.), with the full cooperation of national engineering societies and of industry, has been engaged in the standardization of screw threads. This work has necessarily carried with it a corresponding standardization of threading and gaging equipment.

It will be interesting to inquire as to the effect this standardization program has had upon those branches of industry which manufacture and use screw threads. A partial answer to this inquiry may be had from an analysis of the results of a screw-thread survey that is just now nearing completion. This survey, sponsored by the American Society of Mechanical Engineers, and supported by manufacturers and users of screw threads, has had the cooperation of the National Screw Thread Commission and the Bureau of Standards.

In an inquiry of this nature the first question would naturally be, To what extent is an attempt being made by manufacturers to produce threaded products to the standards set up by the commission? and the second question, To what extent is this attempt successful?

In answer to the first question it may be said that, of the 128 manufacturers from whom samples were collected and of whom 116 gave a direct answer to the question, 58 per cent reported that they are working 100 per cent to the N. S. T. C. standard, an "American standard," approved by the American Standards Association, 10 per cent reported that they are making from 50 to 99 per cent of their product to the N. S. T. C. standard. This leaves 32 per cent of those reporting on this question as making less than 50 per cent to the N. S. T. C. standard.

In this same group of 116 manufacturers definitely reporting on the question 20 per cent stated that they are working to the old United States standard, and 11 per cent reported that they are making from 50 to 99 per cent of their product to the United States standard.

The answer to the second question, that is, To what extent are the manufacturers' attempts successful? can be obtained only by a careful measurement of the more than 7,000 sample screws, bolts, and nuts collected from the 128 manufacturers.

From an analysis of the measurements of one size it appears that 49 per cent of the screws and bolts manufactured to comply with a given class of fit are actually equal or superior to that class, and that only about 19 per cent of those intended to be within one of the regular classes are actually not within any of the regular classes. Furthermore, it is found that 47 per cent of those supposedly made to the United States standard are actually within the limits of the N. S. T. C., class 2.

The test of nuts is not yet complete, but measurements so far made indicate that results on the nuts will not differ widely from those on the screws and bolts.

At the conclusion of the investigation a detailed report will be issued by R. E. Flanders, chairman of the sectional committee on standardization and unification of screw threads.

Some persons may be surprised or disappointed that progress in the adoption and successful production of standard screw threads has not been even more rapid. But it should be appreciated that 12 years is a relatively short time for an entire industry to progress from a condition of nonstandardization and noninterchangeability to one of complete standardization and complete interchangeability.

In this connection it must be appreciated that standardization of threading equipment, gaging equipment, and an adequate system of inspection are prerequisites of complete standardization of the product. It is too much to expect that all threading equipment—taps, dies, gages, etc.—will be scrapped in order to put into immediate production a new standard.

Such a step is neither economical nor necessary, since threading equipment tools and gages wear out with normal use and have to be replaced. The normal and economical procedure is to replace worn-out, obsolete, nonstandard equipment with standard equipment that may reasonably be expected to produce a standard product if properly used under adequate supervision.

Much progress in this work of necessary replacement has already been made. Die head and chaser manufacturers have adopted and are now turning out a complete standard line; tap and die manufacturers have materially improved the accuracy of their products; and manufacturers of threaded work are giving increased attention to threading tools and gages, and to production inspection.

There is an increasing acceptance of the fact that it is more economical to prevent the manufacture of defective material by adequate supervision of equipment, tools, and gages used in production than to reject defective material after manufacture.

In view of the advance already made toward the goal of complete standardization of screw threads it may confidently be expected that this advance will continue at an increasing rate as obsolete tools and gages are still further replaced.

BRICK PRODUCERS ADOPT NEW RULES

Included in the grading rules recently adopted by the American Face Brick Association and the Face Brick Dealers' Association, are 10 simple tests which makes it easy for the users to determine whether the brick they use are in the standard, substandard, or cull grades.

Previous to this time there have been no generally accepted methods for determining the different grades of face brick. The rules give the allowable variations from standard sizes, include provisions concerning color and state the size and number of chips permitted off the corners and edges.

SIGNIFICANCE OF GRADE-MARKING OF LUMBER IN BOSTON

By Stuart Huckins [1]

A significant forward step in the history of the lumber business was taken by the building commissioner of the city of Boston, Mass., when on December 1, 1931, he promulgated the following ruling: [2]

> On and after April 1, 1932, all lumber (beams, boards, dimensions, joists, plank, posts, etc.) used for load-carrying purposes shall bear the official grade mark of the association under whose rules the lumber was manufactured and graded, or equivalent identification acceptable to the building commissioner.

Further than this, the building commissioner has stipulated in the same bulletin the lowest grade of lumber which can be used for various construction purposes and functions.

This action is the culmination of a series of conferences between the building commissioner and representatives of local retail lumber dealers, the purpose of which is to standardize and safeguard the qualities and performance of lumber for structural use.

The rulings of the commissioner will prove of benefit to the public, to contractors, architects, lumber dealers, owners of property, and to officials charged with the responsibility of maintaining proper standards in the construction industry. The public will gain in so far as the requirement of grade marking will facilitate the administration of building code practice and procedure. It will benefit contractors and dealers in that their estimates will necessarily be predicated upon identical qualitative specifications in so far as structural lumber is concerned, for the reason that qualities and size must be shown on the plans for each building project.

These grades and sizes of course, can not be less than the minimum requirements specified in the commissioner's rulings of December 1, and through grade marking their quality will be susceptible of accurate identification on the job. Moreover, these objective limitations of quality, clearly identified by expert graders, will protect the property owner against inferior quality and safeguard the integrity of his investment.

It is probable that the progressive action of the building commissioner of Boston will be followed by other cities and towns of New England and thus become of sectional rather than of local importance. In any event, it is not unlikely that architects and builders recognizing the advantages of grad-marked lumber will require such identification for construction outside of Boston even though not required by law.

> In recognition of the requirements in the Boston building code, effective April 1, 1932, that all load-bearing members of lumber or timber shall bear the official grade mark of lumber manufacturers' associations for each species affected and in accordance with American Lumber Standards, and that grades are altered when remanufacture takes place, the Southern Pine Association has offered to extend, in cooperation with the Boston lumber dealers, its grading and grade-marking supervision over Southern yellow pine in Boston yards under the following conditions: (1) The Southern Pine Association, through an efficient inspector, will give regular monthly inspections at retail yards at least as thorough as that given at the mills subscribing to the Southern Pine Association; (2) such Southern Pine Association inspector will give competent instruction to the graders employed by the dealers, and conduct frequent examinations of their work; (3) the retail lumber dealers agree to employ such competent inspectors as meet the approval of the Southern Pine Association inspector, and abide by the rules and regulations for grading and inspecting Southern yellow pine as adopted by the Southern Pine Association; (4) whereupon the Southern Pine Association will permit the official grade marking by such retail graders with marks and methods approved by the Southern Pine Association, and bearing the standard grade names and identification marks; and (5) the Boston dealers will pay to the Southern Pine Association an amount equal to the regular subscription fee of the Southern Pine Association.

Most of the lumber hereafter purchased, except for remanufacture, by greater Boston yards will be grade marked at the mill by representatives of the regional manufacturing associations or other properly qualified associations acceptable to the building commissioner. For material now in stock not so marked, and for material hereafter remanufactured, it has been necessary to set up machinery for a local grade-marking service under adequate supervision to maintain proper standards in strict conformity to the grading rules of the regional associations.

Briefly outlined, the local grade-marking service will be under the general supervision of the Boston chapter of the Northeastern Retail Lumbermen's Association. A qualified supervisor of inspection has been selected by a committee of the association and it will be the duty of the chief inspector to instruct and examine retail yard inspectors in the standards and methods of grading lumber for structural purposes and to license applicants who qualify. Each yard inspector who passes the necessary examination will be given a license card, indorsed by the chairman of the committee and by the supervisor of inspection, and will be assigned a license number which must appear on every piece of lumber which he marks as a means of identification.

[1] The George McQuesten Co., of East Boston, Mass.; abstracted from his article in The Purchasing Agent.

[2] An announcement of this action appeared in the April, 1932, Commercial Standards Monthly, in connection with the story on the Thirty-eighth Annual Convention of the Northeastern Retail Lumbermen's Association, entitled "Grade-Marked Lumber Activities Reviewed by Lumbermen."

It will be the further duty of the chief inspector to call frequently at yards subscribing to this service for the purpose of checking up and advising upon the work of his deputized surveyors. In the event that any licensed inspector is found to be inaccurate in his grade marking, he will be warned by the supervisor and, if such errors should be found to persist, his license will be revoked by the committee in charge. As a further check, the chief inspector must qualify before the building commissioner and an inspector representing the association under whose rules the lumber was manufactured and graded, and his work thereafter will be subject to the commissioner's approval.

AMERICAN STANDARDS ASSOCIATION

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

Noise measurement.—The initiation of a project on noise measurement, under the procedure of the association, has been approved by the standards council. The Acoustical Society of America has been designated sponsor for the project. It is expected that a sectional committee to work under the procedure of the association will be organized at an early date.

