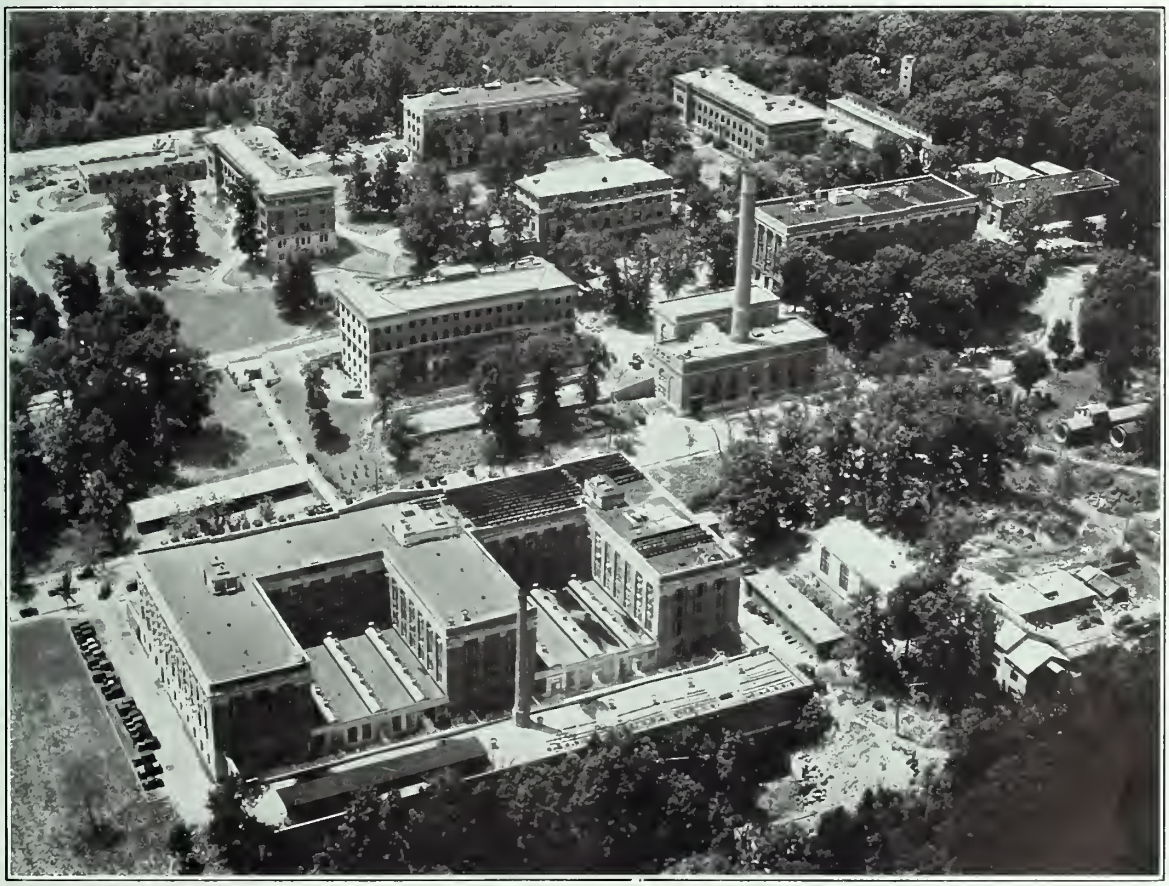
Bureau of Standards
DEC 22 1932

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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DIVISION OF SIMPLIFIED PRACTICE

Edwin W. Ely

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

BUILDING AND HOUSING DIVISION

J. S. Taylor

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

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

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

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

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

DIVISION OF 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

A Review of Progress in Commercial Standardization and Simplification

VOLUME 9 WASHINGTON, D. C., DECEMBER, 1932 NUMBER 6

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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.

Identification of Simplified Lines of Woven-Wire Fencing in Trade Literature

ALL OF THE producers of woven-wire fencing who have accepted simplified practice recommendation No. 9–28, have expressed their intention to extend their present methods of identifying the simplified lines by the use of specific statements in catalogues and other trade literature. For several years past some manufacturers of this commodity have been attaching tags to their rolls of fencing to show that they conform to this recommendation.

Many national associations representing users of simplified commodities have for some time strongly urged that this policy be adopted by manufacturers who have accepted the various simplified practice recommendations. The general adoption of the identification plan should assist the woven-wire fencing industry in maintaining close adherence to the waste elimination program. Cooperation by distributors, buyers, users, and others will greatly increase the benefits and economies possible through simplified practice. When the simplified lines are so designated in trade literature their selection can be made without difficulty and much waste now incurred in checking files and auxiliary records for these data is eliminated.