Classification and designation of surface qualities.—The standards council of the association has decided that a sectional committee on classification and designation of surface qualities[1] should be organized to undertake work on a project covering this subject. The American Society of Mechanical Engineers and the Society of Automotive Engineers have been appointed sponsors for the project.

The initiation of the project is the result of a request submitted to the association by the American Society of Mechanical Engineers to have work undertaken on standard finishes of machined surfaces. The special committee to which the request was submitted for investigation and recommendation to ASA found an immediate need existing for the standardization of classification and designation of surface qualities of machined metal surfaces and ground metal surfaces. It therefore recommended that the development of standards in this field be given priority by the sectional committee to be organized. The suggestion was made, in the report, that this important division of the work might be formulated as the "classification of machined or ground surfaces according to quality of finish" and that there be developed in this respect (*a*) standards of quality of finish for machined surfaces, (*b*) standards of quality of finish for ground surfaces, (*c*) method of inspection for the quality grades standardized, and (*d*) designation of quality grades for use in specifications and on drawings.

The special committee also found that there was a decided interest on the part of certain lines of industry for standards of quality for finishes produced by fabricating processes other than machining and grinding, such as casting, rolling, drawing, forging, etc., and also for finishes produced by hand tools.

Furthermore, the special committee agreed that it was not desirable to recommend that the scope of the project be limited to quality of finishes produced on metal surfaces. In fact, the establishment of standards for the surface quality of parts made of bakelite, glass, hard rubber, etc., may also appear to be desirable.

While, therefore, the immediate need evidently mainly concerns machined and ground surfaces, the special committee recommended a formula for the general scope of the work that is wide enough to permit the sectional committee to take up the additional items referred to above, if it so desires. (A formula of scope defines the field which a sectional committee may, but not necessarily must, cover.) This general scope is worded as follows: "Classification and designation of surfaces according to quality of surface."

This wording does not tie the work to the process by which the surfaces in question have been produced, nor to the materials to which they belong, metal or otherwise.

Owing to the many and varied interests involved, the special committee also recommended that the final wording of the scope of the project be left to the sectional committee now to be organized. If the proposed scope is found to be acceptable by the sectional committee, the title of the project may accordingly, the special committee suggested, be stated as follows: "Classification and designation of surface qualities."

[1] For those interested in this subject attention is invited to Standards for Machined Surfaces, by Robert Corey Deale, of Stevenson, Jordan & Harrison, which appeared in the February, 1932, COMMERCIAL STANDARDS MONTHLY.

USE OF QUALITY LABEL IN FARM-MARKETING PROGRAM

The New England farm-marketing program during 1931 continued to show a steady and substantial growth, from the standpoint of both the number of users of the New England quality label and the number of labels used, according to the March, 1932, issue of the New England News Letter. The program is the major project of the New England Council in the field of agriculture.

There were 314 more users of the label in 1931 than in 1930, and an increase of more than two and one-quarter million in the number of labels used. There were 843 poultrymen using the New England label in 1931. Of these 843 users, 573 were marketing eggs under the label and 270 used the label in selling their turkeys. In the six New England States, 20 different farm products are subject to grades established by the department of agriculture entitling them to be marketed with the New England quality label attached.

FOSTERING STANDARDIZATION

Cooperation of the Bureau of Standards and the American Standards Association

By R. A. Martino, *Bureau of Standards*[1]

Since the United States Department of Commerce is one of the member bodies of the American Standards Association, and the Bureau of Standards is naturally interested in standardization, the bureau takes a very active part in the work of the association. The present paper is intended to give a condensed review of the cooperation of the scientific research and commercial standardization groups of the bureau in the standardization activities of various committees functioning under the procedure of the American Standards Association.

The American Standards Association was organized in 1918 to serve as the authorized clearing house through which nationally applicable standards are developed and approved. At present the membership consists of 43 national technical societies, trade associations, and departments and establishments of the Federal Government. In addition to this membership class, there is a group of sustaining members composed of associations, industrial concerns, and individual companies. There is also a group of cooperating bodies which have a direct interest in the work of the American Standards Association.

Since its organization there have come before the American Standards Association 213 projects involving one or more subjects from which there have been developed to date 200 standards approved either as American tentative or American standards.

At the present time the Bureau of Standards is responsible for the management of 17 projects, serving either as sole or joint sponsor under the rules of procedure of the ASA. In addition, it is officially represented on 84 sectional and special committees in the development of projects sponsored by other organizations.

Of the American standards thus far approved by the ASA, the bureau has participated in the development of 121 relating to many subjects in various fields of industry.

In the accompanying table are shown the total number of projects which have been submitted to the ASA for development under its rules of procedure and also the total number of standards which have been approved to date. These are listed according to the ASA system of classification which covers practically every major field of industry. The table also shows the total number of projects for which the bureau is serving as sponsor or joint sponsor, the number of ASA committees on which it is officially represented, and also the extent of cooperation in the development of American standards.

	Civil engineering	Mechanical engineering	Electrical engineering	Automotive	Transportation	Ferrous metallurgy	Nonferrous metallurgy	Chemical industry	Textile industry	Mining industry	Wood industry	Pulp and paper industry	Miscellaneous	Total
Projects under ASA procedure	36	38	43	5	10	4	14	12	5	21	4	1	20	213
Standards approved by the ASA	21	41	27	4	10	4	6	10	3	12	13	1	48	200
Bureau serving as sponsor or joint sponsor	5	1	4	3				2					2	17
Bureau representation on ASA committees	22	20	11	2	1	1	5	3	4	3	4	1	7	84
Bureau cooperation in the development of American standards	21	13	17	4	1	2	3	5	3	2	13	1	36	121

(Table compiled as of Apr. 1, 1932.)

Included among the standards in the mechanical field is the one relating to Fire-Hose Coupling Screw Thread, which was approved as an American standard by the ASA in 1925. Although not serving as one of the sponsor bodies the bureau cooperated very actively with the sectional committee in the development of the technical details and requirements because of its very close cooperation in the formulation of the National Screw Thread Commission report on which this standard is based. Since its approval this standard has been extensively promulgated and its use is constantly increasing. This is evidenced by the fact that more than 3,900 cities and towns located in 40 States and the District of Columbia have adopted it. The States of California, Maryland, Massachusetts, Oregon, and Texas have passed legislative enactments which prohibit the sale, purchase, or use of any fire-fighting apparatus which does not conform to American Standard Fire-Hose Coupling Screw Threads.

The bureau is officially represented on the sectional committee on regulations for electric wiring and apparatus in relation to fire hazard which is known as the National Electrical Code, the fifteenth revision of which was approved last year as an American standard, and issued as the 1931 edition of the original National Electrical Code, which was first published in 1897.

The Bureau of Standards served as sole sponsor for the sectional committee on the National Electrical Safety Code. This code was first approved as an American standard in 1922. The present edition was given the status of American standard in 1927. The work of developing the last edition was done by two sectional committees functioning under the sponsorship of the bureau.

This code is published by the Bureau of Standards and is designated as Handbook No. 3. In addition, the bureau has also issued a publication to serve as a companion volume to the code. This volume deals with a discussion of the rules contained in the National Electrical Safety Code and is designated as Bureau of Standards Handbook No. 4.

[1] Abstract of paper delivered before staff meeting of the Bureau of Standards on Apr. 15, 1932.

Protection of persons and property against lightning is a subject of growing importance in view of injuries to persons and damage to property which occur annually. A real effort has been made in minimizing as much as possible the dangers incident to lightning by the formulation of a safety code prepared under the auspices of the American Standards Association. The code for the protection against lightning was prepared by a sectional committee serving under the joint sponsorship of the American Institute of Electrical Engineers and the Bureau of Standards. This code, issued in 1929, comprises five parts. Parts I and II, relating to protection of persons and buildings, were approved as American standards, and Part III, dealing with protection of structures containing inflammable liquids and gases, was approved as American tentative standard by the ASA. These are included in a publication printed by the Bureau of Standards as Miscellaneous Publication No. 92. Parts IV and V, having to do with the protection of electrical circuits and equipment against lightning, were printed in booklet form (Miscellaneous Publication No. 95) by the bureau as a preliminary report of the sectional committee in 1929 and circulated for comments, criticisms, and suggestions.

During the past year there was organized under the auspices of the American Standards Association, the Electrical Standards Committee which supersedes the former Electrical Advisory Committee of the ASA. The chief function of the ESC is to coordinate all work relating to the formulation of standards of national scope affecting the electrical industry. This new committee, with some additional members, also serves as the United States National Committee of the International Electrotechnical Commission. In this connection it is the channel through which the work of ASA sectional committees is correlated with international projects in the field of the IEC. The Bureau of Standards is one of 11 groups represented on the Eelectrical Standards Committee and, as such, is entitled to one vote on all business matters coming before the committee.

The Bureau of Standards has taken a leading part in ASA work on safety codes.