The woven-wire fencing recommendation, which was proposed and developed by the industry in 1923, and subsequently revised in 1928, has been instrumental in reducing the number of styles of this commodity from 552 to 69, or approximately 89 per cent, and the number of sizes of woven-wire fence packages from 2,072 to 138, or approximately 93 per cent.

Manufacturers of the other 140 commodities, for which simplified practice recommendations have been developed, have recently commenced identifying in their catalogues those products which conform to the simplified lists.

LIFE TESTING OF ELECTRIC LAMPS

Description Given of Methods Used at Bureau of Standards for Life Testing of Incandescent Lamps to Determine Their Efficiency

The Federal Government is a large purchaser of incandescent electric lamps for use in post offices, customhouses, on board battleships and cruisers, in Army posts, in navy yards, in hospitals and schools, and in the Federal buildings.

During the fiscal year ended June 30, 1932, incandescent lamps of a value exceeding $800,000 were bought from four contractors for furnishing lamps to the Federal Government. Of the lamps purchased, approximately 2,000,000 were inspected at the factories of the contractors, and samples were selected for measurements and burning tests in the laboratories of the Bureau of Standards to check their compliance with specification requirements. This article describes briefly the methods of factory inspection and subsequent measurements and tests made at the Bureau of Standards.

The Federal specification designated as "WL-101, Lamps; Electric, Incandescent, Large, Tungsten Filament," forms the basis on which the General Supply Committee of the Treasury Department awards annual contracts for the supply of lamps to all executive departments and independent establishments of the Federal Government. A supplement to the specification is issued annually so that changes in lamp efficiencies, bulb sizes, etc., as made from time to time by the manufacturers, can be quickly brought into the specification. Under the terms of the specification and annual supplements, lamps are inspected and samples for life test are selected by a Government inspector at the factories of the contractors.

An incandescent lamp is a device that consumes electrical energy and produces light. The user of the lamp is interested in a minimum electrical power input to the lamp, a maximum light output of the lamp, and a maximum useful life of the lamp. The electrical power input is measured in watts, the light output in lumens, and the life in hours. The ratio of the light output (in lumens) to the power input (in watts) is called the efficiency of the lamp, and it is expressed in lumens per watt. The electric-lamp industry long ago adopted a system of designating lamp sizes by the electrical input in watts, at a chosen voltage. Lamps are labeled in watts and volts; for example, a very commonly used size of lamp is a 40-watt lamp, marked on the bulb, 40W, 115V. A similar lamp might be marked 40W, 110V and another 40W, 120V. These three lamps if properly marked are equal in power input, if operated on electrical circuits of 115, 110, and 120 volts, respectively, but not under any other conditions. They may or may not be equal in light output, efficiency, lumen maintenance, and life.

Under the terms of the Federal specification the contractor agrees to supply lamps, which, when measured initially at marked voltage, will consume 25 or 40 or 100 watts, as the case may be, will produce a certain specified number of lumens (light output), an initial efficiency not less than a specified minimum, and if burned at marked voltage will have an average life of a specified number of hours, and will maintain during that life a specified percentage of the initial light output.

An inspector employed by the Government visits the factories of the contractors at regular intervals and makes physical, mechanical, and photometric inspections and tests on the lamps submitted by the contractor to fill orders for lamps placed by the various purchasing officers of the Government departments. If the measurements made by or at the request of the inspector in the contractor's plant, or the physical inspection of a definite selection of samples, show that more than a specified number of lamps falls outside the limits set in the specification, then all the lamps of the lot from which the inspection samples were selected are rejected, and the contractor must offer another lot of lamps for inspection and measurement. If a lot of lamps inspected is accepted, samples are sent to the Bureau of Standards for further test. The samples selected by the Government lamp inspector life test are delivered to the testing laboratory at the Bureau of Standards, with the data on each lamp, as supplied to the inspector by the contractor.

The data consist of a statement by the contractor of the efficiency at which each lamp was designed to operate, and the results of measurements made in the presence of the inspector at the contractor's plant on each sample lamp.

Each lamp received for life test is measured in the life-test laboratory at manufacturer's marked voltage, for lumens and watts, and the corresponding lumens per watt computed. The photometric measurements are made by means of a 60-inch sphere photometer, with photo-electric cell auxiliary photometric equipment. The electrical measurements are made by means of a potentiometer. The measurements are compared with the measurements supplied by the contractor and inspector, and the lamp is then ready for life test on burning racks.