For many years industry has been concerning itself with the problem of reducing accidents among employees, particularly those who are engaged in hazardous occupations.

Many of the States have established industrial accident boards or compensation commissions to adjust claims of employees and to prescribe safety rules intended for the use of industries to reduce as much as possible the hazards which are to be found in the performance of certain lines of work.

The preparation of safety rules or codes commanded its greatest attention, perhaps, during the World War. The Bureau of Standards, working in cooperation with the War and Navy Departments, proceeded to prepare several safety codes for Government use. While this work was in progress it was felt that a demand would be made by industries for the development of safety codes in their respective fields in order that their work could be carried on as expeditiously as possible and with a minimum of damage to machinery and accidents to employees. The bureau appreciated the importance of this work, particularly at that time, and so decided to call a conference of industrial and interested organizations for the purpose of preparing safety codes and rules which later might become national codes and be generally used throughout the country, thereby eliminating duplication of effort and differences which might be found in the codes adopted by various States. Such a conference was held in 1919.

At a second conference called in the same year, the American Standards Association, then known as the American Engineering Standards Committee, was requested to ask the International Association of Industrial Accident Boards and Commissions, the National Safety Council, and the Bureau of Standards to form a National Safety Code Committee. The committee was organized in 1920 and began to function under the auspices of the AESC. In 1922, this committee was reorganized as the Safety Code Correlating Committee, by which name it is known at present, and placed on a strictly representative basis. All safety projects coming before the ASA are referred to this committee for consideration and advice both at their initiation and when the completed codes are submitted for approval as American standards. The bureau is officially represented on the membership of this committee.

Since its organization there have come before the ASA 39 safety projects covering several fields of industry. From this number, 23 have already been approved either as American standards or American tentative standards. This number does not include the codes pertaining to the electrical industry which have already been reviewed.

The Bureau of Standards served or is serving as sponsor or joint sponsor for 6 sectional committees dealing with safety codes and is officially represented on 23 additional committees.

Safety-code work conducted under the auspices of the ASA in the building and construction industry shows remarkable progress and development. The Bureau of Standards, in cooperation with the American Institute of Architects and the American Society of Mechanical Engineers served as joint sponsor for the safety code for elevators, dumb-waiters, and escalators which was approved as an American standard. Through representation on ASA committees the bureau assisted in the preparation of American standard safety codes for building exits; construction work; lighting factories, mills and other work places; floor and wall openings, railings and toe boards; construction, care and use of ladders; walkway surfaces; lighting of school buildings; and window washing.

The bureau served as sponsor for the sectional committee on the safety code for logging and sawmill operations.

Such mechanical codes as relate to the use, care, and protection of abrasive wheels; protection of industrial workers in foundries; mechanical refrigeration; power presses and foot and hand presses; mechanical power transmission; forging and hot metal stamping; and rubber machinery have all been developed through sectional committees with the bureau being represented on all of them.

Safety-code work in the automotive industry has also commanded the attention of the bureau. It served as sponsor for the code relating to colors for traffic signals which was approved as an American standard in 1927, and as joint sponsor with the American Auto-

mobile Association for the safety code for brakes and brake testing approved as an American tentative standard also in 1927. In addition it is assisting in the development of other codes pertaining to automobiles and aircraft through cooperation with sectional committees dealing with such problems as aeronautical safety code and technical standards of safety for the design, construction, and testing of aircraft; laboratory tests for approval of electric headlighting devices for motor vehicles; and manual of street traffic signs, signals, and markings.

One of the first safety codes which was approved by the ASA as American standard was the National Safety Code for the Protection of the Heads and Eyes of Industrial Workers. The first edition of this code was prepared and issued in 1921 by the bureau with the helpful cooperation of an advisory committee composed of representatives of interested organizations. It was published as Bureau of Standards Handbook No. 2. Later this code was revised to conform to industrial requirements, regulations, and practices as well as to include references to more modern and scientific protective devices and equipment, and the second edition was approved as an American standard.

The Bureau of Standards has assisted materially in the formulation of codes affecting certain other industries under American Standards Association procedure. For example, it cooperated with sectional committees in the preparation of safety codes for plants operating textile machinery and equipment, woodworking plants, paper and pulp mills, and laundry machinery operations.

Several years ago the American Standards Association became a member of the International Standards Association as the representative of American industry in matters of international standardization. Several projects now before the ASA have become international in scope, one of them being the standardization of sieves for testing purposes. This project is being sponsored jointly by the American Society for Testing Materials and the Bureau of Standards functioning under ASA procedure, and corresponds to ISA project No. 24. The ASA sectional committee has designated a member of the bureau staff to serve as the American representative on the international committee.

Some of the more widely recognized Federal specifications are being submitted to the American Standards Association for consideration for approval as American standards. From time to time certain Federal specifications promulgated by the Federal Specifications Board which have received widespread approval have been submitted to the ASA, and several have already received ASA approval. The specification covering dry cells and batteries was approved as an American standard in 1930, the bureau serving as sponsor for the sectional committee. Specifications for liquid soap and putty were given the status of American tentative standards in 1930 under ASA procedure. The bureau was officially represented on the special committee which gave consideration to these specifications.

One of the first standards approved by the American Standards Association was that relating to Portland cement for which there were in existence at that time two specifications, one issued by the American Society for Testing Materials, and the other by the Federal Specifications Board, the two being identical in all respects except for the use of the two words "may" and "shall." The ASTM specification was formally approved as an American standard, and thereby the same status was given to the Federal specification, which covers the identical commodity.

One of the functions of the bureau in standardization is the service that it renders to industry in the reduction of waste through the elimination of unnecessary varieties of products, methods, or practices. By means of this cooperation, industry has, through the bureau's division of simplified practice, established simplified practice recommendations covering many lines of commodities or activities in various fields of industry.

Three simplified practice recommendations dealing with concrete materials and construction prepared under the auspices of the division of simplified practice have been submitted for ASA consideration. The Bureau of Standards served as joint sponsor with the Concrete Reinforcing Steel Institute for the ASA sectional committees on steel spiral rods for concrete reinforcement, steel reinforcing bars, and sizes of forms for concrete ribbed floor construction. Recommendations covering the first two subjects were approved as American standards. These are published by the Bureau of Standards as SPR–53 (ASA–A38) and SPR–26 (ASA–A47), respectively. The third recommendation is still before the committee pending acceptance by industry of the proposed revision.

Coincident with the work of the division of simplified practice in the elimination of waste and following somewhat in detail the procedure employed in the formulation of simplified practice recommendations, the bureau's division of trade standards is carrying on a very important activity through its cooperation with industry in the development of commercial standards for grades and standards of quality for different commodities. It frequently happens that different commercial standards in the same broad field may recommend conflicting requirements or methods of test since the procedure for the establishment of these standards provides no direct means for coordination between the various industries, except in so far as each may voluntarily accept the practices of other industries within its own broad field.

In order that this work may be more properly coordinated with similar activities being carried out in various American industries and the value of commercial standards be more generally appreciated; and in order that duplication of work and the promulgation of conflicting standards may be avoided, certain of the commercial standards, at the specific request of the industries concerned, are being submitted to the American Standards Association for approval as American standards.

At the present time there have been submitted to the ASA three commercial standards dealing with builders template hardware, foundry patterns of wood, and plain and thread plug and ring gage blanks. These have been presented for approval as American standards by representative organizations of the industries in which they apply. The Bureau of Standards is assisting these organizations in an advisory capacity with reference to matters pertaining to ASA procedure.

LABELING OF FOOD PRODUCTS

If a housewife wants to get her money's worth, she should know what labels on food containers mean. Through the educational work done by the Federal Food and Drug Administration, United States Department of Agriculture, the housewife in the smallest settlement in the country to-day can assure herself and family of the highest grade commodities by "reading the labels."

The art of pickling is one of the oldest methods of preserving food known to man. It is said that when explorers uncovered the ruins of Pompeii, destroyed in A. D. 79, they discovered pickled olives which retained, after nearly 2,000 years, their characteristic flavor. While many kinds of foods are pickled, pickles to the housewife generally means cucumbers. Cauliflower, onions, and other vegetables when properly put down in brine or vinegar are considered as pickled. The pure food law requires that pickles entering into interstate trade be labeled with quantity-of-contents statements. Some manufacturers state on their labels how many pickles there are within the container. Net-weight statements apply to the weight of pickles exclusive of brine or vinegar. Where volume statements, such as 1 pint or 1 gallon, appear, the pure food law requires that the pickles must completely fill the volume specified.

The label on a box of raisins will tell the discerning buyer more about this delicacy than the dictionary does. Coming mostly from the Mediterranean countries and California, raisins fall into a number of different classes, suited for special purposes. Clusters and seeded raisins are sold by size and the sizes are frequently indicated by the terms "Fancy" and "Choice." Two other designations frequently printed on labels to indicate relative sizes are "Extra standard," and "Sstandard." "Extra standard" raisins generally are meaty and plump and have shallow wrinkles, while raisins of the next lower grade, "Standard," tend to be more wrinkled and lean. The housewife may find upon raisin-box labels information as to the kind, variety, quantity, place of production, whether seedless or seeded, and sometimes a declaration of grade. While the pure food and drugs act does not require all this information, it does indicate that labelings be truthful. Raisin boxes are occasionally slack filled, but the label always states the quantity in the package.