The life of incandescent lamps is an arbitrary number of hours established by the lamp manufacturers. It is the number of hours the manufacturer selects as commercially desirable, both for the user and manufacturer. It may be 1,500, 1,350, 1,000, 200, 100, 50, or 5 hours for particular types or sizes of lamps, when operated at labeled or marked voltage. A voltage higher than marked voltage, when applied to a lamp, will shorten its life; a lower voltage will give longer life; all compared to the life chosen by the maker as normal life at the design efficiency of the lamps. A 1 per cent increase or decrease in the applied voltage is known to change the life of lamps by approximately 13 per cent. It is therefore highly essential that the voltage applied to lamps in life testing should be carefully regulated. At the Bureau of Standards the voltage applied to lamps on life-test racks is regulated to a maximum variation of about 0.2 volt. Any voltage within the whole range of voltages available from the transforming and distribution equipment for life testing can be applied to the lamps on any burning

rack, but all the lamps on one rack are burned at the same voltage. The racks are so designed that if lamps burn out on the racks the change in voltage is negligible. The voltage on each rack is checked at frequent intervals and adjustments made, if necessary.

Each lot of lamps is burned on the testing racks, not at marked voltage, but at the voltages required to operate the lamps at a predetermined efficiency, usually the efficiency required by the specification. In so-called forced tests this efficiency is increased so as to shorten the burning time, but all results are computed to specification requirements. After a certain number of hours' burning, known as the photometric interval, determined by the size and type of lamp under test and the requirements of the specification, photometric readings are made at initial marked voltage. At the end of the second photometric interval, another reading is made, and so on until each lamp fails. From the data thus obtained the average life and the lumen maintenance during life, of the lamps comprising a lot undergoing test, are computed. Lamps may fail on the racks while burning, or during handling, or while being measured on the photometer. Each lamp is individually considered in computing the final average life and lumen maintenance of the test lot. Approximately 3,000 lamps were tested during the fiscal year ended June 30, 1932.

An annual summary of test results on all contractors' lamps is prepared for the use of the General Supply Committee and purchasing officers of Government departments and independent establishments. The results of the tests are not available for use by the contractors in advertising or selling their particular brands of lamps.

PUBLIC HEALTH CONVENTION CONSIDERS STANDARDIZATION

Standardization and its relation to public health formed an important part of the various subjects considered by the 1932 annual meeting of the American Public Health Association, held October 24 to 27, at Washington, in conjunction with the annual conference of State sanitary engineers.

Speaking on More Uniformity and Reliability of Records, Dr. Harold B. Wood, of the Pennsylvania State Department of Health, pointed out that while morbidity and mortality records are slowly improving, their completeness and accuracy are still far distant. He said that a uniform method of ending the morbidity and mortality tabulation periods is needed to overcome the inclusion of the events of one year in the records of another. Doctor Wood urged all registrars who tabulate the causes of death to use the International Classification of Causes of Death, including the official coding selection system.

The Standardization of Diagnostic Reagents, was the subject of a paper delivered by John F. Norton, of the Michigan State Department of Health, in which he pointed out that the laboratory section of the American Public Health Association has for more than 25 years been actively interested in the standardization of certain laboratory procedures. According to Mr. Norton this standardization of technic has had a wholesome effect on public health laboratory work.

In making its 1932 report the joint committee of the two conferences on swimming pools and bathing places stated that the committee had previously suggested comprehensive standards for swimming-pool design and maintenance which were published in 1926. Inasmuch as these standards are now of several years' standing, the committee deemed it advisable to seek the advice of interested groups as to the practical application of the standards. Reports received by the committee showed that State regulations on the design and maintenance of swimming pools, as well as regulations in effect in many cities, generally follow very closely the recommendations of the committee. Some differences in bacteriological standards exist, according to the survey, but no major discrepancies were reported.

FEDERAL SPECIFICATIONS

Seventeen specifications were acted on by the Federal Specifications Board during the month of November. Of this number, eight proposed specifications and nine revisions have been sent out for official comment and criticism. Copies of these specifications are available in mimeographed form, and further information can be obtained from the Federal Specifications Board, Bureau of Standards, Washington, D. C.

New designation	Specifications proposed	Old F. S. B. No.
	Cutlery, galley, kitchen	
	Bands, paper, shirt, laundry	
	Hooks, chain	
	Tissue toilet paper	
	Paper towels	
	Packing, asbestos, rod, braided	
	Belting, conveyor (friction surface)	
	Belting, conveyor, rubber covered	
	Specifications to be revised	
AA-B-201	Beds, hospital	186a
HH-P-71	Packing, fabric, condenser tube	99
HH-P-126a	Packing, metallic, flexible	--------
HH-P-131a	Packing, metallic and nonmetallic, plastic	--------
ZZ-C-191	Cement, rubber (for) medical rubber goods	223
ZZ-H-491a	Hose, pneumatic	--------
ZZ-P-51	Pads, surgical-operating	230b
ZZ-P-361	Pillowcases, rubber	231a
ZZ-T-791	Tubes, lavage or stomach	237

ICE-CREAM CUPS AND CUP CAPS

Simplified Practice Recommendation No. 132–32, Ice-Cream Cups and Cup Caps, is now available in printed form, and copies can be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents each.