All mustard products come from the three general classes of seed—white, black, and intermediate, the latter shading from yellow to brown to red. The value of mustard as a condiment depends on its content of volatile oil or other pungent principles. The official standard prohibits the presence of starch, mustard bran, or vegetable gums in prepared mustard. Tumeric is sometimes added to prepared mustard. If it is present, it will often be declared on the label. While tumeric is sometimes added to give the mustard a yellow color, it actually does not closely resemble the pure mustard color. Some mustard manufacturers make an imitation which, as a rule, according to the statement of the Federal Food and Drug Administration, contains principally mustard bran, usually with some mustard seed, and sometimes starch or gum. This has the appearance of a good prepared mustard. The food law requires that such an article be sold under a label which makes it clear that the product is an imitation, and further specifies that the ingredients of the product be declared on the label.

Many asparagus labels bear grade designations, which run all the way from "Giant," meaning asparagus of 1-inch diameter at the base, to "Tiny" asparagus under three-eighths inch in diameter. Other designations, indicating size, from largest to smallest, are "Colossal," "Mammoth," "Large," and "Medium." Color is also important, and the packers separate asparagus into lots varying in color, as light green, white, and natural, which is unbleached. Asparagus labeled salad points (tips), which range in length from 1 to 2½ inches, are packed in all sizes of cans. The diameter of the tips usually varies between that of the mammoth and small sizes. Very large and very small tips are not packed as salad points. Salad points, as a rule, bring a lower price than do asparagus tips, which are cut to a uniform length. If a buyer finds a label reading asparagus soup tips, or asparagus tips, she may expect the can to contain nothing but the tip portions. A can labeled asparagus center cuts, however, will contain no tip pieces. Products labeled merely cut asparagus or asparagus soup cuts contain both tips and center cut, or butt pieces.

The statement of the Federal Food and Drug Administration points out that it will pay to read the quantity of contents statements required by the pure food law to be printed on cans or other containers of foodstuffs. The law requires that these statements be truthful and not misleading.

STANDARDS PROPOSED FOR WOOD FIBER INSULATING BOARD

At the request of the manufacturers of wood fiber insulating board, a general conference is scheduled at the Palmer House, Chicago, for May 16, to consider the adoption of a commercial standard for this commodity. The conference will be held under the auspices of the division of trade standards of the Bureau of Standards, and a tentative specification proposed by a committee of manufacturers will be used as a basis for discussion.

The proposed standard will cover insulating building board, such as that used for sheathing, partitions, plaster base, etc., and roof insulating board. The former class is governed by requirements for thermal conductivity, moisture absorption, tensile strength, plaster adhesion, expansion, minimum thicknesses, and standard sizes, while the only requirement for roof insulating board is that of thermal conductivity.

While the standard, as proposed, refers to wood fiber insulating boards, it is recognized that other similar boards are made from bagasse, cornstalks, licorice root fibers, and other material, and the conference will be open to suggestions for broadening the scope of this project to include all fiber isulating boards.

STANDARDIZATION AS AN AID TO RETAIL MERCHANDISING

More profitable sales are induced through "eye appeal" than in any other manner. Merchandise readily accessible to the hands of the housewife is more than half sold. This philosophy of "eye appeal" has practically revolutionized retail merchandising. The heretofore odd and ill-assorted stocks of improper fixtures and equipment and variegated assortment of goods is giving way to modern standardized fixtures and equipment and higher standards of quality of the goods.

The grocery trade equipment department of the National Association of Retail Grocers has approved specifications for shelving units and service counters.

These specifications are the first of a proposed series covering the complete grocery fixture and equipment line, to be acted on by the association. As rapidly as possible other units will be considered and, as careful study is succeeded by definite conclusions, specifications will be issued. Such specifications will represent what analysis, inquiry, and study seem to recommend as the most practical for general use in the way of dimensions and construction.

No attempt will be made to dictate either to manufacturers as to what they will produce, nor will there be any dictation, coercion, or persuasion to get retail groceryman to buy any particular manufacturer's make of fixture or equipment. The important thing will be the finding of specifications and presenting them to the grocery trade. Manufacturers building equipment in accordance with these approved specifications will be permitted to state:

> Built according to specifications approved by the National Association of Retail Grocers.

These specifications will be somewhat flexible in the beginning in order that experimental study of operation may be made.

For the present and until further announcement, the National Association of Retail Grocers will apply this service only to wall shelving, service counters, display racks, floor display tables, stands, and window display equipment, taking each of these in order until all the shelving and display requirements of the retail groceryman have come under the complete program. Refrigeration, display equipment, scales, cases, utensils, and appliances will be given consideration as quickly as conditions will permit.

The National Retail Hardware Association began several years ago to attack the same situation in its field, with the result that to-day that association gives fixture equipment, store planning, and display consulting service to its members and the hardware merchants of the country.

"Manufactured in accordance with specifications approved by the National Retail Hardware Association," is now found on the more important equipment in most progressive hardware stores, according to the National Grocers' Bulletin in discussing the situation. The bulletin pointed out that there are many thousands of retail grocers now equipped with obsolete and antiquated fixtures which the pressing problem of modernizing and effective completion will soon throw into the discard.

According to the Wisconsin Retail Bulletin discussions on quality of goods featured the annual convention of the National Retail Dry Goods Association. The various speakers touched on reasons why stores should trade up on the quality of their goods, in their respective addresses to the convention.

John D. Hughes, merchandise manager of Denholm & McKay Co., Worcester, Mass., stated that cheap merchandise has been glorified entirely too much. "Skimped sizes and hidden weaknesses never made friends of customers for any store," he said "and every possible effort should be made by our buyers to discourage the manufacture of such merchandise. Specifications of size and quality should be watched more carefully than in the past. * * * Fashion is more important in the present situation than it has been in any similar period. * * * The more that stores trade up, the farther they will move in the right direction * * * away from the 'danger line in merchandise.' * * * We need a sincere 'trading up' movement * * * not an excited rush that will get us nowhere in the long run, but a common-sense, carefully planned campaign in all stores to promote the sale of better merchandise, combining quality, dependability, and fashion at a price that customers are willing to pay."

In discussing why stores must trade up, P. A. O'Connell, president of the E. T. Slattery Co., Boston, Mass., said "Quality must be good, for people can not afford to buy poor or uncertain merchandise. One of the greatest mistakes a store can make to-day is to trade down on the quality of its goods."

Paul H. Nystrom, professor of marketing at Columbia University, New York, N. Y., declared in an article in the Retail Ledger shortly after the convention, that "consumers, though forced to consider price, have not lost their interest in quality, and every piece of goods misrepresented or jerry-built for sale purposes that finds its way into consumers' hands is likely to serve as a reminder for years to come to trade elsewhere."

In his first statement as president of the National Retail Dry Goods Association, E. T. Slattery said:

> There seem to be two schools of thought as to the most practical method of meeting the pinch in net profits that is resulting from the lowered amount of sales in dollars. Some believe that the solution lies in a higher mark-up. If general conditions were favorable they doubtless would be justified in their reasoning.
>
> The other school is convinced that in view of the present trend of economic conditions, a higher mark-up would only make a further shrinkage in volume of sales and thereby defeat its purpose. In my opinion, the second group is right. With the present restricted buying power of consumers, the great need is for lower distribution costs, and the retail merchant who can do most to reduce the cost of distribution and at the same time give the quality of merchandising and service that people need is the one who will make the most headway during the coming period. I might add also that supplying only the quality of merchandise which people need is one of the surest ways to cut distribution costs.

AMERICAN SOCIETY FOR TESTING MATERIALS

The following current information concerning developments in standardization projects under the auspices and procedure of the American Society for Testing Materials, has been furnished by that society:

Masonry cement.—The society has approved tentative specifications and tests for masonry cement. These specifications are, with certain modifications, the same as the present Federal specifications for masonry cement. In view of the extended use of this material and the many types on the market at the present time, there has been a need for a standard embodying specifications and accepted tests, and it is believed that the publication of the proposed standard as tentative will accelerate interest in improving the methods of testing this material.

Viscosity temperature chart.—The new viscosity temperature chart has been adopted as tentative standard. For many years it has been necessary to know the viscosity of various petroleum liquids, conspicuously lubricating oils, at the varying temperatures of use. The determination of viscosity requires considerable time. By determining the Saybolt viscosity (ASTM method D88–30), at two temperatures, it is possible to calculate the viscosity at any intermediate temperature, but the calculations involved are very laborious. During the last 10 years, various individuals have prepared graphic charts with ruling so made that a straight line drawn through two determined viscosity-temperature points will indicate intermediate viscosities and, within reason, viscosities outside the range of measurement may be obtained by extrapolation. There have been in use at least seven such charts, differing from each other in size, method of ruling, and system of units. The resulting discrepancies were sometimes serious. For the sake of accuracy, as well as uniformity, a real need for a standard chart became apparent, particularly to automotive engineers studying the series of problems presented by new automotive design, such as free wheeling, hypoid gears, etc.