This simplification program, which was proposed and formulated by the industry, has been the medium by which the number of capacities of the so-called 5-cent cup has been reduced from 4 to 1; the one-fourth pint (known as the 10-cent size) from 5 shapes to 1, and cap diameters from 3 to 1; the half-pint cup from 3 shapes to 1, and cap diameters from 5 to 2; the pint cup from 2 shapes to 1, and cap diameters from 5 to 2; and the quart cup from 2 shapes to 1, and cap diameters from 2 to 1.

TEXTILE RESEARCH

Studies Conducted at Bureau of Standards Are of Vital Concern to Consumers and Manufacturers Alike

By Miss R. K. Worner, *Bureau of Standards*

The facilities of the Bureau of Standards for textile work are unusually complete, and make possible studies both of a theoretical and a practical nature. The processes that are carried out in a commercial cotton mill from the time the cotton is received in the bale until it is woven or knit into cloth can be duplicated and studied under carefully controlled conditions.

Commercial practice in laundering and dry cleaning can be duplicated. Dyeing equipment and apparatus for testing fastness to light and washing of colored textiles are available. A large room, which is maintained at a relative humidity of 65 per cent and a temperature of 70° F., is provided for experiments and tests, the results of which are affected by these conditions. In addition to the usual equipment to be found in chemical and physical laboratories for the study of textiles, there is available much special equipment that has been developed and built at the bureau. Well-equipped photographic, microscopic, and X-ray laboratories are maintained.

This is the last of a series of articles describing the activities of the textile section of the Bureau of Standards. In these articles the author described the work of the textile section and its relationship to the producing, distributing, and consuming elements of the industry.

Textile research may be divided into two categories—that of a purely academic and that of a practical or technological nature. Some examples of pure academic textile at the Bureau of Standards are a study of the deterioration of silk by light, the measurement of the isoelectric points of silk and wool, and a study of the stress-strain relations of rayons and other fibers.

Although silk is one of the strongest textile fibers known, it deteriorates rapidly when exposed to strong light. The purely academic study of the photochemical decomposition of silk recently carried out at the bureau showed that the amount and rate of deterioration of silk depend upon its acidity or alkalinity. Silk on the alkaline side of neutrality is much more stable in light than silk on the acid side. Since silk is usually finished in a slightly acid solution, this result is of very practical significance. It indicates that by proper chemical control of the finishing bath, the stability of silk to be exposed to strong light; for example, silk for window curtains, may be materially increased.

The measurement of the isoelectric points of silk and wool is another academic study recently completed at the Bureau of Standards which has revealed new possibilities for the improvement and control of textiles made from these fibers. When silk or wool is immersed in water or in an aqueous solution the fiber becomes electrically charged. The charge is positive or negative, depending upon the acidity or alkalinity of the solution. At a particular acidity, which is different for silk and wool, the fiber is electrically neutral. This is the isoelectric point of the fiber. It is of great importance to the mill which is scouring, dyeing, fulling, and wet finishing these fibers and to laundrymen because the fiber is most stable at its isoelectric point and accordingly least liable to damage.

A tool of the physical chemist called the electrophoresis cell heretofore not applied to textiles, made possible the exact measurement of the isoelectric points of wool and silk. With this cell not only can the isoelectric point of a fiber be determined, but the amount of the electrical charge on the fiber when placed in solutions of different acidities and alkalinities can be evaluated. This has an intimate theoretical bearing on the way in which textile fibers combine with dyestuffs or give up impurities when scoured or laundered. Accordingly it is confidently expected that the application of the electrophoresis cell to these questions will result in practical developments which can not at present be clearly visualized.

Textiles are under tension in various stages of manufacture and during use. They must stand repeated loading and unloading. Loads are applied when the textiles are wet, in processing or laundering, and when they are dry. Under these conditions they stretch and, if the load has not been too great or applied for too long a time, they return to their original dimensions. The relation of the load to the elongation, the stress to the strain, is represented graphically in a stress-strain curve. The Bureau of Standards has made systematic studies of the stress-strain relations of textiles. The work on rayon is particularly significant because rayon is much weaker and more plastic when it is wet than when it is dry. Special equipment for testing yarns and cloth where it is actually immersed in a liquid during the test has been designed and built. The results of this work are, of course, available to anyone who has use for them.

The technological investigations of textiles include studies of the application of the results of fundamental research to practical mill finishing or maintenance problems, studies of the relation of the fabric and yarn construction and finish to the properties of the finished yarn or fabric, and the development of fabrics having the optimum properties for a specific purpose.

The twist in rayon yarns, which varies from a few turns per inch up to, perhaps, 100 turns in some crêpe yarns, affects a number of properties of the yarn. A study of these effects of twist has been made. The results are of importance in predicting the utility and durability of fabrics made from these yarns. The contraction in length resulting from twisting is of importance to the Treasury Department which allows

a rebate on rayon yarn imported into the country if it is reexported. Accordingly, the contraction occurring during the conversion of the yarn into cloth must be calculated.

To obtain basic data on the effect of yarn and fabric construction on the properties of cotton materials, studies are in progress on the relation of yarn twist to the strength, stretch, diameter, and angle of twist of the yarns, and of yarn twist and of fabric construction on the strength, stretch, tear resistance, and air permeability of fabrics. The results of these studies will make it possible to design and construct fabrics having predetermined desirable properties.

The development of fabrics for aeronautical purposes presents a number of problems which the Bureau of Standards has studied at the request of, and in cooperation with, the National Advisory Committee for Aeronautics. It is important that aeronautical fabrics, such as parachute cloth, the cloth used for the outer cover and gas cells of dirigibles, and airplane wing cover cloth have a minimum weight for the required strength and that they have high resistance to tear. To find out how to produce such fabrics, a comprehensive study was made of the relation between the kind of yarn used and the weave of cotton fabrics and their physical properties.

One result of this study was the production of a cotton parachute cloth in the bureau's experimental cotton mill. Practical service tests conducted by the Navy Department of parachutes made from this cloth has shown it to be serviceable and reliable. In the event of an emergency curtailing the supply of silk, all of which is imported, parachutes can be made from the domestic fiber. More than 50 per cent of the parachutes used by commercial aviators are, in fact, now made of cotton.

The Bureau of Standards is attacking the problem of mercerization from a new angle. Ordinary commercial mercerization is concerned with the luster and appearance of the cloth. Isolated experiments indicated that by mercerizing cotton yarns and fabrics under suitable conditions, an increase in strength might be obtained. All of the factors of the mercerizing process were studied systematically. The results of the experimental work, which is nearing completion, indicate that the strength for a given weight may be materially increased by proper control of conditions during mercerization.

Although the studies just described refer primarily to aeronautical fibers, the results are applicable to general mill practice. In these studies not only has a mass of pertinent data been assembled on the relation of the construction to the properties of a cloth, but a number of methods for testing the properties of cloth have been developed. The results are of general interest to the textile industry.

Many controversial statements may be found in the literature on the advantages of the different types of fabrics for clothing. To obtain specific data on the relation between the construction and properties of underwear fabrics, a research associate representing the Associated Knit Underwear Manufacturers of America, working under the direction of the bureau, examined approximately 100 different typical commercial knit fabrics with reference to the details of their construction and properties, particularly such properties as air permeability, behavior toward moisture, and warmth, which are closely related to the comfort and health of individuals. The resulting data should make it possible for manufacturers to design underwear fabrics to meet any requirements which may be found to be desirable by health authorities or users.

The problem of the selection and utility of silk fabrics likewise concerns both the manufacturer and the consumer. At the request of the American Home Economics Association, the Bureau of Standards is studying typical silk dress fabrics purchased in various parts of the country and made up into dresses by home economics students. Samples of the new fabrics have been tested and the garments are being examined from time to time during their life. The results obtained to date indicate that while lack of fastness to light and to washing and a tendency of the yarns to slip are the chief factors limiting the life of the fabric, in a number of instances the serviceability of the garment is not limited by the quality of the fabric, but by the unsatisfactory design of the dress or shifting styles.

It will be noted from this outline that there exists a very close interrelation of these various textile activities of the Bureau of Standards. The problem of evaluating a particular fabric for a specific purpose creates the need for the development of adequate test methods. These in turn make possible further studies of the relation of the construction of yarns and fabrics to their utility and durability. The studies suggest ways for improving fabrics intended for specific uses, and for developing suitable ones when the need arises.

A considerable amount of the work described might be considered in the light of interpreter for consumer and manufacturer. The manufacturer is constantly striving to make a fabric with improved or novel characteristics for a given purpose. The consumer is interested primarily in the utility of the fabric. However, there has been no common basis for understanding what a fabric of a particular construction will do in service, and accordingly a feeling of mutual distrust has developed between buyer and seller. The work of the Bureau of Standards in interpreting construction in terms of serviceability, has already done much to break down this barrier and to stimulate a spirit of cooperation and friendliness between the producer and the consumer. Having a totally unbiased point of view, the bureau is in a particularly advantageous position to act as intermediary and interpreter. The need for establishing such cooperative relations and the benefits to be derived therefrom can not be overemphasized.

The series of articles on the work of the textile section of the Bureau of Standards, of which this is the last, points out how the textile section keeps in close contact with the activities and interests of all who are concerned with the technical aspects of textiles, including governmental, industrial, scientific, technical, and consumer groups.