Creosote.—Certain creosote tables will be presented to the society's annual meeting, to be held in June at Atlantic City, with a recommendation that they be accepted as a tentative standard. In 1927 a joint committee was set up composed of representatives of the society's committee on timber and representatives of the committee on wood preservation and preservatives of the American Railway Engineering Association and the American Wood Preservers' Association. The objective of this joint committee was to provide standard tables for correcting the volume of creosote when observed at various temperatures in and above the atmospheric range, and for correction of specific gravity in a similar temperature range. It was known that the correction factor commonly in use in the wood preserving industry was not accurate, nor was there any general agreement on the correction factor or method of using it. The Bureau of Standards having published about that time correction tables for petroleum in cooperation with the American petroleum industry, it was decided to approach it with the view to having it make the necessary density determinations leading to the preparation of tables for creosote. The creosote tables were published in 1928 and 1929. Following this, the same committee obtained the cooperation of the Bureau of Standards in preparing additional tables for mixtures of creosote and coal tar commonly used the Bureau of Standards in preparing additional tables include corrections in parallel columns for three commodities, namely, creosote, creosote coal-tar solution and coal tar. There can be doubt that the tables will be universally recognized and used throughout the wood preservation industry and the importance of this matter to the industry may be judged by the statement that the annual use of creosote exceeds 200,000,000 gallons. Temperature correction enters into every transaction concerning the sale of creosote and its daily use at the treating plants.

Fire tests.—The society's committee on fire tests for materials and construction, as an outcome of extended discussion at its meeting held in New York on March 17, has decided to organize new subcommittees to prepare, for the consideration of the main committee, specifications for fire tests of acoustical and similar finishes and for scaffolding. Reports from the subcommittees of the committee indicate marked progress in the development of the fire test specifications that are under consideration. These are proposed tests for treated lumber, and tests for doors for use on interior wall openings. One of the subcommittees has been assigned to review the comments and criticisms that have been received relating to the present tentative specifications for fire tests of building construction and materials. As soon as a digest of these criticisms is prepared, the specifications will be critically reviewed, and it is hoped that soon thereafter they may be proposed to the society for adoption as standard. At the meeting of March 17 the need for a subcommittee on nomenclature and definitions was made apparent, and it is quite probable that such a committee will soon be appointed.

BRITISH STANDARDS FOR AIR RECEIVERS

Users of receivers and bottles for compressed air will be directly interested in three new British standard specifications for air receivers which have been issued by the British Standards Institution.

The first of these refers to forge-welded steel air receivers, the second to riveted-steel air receivers, and the third to solid-drawn steel air receivers. Each specification provides for the quality of material used, the method of construction, formulas for the determination of plate and end thickness, and requirements for workmanship and testing.

The specification for forge-welded air receivers also lays down details as to the methods of making forge-welded joints, for attaching the ends and also for inlet and outlet connections, and the riveted air-receiver specification states the requirements for efficiencies of joints, thicknesses of butt straps, methods of riveting, and the staying of end plates.

INDUSTRIAL STANDARDIZATION AND MOBILIZATION

Plans of the War Department in Connection with Future Industrial Mobilization Provide for the Fullest Utilization of Commercial Standardization

By S. F. Tillman

In developing plans for war-time procurement the War Department has been most alert to, and in step with, the modern industrial trend toward simplification and standardization. In any mobilization of major scale the War Department will use vast quantities of what may be termed strictly commercial items.

To supply a large army will call for the most complete cooperation between the Army and industry. The best cooperation can only be maintained by a mutual understanding of each other's problems on the part of the War Department and industry. This is now being studied by carefully selected officers of the Army who are assigned to duty in the office of the Assistant Secretary of War. One of the major functions of this group is to keep abreast of what industry and the various technical and trade associations are doing to further the principles of simplification and standardization, since such activities will be reflected in war-time procurement.

The plans for the mobilization of the Nation's industries will not be executed by the War Department. This will be the responsibility of a super agency, consisting of civilians operating directly under the President. This organization will be fashioned somewhat along the lines of the War Industries Board existent during the World War. Through this organization the President will be enabled to exercise the leadership necessary to carry the country through the industrial emergencies occasioned by war.

While this civilian group will be responsible for industrial mobilization in case of war, the advanced planning is being done by the War Department. The task of the Army in peace time is to estimate carefully the amount and kinds of supplies and munitions needed in time of war, and to tentatively allocate the necessary manufacturing facilities, thus eliminating the confusion and mistakes experienced in the World War.

The War Department's interest in standardization is not a post war development. Fundamentally speaking, the Army was a pioneer in this field. The science of interchangeable manufacture that has revolutionized industry began in this country in 1798 with the filling of a contract for 10,000 muskets. In 1812 interchangeability had become a normal contract specification of the War Department.

In regard to standardization, one example will serve to point out what the War Department is doing in this field. Radio sets are designed for particular uses and must therefore have varying characteristics. Many components, such as batteries, tubes, antennas, and in some cases even the receiver or transmitter are used in more than a single type of set. This insures mass production of most of the components and specialized production on only a comparatively small number of the components.

But what part is standardization playing in the current procurement studies of the War Department? The Army has recognized the practical wisdom of fitting in, so far as possible, with the commercial practices and its specifications are prepared with this objective in view. Recent application of quality standards to familiar articles of commerce has greatly stimulated interest in the establishment of standards. The average buyer, whether acting for the War Department, a large corporation, a department store, or a single family, is confronted with a bewildering variety of product, prevalent propaganda, clever claims, glittering guaranties, salient sales talks, and adulant advertising, which are difficult to evaluate. How can he compare quality or value with any degree of safety or assurance? The answer is, obviously, by purchasing on nationally recognized specifications.

A specification or standard is a clear and accurate description of a material, article, or service, which is to be procured, and the procedure which the purchaser will follow to satisfy himself that the requirements of the specifications have been complied with. As it is impossible to foresee, classify, and cover with detailed and fixed instructions, every condition under which purchases may be necessary, so it is impossible to prepare a specification from which there may be no variance. It is not the purpose of specifications to unnecessarily restrict purchasing officers, or to deprive them of such discretion in purchasing as special conditions and good business judgment may dictate.

Army purchases are made on specifications. The supervision of the preparation of such is vested in the Assistant Secretary of War. If a complicated specification is promulgated the steady flow of finished items in time of need will be seriously impaired. Hence the desire of the War Department to adopt commercial standards and methods of test whenever possible. Army specifications are based on nationally recognized industrial practices. Where a Federal specification is existent for the item to be procured, that specification is followed. Thus in drafting Army specifications for which there exists either a Federal specification or a nationally recognized commercial standard, it will not be necessary to repeat all technical data contained in an existent specification. It will suffice to refer by name to the existing specification or method of test to be followed.

What will be the gains to the War Department in following this procedure? It must be remembered that after the national emergency calling for mobilization of industry exists, time required to procure supplies and equipment will be precious. Production of needed items must keep pace with the tempo of mobilization of man power. Hence, any savings that can be made in the time required for deliveries will mean just that much more contributed to the ultimate conclusion of the emergency.

Through having the War Department follow generally recognized commercial practices, the manufacturers will be able to make longer runs on production with less frequent change of machines and will be able to increase the rate of production of the individual workers; they will be able to improve and simplify the inspections required, and at the same time keep to a minimum the need for more manufacturing equipment.

To the War Department this will mean greater confidence and assurance of quality and quantity, as well as insuring easy replacement of needed parts; increase of production of standardized items will permit a decrease of the delivery time required for the finished items, as well as storage space and handling requirements.

Thus, in no small degree is the ultimate success of the War Department's procurement plans contingent on commercial standardization.

APPROVAL OF COMMERCIAL STANDARDS AS AMERICAN STANDARDS

Commercial standards are developed by individual industries to serve as a nationally-acceptable basis for marketing their individual commodities in order that the producer may have a basis for certification of quality and that the distributor and consumer may both have a definite basis for justifying complaint on unsatisfactory material.

It frequently occurs that different commercial standards in the same broad field may recommend conflicting nomenclature, requirements, or methods of test since the procedure for the establishment of these standards provides no direct means for coordination between the various industries, except in so far as each may voluntarily accept the practices of other industries within its own broad field, such as, for example, textiles.

The American Standards Association, organized in 1918, has as one of its most important functions the duty of coordinating standards so as to avoid conflict and to determine the status of such standards in relation to the entire field of standardization. In order that each individual standard may assume its proper place in the broader structure of standardization for all industries, it is desirable that any conflicts or discrepancies be discovered and remedied as far as practicable.

At present the association is a federation of 43 national technical societies, trade associations, and departments and establishments of the Federal Government. Actions with respect to the formulation of rules for the determination of status of standards are governed by a standards council consisting of representatives of all the member bodies. To this standards council is intrusted the duty of approving standards which are to be known as "American standards."

In order that the work on commercial standards may be properly coordinated with other standardization activities being carried out in various American industries and their value be more generally appreciated, and in order that duplication of work and the promulgation of conflicting standards may be avoided, certain of the commercial standards, at the specific request of the industries concerned, are being submitted to the American Standards Association for approval as American Standards.

Each industry should, of course, determine for itself whether its standards should be submitted to the American Standards Association for this coordination process and in the event it desires to do so, some trade association or technical society should be ready to stand as sponsor for the project before the ASA. In the event the industry desires to have a given commercial standard submitted for approval as an American standard and has no organized group which may properly assume sponsorship, the Bureau of Standards will, on request, serve as sponsor for such project.

CERTIFYING THE ELECTRIC LAYOUT

A plan has been developed by the Western Massachusetts Electric Light & Power Cos. by which the group recommends for every set of house plans brought to its attention, a wiring layout adapted to the particular house, according to an account appearing in the Electrical World.

On acceptance by the builder the company concerned certifies that the house has passed its requirements. As a result builders are said to be able to sell such houses more rapidly than less modern ones and to obtain better prices for them. Where, in addition to other features, a complete electric kitchen is provided, the company certifies the electrical completeness of the home. Under these plans the usual installation of wiring and outlets exceeds the "red seal" standard of the Society for Electrical Developments.

CHANGES IN MARKING CANNED GOODS

Certain changes in the marking of foods by canners to designate quality and in the size and type of border used in such markings were suggested on April 14 at a meeting of the Department of Agriculture in Washington. This meeting was called to consider proposed changes in regulations under the McNary-Mapes amendment to the Federal food and drugs act, according to the announcement of the Department of Agriculture.

The advisability of changing the substandard legend required to be printed upon the labels of all foods that fall below the quality prescribed by the Secretary of Agriculture also was discussed.

The morning session of the April 14 meeting was devoted largely to a consideration of proposed changes in the substandard legend, "Below U. S. Standard—Low Quality But Not Illegal," required by the amendment to be printed upon the labels of all foods that fall below the standards prescribed by the Secretary of Agriculture. Representatives of canning companies and associations and of consumer groups discussed the advisability of changing the substandard legend so as to read "Below U. S. Standard—Good Food, Not High Grade."

The conference also considered the desirability of reducing the size of type and border used in the printing of the legend, the consensus of opinion of those present being that sizes should be reduced somewhat.

ART OF COMMUNICATION

Standard Communication Promotes Human Progress

By H. D. Hubbard, *Bureau of Standards*

Standardized communication promotes human progress. Each has unique needs to add to the catalogue of human desires. Each has unique ways to meet such desires. Communication links need and means. At the ends of each line of communication are the sender and receiver—a general to his army, a newspaper to its readers, a radio broadcast to the world, or a chat between two children. Contacting the two is the art of communication. Between them vast standard systems of sending and receiving assure adequacy, accuracy, speed, convenience, economy, and they are fast becoming automatic.

Written word is sent by mail, pigeons, printing, telegraph, wire, or radio. Spoken word goes direct by wire or radio across continents and oceans. Code signals with conventional meanings are primitively sent by drums, click of stones under water, beacon fires, smoke pulses, flags, devices without end.

Language is a standard convention of symbols written, spoken, or performed by gesture (Indian sign language and deaf-mute manuals). The art of printing is the multiplier and broadcaster of language in ink patterns called alphabets. Literature is the capital and equipment and contents of such broadcasts.

Communication is the bridge between minds or between nature and man. Waves of air and ether tell us all we know of the universe about us. Incoming starlight is a continuous message of events among the stars. Each atom formed in interstellar space sends a quantum of radiation, reporting the fact. Star light messages en route millions of years reach the eye or the camera to be deciphered by prism or grating.

We use ether waves wherever light or radio serves us, for the two differ only in wave length. Patterned grooves on a disk become automatic transmitters. Photographic film is the automatic recorder and reproducer of incoming messages from a source. Patterned light point pulses of ever varying size are the essential of television.

Communication is a bridge to and from the minds of men built on such air or ether waves. Air waves which impinge on the ear meet tuned response mechanism. Such air waves are evoked by the thud of the jungle drum, the clang of the gong, the stroke of the cathedral carillon calling to prayer; by a thousand means of causing bodies to vibrate.

Standardization is essential because the messages communicated must reach millions and be correctly interpreted. Hence, telephone equipment is standardized for both transmission and reception. The standard highway stop light is an example of one way communication. But recent developments permit the car to turn the light to the cross traffic by photo-electric cell or mechanical leverage. The red becomes an automatic broadcast 24 hours a day safeguarding the lives of motorists at every crossroad.

The flow of information through countless channels of communication makes the world aware of its events everywhere. It quickens our racial life and enriches it. Day and night the continuous flow of the news; the epic of progress. Communication is essentially a convention, which in itself means a standardized language to the extent that it is intelligible to all. Progress in the means of communication, therefore, directly speeds up human progress by perfecting the means.

In unnumbered ways communication makes safe the travel of the world, makes wiser its people, integrates its interests and concerns, develops a racial consciousness not unlike in principle the central nervous system of man, but on a racial scale. As transport carries the means of subsistence and enterprises, so communication carries facts and ideas from each to all and all to each. It is the vast vehicle of the mental and spiritual life of the world. In our own day it has developed so that its messages travel with the speed of light to the ends of the earth continuously, with speech, signals, music, and song to inform, entertain, educate, and to coordinate and unify the thoughts and ideals of the human race. Communication is the art which gathers and distributes and accumulates the racial heritage of knowledge and its mechanisms are becoming standardized and thus perfected for the purposes they serve.

IOWA REVISES SPECIFICATIONS FOR BRIDGES AND CULVERTS

Special provision of the bridge and culvert specifications issued by the Iowa State highway commission under date of November 16, 1931, have been still further revised and the latest requirements became effective March 29, 1932.

Contractors who have been using hour-glass devices, some of them fashioned from superimposed milk bottles, and all other similar arrangements for measuring the mixing time, will be obliged under the new wording of the special provision to secure accurate mechanical timing equipment.

The provision now provides that "the minimum mixing time shall be indicated by an accurate timing device which shall be automatically started by the mixer and which shall indicate by a clearly audible signal the expiration of the required mixing period."

It is anticipated that rigid enforcement of the requirement of scales for proportioning aggregates by weight will necessitate the purchase of more modern and accurate scales than are now in use on a number of jobs. The specifications provides that the scales shall be of simple, rugged design manufactured by an established manufacturer of weighing equipment and recommended by the maker for the kind of service for which they are to be used. It is said that the last phrase of this specification will bar many of the scales previously employed.

SAFETY ON THE HIGHWAY

Standardized Signs and Signals Promote Highway Safety

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

Much of the traffic in the streets of any city is not local, but interurban, interstate, or possibly of still more distant origin. If vehicle operators are to be expected to comport themselves in conformity with local regulations and practices, those regulations and customs should be substantially uniform in all municipalities.

Modern control and regulation of street traffic, to be efficient, involves the use of such mechanical helps as traffic signals, signs, and pavement markings. The use of such devices has been developing rapidly in recent years. City traffic has become so complicated and restrictions have become so numerous that it is necessary for drivers of vehicles to receive an almost continuous series of instructions not to violate regulations and thus interfere with the use of the streets by others.

The necessity of controlling traffic at intersections was first met by stationing a traffic officer personally to direct the movements of vehicles. To perform this function more easily he was provided with mechanical semaphore signals operated manually to stop traffic alternately upon the two intersecting thoroughfares. For use after nightfall, such apparatus was provided with lanterns of some type, the color of the light carrying the intended message. The desirability of coordinating form, color, number, and lettering in giving signals to an indiscriminate succession of drivers, who may include the illiterate, the deaf, and the color-blind, is obvious.

Traffic signal lights.—The value of the automatic signal at street intersections has been sometimes questioned, and its installation should always be preceded by a traffic survey which will indicate the type of control which may be necessary. Such signals have undoubtedly been installed at places where their presence was a nuisance and where the volume of traffic was not sufficient to warrant their use. In many places they have been of great value in avoiding confusion and accidents and in releasing traffic officers for use elsewhere. Whether their application expedites traffic will depend entirely upon the local conditions.

Where such signals are installed their choice should conform with general standards which have been based upon wide experience and a consideration of all phases of the subject, so that they will be so far as possible uniform with the practice in other cities, and thus cause as little confusion as may be to the visiting driver. For instance, there was at one time some discrepancy in the use of colors for this purpose, but this has been largely eliminated since the standard of the American Standards Association on this subject was drawn up and published. The standard practice here is the same as upon the railroads and uses green to indicate "Go," red to indicate "Stop," and yellow or amber to indicate "Caution."