As a result of these contacts, it is uniquely fitted to act as a clearing house for information and to bring together individuals or groups having a common interest or problem. Many letters and visitors come to the laboratory for technical information relating to textiles. Some of the queries are answered directly. Others are referred to the proper source for the information, perhaps to commercial testing laboratories equipped to carry out tests, or to manufacturers of

equipment, or to individuals or companies that have had special experience in solving the particular problem involved, or to the vast literature on textiles.

Thus, the Bureau of Standards serves to link together the research, producing, distributing, and consuming branches of the textile industry.

WIND PRESSURE ON THE EMPIRE STATE BUILDING

Bureau of Standards Conducts Tests on 5-Foot Model of Famous Empire State Building

By H. L. Dryden, *Bureau of Standards*[1]

When the Empire State Building was constructed in New York City provision was made through the cooperation of architects, engineers, and owners to have the building serve as a laboratory for obtaining more accurate knowledge of wind pressure.

Under the direction of the committee on research of the American Institute of Steel Construction, 30 pipes were placed at the thirty-sixth, fifty-fifth, and seventy-fifth floors, transmitting the pressure from small openings in the exterior faces of the building to accessible places on each floor. In addition, some of the steel columns under the tower portion of the building on the twenty-third floor were provided with strain gages for determining strains in the columns due to wind. Instruments for measuring the direction and velocity of the wind were mounted on the top of the building.

The forecasting of the wind pressure to be expected on a building has many of the aspects of a game of chance. It is practically certain that the speed of the wind will exceed 5 miles per hour at some time during every day of the year. In Washington, D. C., the speed will exceed 40 miles per hour about four times a year. It has not blown at a speed of 100 miles per hour at Washington, D. C., in the 60 years or so that records are available. It is a practical impossibility to design all buildings to withstand the maximum speeds which have ever been experienced anywhere. The engineer must draw the line at some speed which is not likely to be exceeded in the life of the building. To obtain information of this kind from direct observations on a building would require years of measurements, and a statistical study of the results. Moreover, the results would not necessarily be applicable to some other building of a different shape.

The only long-continued observations on the wind are those made by the Weather Bureau. These observations give the wind speeds, and to determine the pressure on the building, the relation between the pressure and the speed must be known. The method of obtaining this relation, which is now coming into use is that of making measurements on models in a wind tunnel, a device in which artificial winds may be produced. Although the method of model testing is well known in hydraulics and aeronautics and has been found invaluable, it is new to structural engineers. Full confidence has not been placed in the results, because of some feeling of uncertainty as to the application to buildings in the natural wind.

When the program of the American Institute of Steel Construction, to be carried out on the Empire State Building, was announced, the Bureau of Standards saw an opportunity to demonstrate the utility and validity of model measurements. Owing to business conditions, the measurements on the actual building had to be postponed, but experiments have been completed on a model of the building at the Bureau of Standards. When the results on the actual building are finally available, comparisons can be made.

The Empire State Building is 1,250 feet high; the model is 5 feet high. On this scale the height of a man would be a little more than one-quarter inch. The model is built of aluminum plates to follow the exterior shape of the building, omitting minor irregularities of the surface. It does not represent the actual building in material, method of construction, or strength. It is not tested to failure, but is used only for measurements of wind pressure. Small holes in the outer walls are connected by rubber tubing to a pressure gage. The air near the surface of the model pushes on the air in the rubber tubing with the same pressure as on the neighboring solid wall of the model. The pressure is transmitted to a gage where it is balanced by the weight of a column of liquid. In some tests the model was mounted in bearings and the overturning moment measured.

The artificial wind was produced in the 10-foot wind tunnel of the bureau, in which speeds up to 70 miles per hour may be obtained.

Under normal conditions, with no wind blowing, the surfaces, both interior and exterior, of all buildings are subjected to the normal atmospheric pressure of 14.7 pounds per square inch. When the wind blows, this pressure is modified. In some places the pressure increases, in others it decreases by amounts which usually do not exceed a few tenths of a pound per square inch. When the pressure is reduced below the normal atmospheric pressure, the effect is often called a suction. The results on the model of the Empire State Building show, as for other models tested, that the pressure varies greatly from point to point and that suction effects predominate. The greatest loads on the building occur when the wind blows directly against one face. The average pressure is of the order of 35 to 40 pounds per square foot at a wind speed of 100 miles per hour. At other wind speeds the pressure varies as the square of the speed; that is, at 50 miles per hour, it is only 9 or 10 pounds per square foot.

It was found that the speed of the air rushing by, close to the building, is greater than that of the approaching wind. Thus the instrument on the building gives a speed about 25 per cent greater than the speed of the wind approaching the building.