The National Conference on Street and Highway Safety adopted a manual on Street Traffic Signs, Signals and Markings, prepared by a committee of the American Engineering Council. The conference included such organizations as the American Automobile Association, American Electric Railway Association, American Mutual Alliance, American Railway Association, Chamber of Commerce of the United States, National Association of Taxicab Owners, National Automobile Chamber of Commerce, National Bureau of Casualty and Surety Underwriters, National Research Council, and the National Safety Council. The standards of this manual conform to the above indications of color and recognize both a 3-color system and a 2-color system. The latter makes use of only red and green. It has been widely applied in cities in the States of California and New York especially, and many cities in other parts of the country. When three colors are used this standard recommends that yellow be shown only after green and not after red.

It is established standard practice not to permit the turning of corners on a red signal. Both right-hand turns and left-hand turns are made on green except under unusual circumstances, where it has been found necessary to install a special signal for the turning movement.

Control of lights.—Various methods of control of traffic lights have been utilized in different cities. In some cases each intersection is individually controlled without reference to what is being done at other intersections. In other cases the controls of various intersections are synchronized so as to permit, for example, all north and south traffic to move at one time and all east and west traffic at another. In the progressive system it is planned that a vehicle traveling at a definite speed will be able to proceed along a given street so as always to encounter a green signal. Such a system, by avoiding stoppages, expedites traffic and, under the conditions where it is applicable, has usually proved more satisfactory than the systems previously mentioned. A coordinated system permits the progressive scheme to be applied to an entire system of streets, with the color intervals at each intersection varied to suit the particular needs of that intersection.

Cautionary luminous signals.—Luminous cautionary signals may be either fixed or flashing lights. Fixed lights should always be yellow in color, and flashing lights should be yellow except where the flashing light is intended to have the meaning of a stop sign; that is, to indicate "Stop" and then "Go." In this case the flashing light may be red.

Nonluminous signs.—The Joint Board on Interstate Highways worked out a system of painted sign which has many meritorious features and which has been accepted by the American Association of State Highway Officials.

This system has been largely applied upon State highways throughout the country and especially upon those receiving Federal aid. The signs are applicable also for municipal purposes in reduced sizes. Three fundamental feature of these signs are shape, color, and lettering. They have been included in the manual adopted by the National Conference on Street and

Highway Safety. The use of symbols in place of, or in addition to, lettering is very desirable when simple symbols can be used whose meaning is obvious.

Shape of signs.—Rectangular signs are used to carry directions, information, and restrictions.

Square signs are used to indicate a condition requiring caution that is not inherent in the road itself, but due to conditions which may be intermittent and which arise from the presence of cross roads, buildings, or other objects.

The circular sign is used as an advance warning of approach to a railroad grade crossing.

Diamond signs are used to indicate a condition requiring caution and restricted speed which is inherent in the road itself.

Octagonal signs are used to indicate that stop is necessary.

A sign in the shape of a shield is used as a through-route marker.

Color of signs.—All directional, informational, and restrictive signs, including route markers, carry black lettering on a white background.

All cautionary signs carry black lettering upon a yellow background.

The stop sign consists of red letters upon a yellow background.

Reflecting signs.—A definite field of usefulness appears to be open to the reflecting sign; that is, one which carries plain or colored glass button inserts which reflect the light from automobile headlamps to the automobile driver. This glass may be yellow or red to convey the message indicated by those colors, or white glass in the form of lettering may be mounted on a sign which is painted to give a background of the appropriate color. For example, one form of such a sign reflects the letters "Stop" from a sign with red background. In another form the body of the sign consists of red reflective glass, no wording being applied.

Safety zones.—Safety zones which are only indicated by pavement markings are sometimes difficult to perceive at night; and to be entirely safe it seems necessary to use a raised platform with appropriate illumination and cautionary lights. These lights in the accepted scheme are yellow, not red, and there should be at least two lamps used, so that a single burn-out of a lamp will not leave the obstruction in darkness. This statement is also applicable to the mushroom buttons, where they are used.

INTERNATIONAL MEETING OF SECRETARIES OF STANDARDIZING AGENCIES PLANNED FOR MAY AND JUNE OF THIS YEAR

The American Standards Association, as a member body of the International Standards Association, has been informed that the next conference of secretaries of national standardizing bodies and a series of meetings on technical subjects will be held in Milan, Italy, from May 30 to June 8, 1932.

Included in the list of technical discussions to come before the meeting are the following: Center heights of shafts, specifications for iron and steel, shaft ends and shafting keys, testing sieves, ball and roller bearings, fluid meters, preferred numbers, cutting tools (more particularly twist drills), widths across flats of bolt heads and nuts, aeronautics, automobile parts, and agricultural machines.

The prime purpose of international cooperation is the promotion of uniformity among national standards in the general industrial field where this appears feasible and desirable. It also acts as a medium for the systematic exchange of information on standardization accomplished or in the course of development in the various countries affiliated. The American Standards Association exchanges information with other national bodies regarding new projects, draft standards and revision of those already in existence.

NORWAY'S STANDARDIZATION REPORT FOR 1931 ISSUED BY ASSOCIATION

Norway's Standardization Association has issued its report for 1931, the outstanding points of which relate to new plans of organization, finances, and program of work, according to information received from United States Trade Commissioner Gudrun Carlson, at Oslo, Norway.

The original committee to study standardization, appointed on October 5, 1923, was reorganized on April 13, 1931, and now operates as an association under the name of Norges Standardisering Forbund. The new group is composed of members representing the same institutions or concerns who were represented in the first committee, and by new members who may be voted in according to the regulations approved for the association. The members elect a board under whose control the office of the association functions. The actual work on standardization is to be carried on as in the past, by committees selected according to the subject to be undertaken.

In connection with the standardization work, the Norway Industrial Association and the Norwegian Engineers Society on February 24, 1932, began a series of lectures and discussions, which were supplemented by visits to local plants and factories. These lectures have been well received by the various interested groups.

TEXTILE AWARDS TO ENCOURAGE RESEARCH WORK

Awards of 16 research fellowships and 4 scholarships to promote scientific knowledge and advancement in the textile industries has been announced by the Textile Foundation. This foundation, of which the Secretaries of Commerce and Agriculture are members, was established about two years ago by Congress to foster research looking to the improvement of the textile industry. It is the custodian of funds which accrued from the marketing of German dyes during the World War, and which were earmarked at that time for the purpose for which they are now being used.

"Not only will the research develop a new reservoir of scientific knowledge and talent," it is pointed out, "but it will also advance the possibility of finding significant new developments."

The broad purpose impulsing this far-reaching program is to build up and develop a body of research-

trained individuals who, although engaged in scientific fields, will at the same time be working and thinking in terms of textile fiber and material development. Producers and manufacturers have a growing appreciation of the indispensible partnership between research and the ever-changing technique of production, and will welcome this new reservoir of scientific knowledge and talent. Then again, it is possible that during the course of the contemplated studies something quite new may be developed having implications of tremendous significance.

The Textile Foundation, with headquarters in Washington, D. C., began its operations in the fall of 1930, and was created to engage in scientific and economic research for the benefit and development of the textile industry, including the production of raw materials.

DIAMOND CORE-DRILL FITTINGS

In accordance with recommendations of the standing committee, composed of recognized producers and users of diamond core-drill fittings, appointed by the general conference of May 27, 1929, the Department of Commerce has submitted for approval of the industry a proposed revision of Commercial Standard CS17–30, Diamond Core-Drill Fittings.

The proposed revision is based upon new tolerances adopted by the Diamond Core Drill Manufacturers Association in order to provide for interchangeability of mating parts.

In general, the changes constitute minor refinements which have developed as a result of experience with the standards and which do not change the important nominal dimensions.

Copies of this proposed revision may be obtained, without charge, from the division of trade standards, Bureau of Standards, Washington, D. C.

IDENTIFICATION OF SIMPLIFIED LINES IN TRADE PUBLICATIONS

All of the manufacturers of clay tiles for floors and walls who have accepted the simplified practice recommendation for this commodity, have expressed their intention to identify the simplified lines in their new catalogues and trade lists, according to information received by the Bureau of Standards.

This procedure is designed to assist users of clay tiles for floors and walls in maintaining close adherence to the waste elimination program, as developed by industry under the auspices and procedure of the Bureau of Standards. Coöperation by architects, engineers, contractors, purchasing agents, and other users greatly increases the benefits and economies possible through simplified practice. The clay-tile industry is the second to record a 100 per cent identification in catalogues.

The National Association of Purchasing Agents, the American Institute of Architects, the Associated General Contractors of America, the National Electric Light Association, the American Gas Association, the American Home Economics Association, the Purchases and Stores Division of the American Railway Association, the National Retail Dry Goods Association, and other representative users of simplified commodities have for some time strongly urged that such a policy be adopted by manufacturers. When the simplified items are so identified in trade literature, their selection can be made without difficulty, and often much waste now incurred in checking files and auxiliary records for this information is eliminated.

HOSPITAL RUBBER SHEETING

Industry has accepted a recommended commercial standard for hospital rubber sheeting, to become effective June 1, 1932.

This specification was drafted by the American Hospital Association in cooperation with the Rubber Manufacturers Association and circulated on February 4. Rubber content, tensile strength, and dimensional requirements are covered, as well as labeling and certification to buyers. It follows very closely the Federal specification for this commodity, and conformance will require no change in manufacturing methods on the part of those producers who are supplying the Federal Government.

PUBLICATIONS AVAILABLE ON ELECTRICAL STANDARDS

Two publications recently issued by the Underwriters' Laboratories relate to standards for Edison base lamp holders and attachment plugs and receptacles. The announcement of these publications discloses the fact that formal standards are now available for these long-established classifications, although requirements in other forms have existed for a long time.

In the case of lamp holders in particular, which have been known for many years as sockets and receptacles, the devices are some of the very oldest which are known to the electrical industry—dating back to Edison's introduction of the incandescent electric lamp. Attachment plugs and receptacles, commonly known also as caps and convenience outlets, are of much more recent development, although they have been recognized by the National Electrical Code and by the Underwriters' Laboratories for many years.

The standard for Edison base lamp holders has been built up around the modern product, although it contains many items relating to long-established practice in the manufacture of these devices. The earlier requirements for the construction and test of lamp holders were included in the National Electrical Code, but these were discontinued in detail after the edition of 1915. The present standard is based to a large extent upon the requirements of the National Electrical Code, but has been amplified and extended to include features of current production. The standard includes sections on definitions, materials, inclosures, linings, interiors, assembly, special features, rating, performance, and marking. Among the newer features are test requirements for lamp holder linings and pull and tortion tests for screw shells.

The standard for attachment plugs and receptacles follows the general form and arrangement of the lamp holder standard and includes sections on definitions, general requirements, attachment plugs, cord connectors, receptacles, current taps, overload tests, rating, and marking. Among the newer features are definite requirements for the identification of terminals in the case of polarized devices, and requirements for moulded rubber attachment plugs.

Each of these standards contains a brief section describing the laboratories' reexamination service under which devices in both classifications are listed.

KNIT-UNDERWEAR STANDARD PUBLISHED BY BUREAU

The commercial standard for knit underwear, exclusive of rayon, just published by the Bureau of Standards, represents the combined efforts of manufacturers, distributors, and users of knit underwear to establish satisfactory measurements for this commodity.

The specifications and measurements embraced in this pamphlet cover the method of measuring and measurements for boys' flat knit and ribbed drawers, flat knit athletic and ribbed union suits, flat knit athletic shirts, children's flat knit and ribbed union suits, flat and ribbed knit cotton pants, sleeping garments, and vests; infants' bands and double-breasted or button front shirts; men's drawers, flat and ribbed knit athletic, polo, and pullover shirts, fleece ribbed and flat knit union suits; women's knee length ribbed drawers, ribbed union suits, ribbed cotton shaped vests and shoulder straps; box sizes; methods of washing wool and wool-cotton knit underwear; and a recommended system whereby the number of single yarn can be recognized by the color of the cone.

The standard further includes a list of official acceptors, a condensed report of the general conference, and the membership of the standing committee appointed to review suggestions and effect a devision of the standard when necessary to keep it abreast with progress of the industry.

The chief purpose in establishing the commercial standard is to provide standard measurements and methods of measuring that represent the mutual understanding of the entire industry; that will be sufficiently broad and clear to insure the manufacturer the necessary data for producing any garment that he may be called upon to make, and that will provide the retailer or user with a basis on which to purchase.

Copies of this standard may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 15 cents each.

TRUTH IN BEEF THROUGH GRADING AND STAMPING

The "truth-in-beef" movement is growing, the U. S. Department of Agriculture reports. From July to December, 1931, representatives of the department graded and stamped 80,381,045 pounds of beef, or an increase of 46,190,568 pounds as compared with the same period in 1930. In January this year, 13,642,303 pounds of beef were graded and stamped, which is 71.4 per cent more than the quantity thus certified in January, 1931.

The greatest gains in January were made in Chicago, Detroit, Buffalo, Kansas City, St. Louis, Washington, Philadelphia, and New York, where an increasing number of consumers are demanding of retailers the authoritative certification of their beef for quality. The department reports that with Government beef graders stationed at Boston, New York, Philadelphia, Washington, Buffalo, Erie, Detroit, Chicago, Sioux City, Omaha, Kansas City, St. Louis, and National Stock Yards, Government graded and stamped beef is available on demand through local meat distributors to practically every retail meat dealer east of the Rocky Mountains.

The department has developed a new roller stamp, much smaller in size than the one formerly used, for use by all official graders in impressing upon the beef the official designation of quality. The sides of beef are stamped in such manner that the U. S. grade appears on each retail cut. The service is aimed also at improving the economic position of the livestock industry through stimulating a demand for high quality products. Many packers who consistently use the department's service declare that it has opened up to them larger selling areas where they were formerly unable to compete satisfactorily with established beef-selling agencies.

SIMPLIFICATION OF FLAX AND HEMP TWINE BEFORE INDUSTRY FOR ACCEPTANCE

The simplified practice recommendation covering flax and hemp twine has been mailed by the Bureau of Standards to all interests in the industry for their consideration and written approval.

The recommendation provides for numbers, ply, yardage, put-ups, and constructions of fine finished and fine unfinished hemp twine, and fine unfinished flax twine. A standing committee to sponsor the recommendation composed of representatives of all elements in the industry, was authorized by the general conference that approved the proposed recommendation.

The recommendation will become effective one month following the announcement by the Bureau of Standards that the required degree of support has been received.

CONCRETE BUILDING UNITS

The proposed revision of Simplified Practice Recommendation No. 32, covering concrete building units, has been mailed by the Bureau of Standards to all interests in the industry for their consideration and written approval.

The revised recommendation, which is concerned with the width, height, and length of concrete block, tile, and brick, was formulated by the standing committee of the industry at a recent meeting. It is at the request of the committee that the revised draft has been circulated for approval.

The revised recommendation will be effective one month following the formal announcement on the part of the Bureau of Standards that the required degree of acceptance has been received.

HARD FIBER TWINES

The required degree of acceptance has been accorded the revised Simplified Practice Recommendation R92–32, entitled "Hard Fiber Twines," and it is to be considered as in effect as of May 10, 1932, the Bureau of Standards announced on April 21.

The recommendation provides for nomenclature, ply, number of feet per pound, tensile strength, and put-ups of classes 1 and 2, laid and twisted hard fiber twines (ply and yarn goods) including lath yarns.

The original simplified schedule as proposed and developed by the industry has been in operation for the past four and one-half years.

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To the interest taken by several departments of the Federal Government in simplification and standardization, a special chapter is devoted.

The Yearbook includes summaries of important national and international standardization activities and accomplishments of the Government standardizing laboratories of England, France, Germany, Canada, Japan, and of the Bureau of Standards of the United States.

Another chapter is devoted to the standardization activities of American technical societies and trade associations.

An abstract of the work in standardization conducted by national standards associations throughout the world is another feature of the Standards Yearbook.

There is also given a brief account of international cooperation in standardization.

The Standards Yearbook should be in the personal library of all engaged in work on standards, or concerned with its application.

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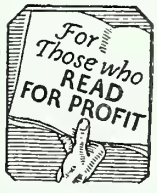

COMMERCIAL STANDARDS MONTHLY

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

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

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R. P. LAMONT, Secretary of Commerce

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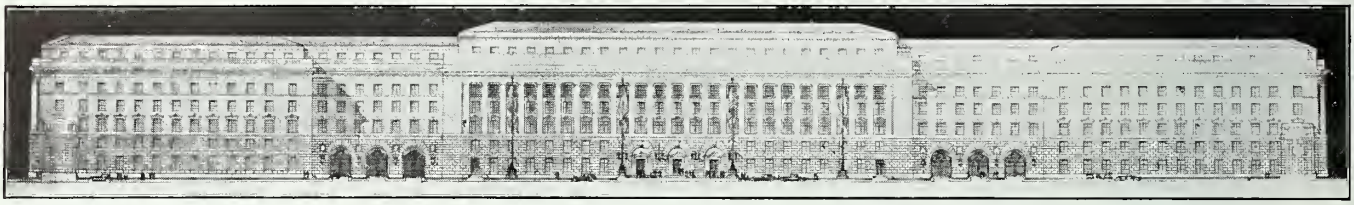
—President Hoover, at the laying of the corner stone of the new building of the U. S. Department of Commerce, June 10, 1929.



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

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

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

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.

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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.

BUREAU OF MINES—Continued.

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

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

BUREAU OF FISHERIES, Henry O'Malley, Commissioner.

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

BUREAU OF LIGHTHOUSES, George R. Putnam, Commissioner.

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

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

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

BUREAU OF NAVIGATION, Arthur J. Tyrer, Commissioner.

Superintendence of commercial marine and merchant seamen.

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

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

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

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

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

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

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

RADIO DIVISION, W. D. Terrell, Chief.

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

U. S. GOVERNMENT PRINTING OFFICE: 1932