The detailed results, giving charts of the distribution of pressure with the wind striking the model from different directions, will be published in a few months as a research paper of the Bureau of Standards.

[1] Abstract of a paper given before the Philosophical Society of Washington, Nov. 5, 1932.

STANDARDIZING THE SHIPPING CONTAINER

Methods of the Freight Container Bureau in Handling Work in This Field

By Edward Dahill[1]

The Freight Container Bureau is an organization founded and maintained by the American Railway Association. It was organized June 27, 1921, for the express purpose of making a scientific study of the various types of containers used in the shipment of different commodities so as to eliminate as far as possible any economic waste which might be attributed to faulty packing or inefficient containers. These studies were to be confined to containers used in the shipment of nondangerous articles.

In carrying out the instructions of the board of directors of the American Railway Association, a highly trained staff of graduate engineers was engaged to conduct the various studies which were to be undertaken. These engineers, who at the present time are seven in number, are under the personal direction of a chief engineer, who in turn reports to a joint committee of cooperation. This joint committee is composed of officers of various railroads or their agencies and consists of 3 traffic men, 3 transportation men, 3 claim-prevention men, 3 classification men, and 1 representative from Canada. The classification committees are represented by the chairman of each of the classification territories, and A. H. Greenly, of the official classification territory, is chairman of the joint committee. The Freight Container Bureau is under the personal direction of the writer.

The following procedure is usual in making a study of a problem. The engineer who has been given the assignment makes preliminary visits to the various industries or shippers involved and if these industries are organized in associations, both local and national in nature, he contacts the secretaries of these various associations, arranges to appear before their meetings and explain the object of the work which is to be undertaken, and requests their assistance and cooperation. He asks that the interested trade associations appoint a committee to work along with him. He explains to them the advantages of standardization in methods of packing and container construction, how crates, for example, of a standard construction will work out to their advantage and how the adoption of such a standard, while adding protection, will not increase the production cost, and as a general rule will cost less than the methods which are then being used by the various members of their association. The engineer again visits the various manufacturers, not only those connected with the trade association but the independent manufacturers, both large and small. Their methods of crating are studied, photographs are taken, and suggestions are made in the various plants as to how their individual crating practices might be improved. The results of these visits are summarized and the information obtained is then carefully analyzed.

Freight and transfer stations are visited and the methods of handling the freight are observed. When occasion requires, test shipments are made with impact recorders placed in the car so as to determine the handling of the car en route during the normal process of transportation. This in a way will determine whether the container has failed as a result of inherent weaknesses or careless handling in transit. Before concluding his study, the engineer will visit various representative consignees to observe the condition in which the purchases are received, to find out what their troubles are and obtain their ideas as to how they believe the merchandise which they purchase should be packed so as to reduce to a minimum the possibility of its becoming damaged. By these means a correct picture is obtained as to what the containers must actually be able to withstand under present-day freight movement.

Tentative specifications are then drawn up, which specifications are gone over thoroughly with a committee which has been appointed by the interested industries. The revised draft is then submitted to the various industries and carriers whose comments, if warranted, are incorporated in the final draft. The final draft is then passed upon by the joint committee of cooperation and issued in an illustrated pamphlet form and widely distributed among all interested parties, including the shippers and carriers in order that all may have the benefit of these recommendations.

From time to time the Freight Container Bureau releases bulletins and pamphlets containing recommendations and information as to certain commodities that are causing the shippers and carriers a considerable amount of trouble and how they should be prepared for shipment. These recommendations are revised from time to time in order to adjust them to changed conditions which may have developed in the container and transportation field.

Up to the present time, some of the principal studies carried on by the bureau have involved the packing and containers, and sometimes loading methods, for various kinds of fresh fruits and vegetables, stoves, household and commercial refrigerators, various types of new furniture, eggs, store fixtures, crockery, glassware, boots and shoes, machinery, sewer pipe, monuments, enameled iron sanitary ware, and vitreous china sanitary ware. There have been numerous short studies made involving many other commodities on which typewritten or mimeographed reports only have been prepared for the information of those directly interested. Besides these principal and particular studies, the bureau carries on much educational field work in the perishable producing territories, acts as a clearing house for information on loading methods and containers and gives what has proven to be most helpful to the shippers, the services of their engineers without charge, on specific shipping problems.

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STUDIES OF PROPERTIES OF NONFERROUS METALS

Investigations of Alloy Values and Commercial Uses Conducted by Bureau of Standards

By H. S. Rawdon, *Bureau of Standards*

Last month the author began a description of the work of the Bureau of Standards as it relates to nonferrous metals and minerals, which is concluded in this issue of Commercial Standards Monthly. The Bureau of Standards will be only too glad to furnish more detailed information on any part of the work.

Extensive fundamental studies have been conducted by the Bureau of Standards on the optical properties of materials, that is, the emissive, absorptive, and reflective properties. Many of these have been made with a direct commercial application in view, in other cases an immediate application was not foreseen. For example, the results of researches on opacity of colored glasses to ultra-violet radiation lay "in storage" for six years when a sudden telephone call for just this information came from the Navy Department. Means of protecting the eyes of workmen from ultra-violet and infra-red rays were urgently needed in the war-time fabrication of ships by welding. This work has been carried much further since and the bureau has cooperated with manufacturers in the commercial development of suitable glasses of this kind, and a Federal specification covering such glasses is now in effect. Similar work has recently been carried out on window glass which is required to transmit ultra-violet radiation. The relative efficiencies of different metals in the form of electrodes for arcs or as incandescent filaments as sources of ultra-violet radiation have also been studied.

Many studies have been made of the reflective properties of metals, such as aluminum, chromium, monel metal, zinc, etc., the results of which have found practical application in connection with the mirrors of therapeutic lamps and reflectors for searchlights and airport illuminators.

The results of studies of the optical properties of metallic (aluminum-pigmented) paint have found numerous industrial applications.

The furnishing of technical information to industry on the various commercial nonferrous metals has developed into a line of activity of very considerable importance. Although a great deal of work may have been done by numerous investigators on a material, the results are, in general, available only to the specialist. A number of circulars of information on the commercial metals have been prepared summarizing the information available in the technical literature as well as the results of such bureau work as may have been done. The latest one of these treats of the metal zinc and its alloys. Previous ones have dealt with copper, nickel, aluminum, magnesium, and light alloys.

Although practically all of the investigative metallurgical work is carried out with the aim of improving the materials studied, a specific and immediate industrial application can not always be foreseen. Some typical metallurgical researches on nonferrous metals are summarized briefly below:

Great quantities of the nonferrous metals are used in the cast condition and a number of studies have been made relating to problems arising in the use of nonferrous metals in the foundry. Methods and apparatus for the testing, grading, and evaluating of foundry sands have been worked out, valuable cooperation being given by the American Foundrymen's Association. A practical method for determining the running properties of metals as in complex foundry molds, such as can be carried out by the foundryman himself, has been developed and found very useful in the making of nonferrous castings. The behavior of metals in shrinking upon cooling after casting is a matter of great practical importance to the foundryman. The results of studies just completed throw much light on this problem. The problem of supplying nonferrous casting alloys in ingot form is becoming increasingly complicated on account of the numerous and "fancy" compositions now on the market or specified by users on insufficient evidence. It is expected that a current research in which the Non-Ferrous Ingot Metals Association is cooperating will do much toward the elimination of many of these apparently needless stringent requirements by the establishment of standard alloys of known properties and by showing the effect on the properties of such alloys of slight variations in composition.

The subject of the wear of metals is one of great economic importance. This general subject is intimately related to that of nonferrous bearing alloys—bronzes and babbitts. Much study has been devoted to the determination of the relative merits, so far as they can be evaluated in the laboratory, of various bearing bronzes, as well as the effect of variations in a number of metallurgical factors upon the properties of some of the more or less commercially standard alloys. Active cooperation of manufacturers has been given in this work through the research-associate plan. Tin and antimony are essential components of certain classes of bearing alloys: that is, the so-called babbitts. In the endeavor to be able to save these strategic materials, if the need should arise, work has been undertaken at the request of the War Department on the determination of the qualities and field of usefulness of bearing alloys containing only a minimum amount of these metals.

Any new commercial metallic material, before it is accepted to replace other materials, must prove its value. To do this by using it in actual structures and observing the results is expensive and very slow. The results of laboratory tests to determine the strength and other properties can in most cases be used in selecting materials. Laboratory results are relatively inexpensive and allow progress to be made rapidly.

A striking example of the value of extensive laboratory tests is the rapid increase in the use of aluminum

and magnesium alloys in aircraft. These materials practically always comply with the purchase specifications because the manufacturers have had the foresight to establish very rigid tests of their product and have developed methods and apparatus which are much more satisfactory than those generally used by the manufacturers of ferrous metals. It is evident that materials the properties of which are definitely known can be used more efficiently; that is, to build lighter and safer structures, than a material the strength and other properties of which are known only approximately.

The determination of the life of a structural material under vibratory or repeated stress is of particular importance in connection with aircraft. A very novel testing method developed at the Bureau of Standards for determining the endurance limit of light metallic sheet materials, such as duralumin, has been in successful operation for several years. By means of suitable air jets a strip of the sheet material supported on " air bearings " at its two nodal points, is made to vibrate at its natural period of vibration which, for the length of test specimen used, is close to 12,000 cycles per minute. By this method the time required for determining the fatigue limit of such materials is very greatly reduced.

Several of the platinum group metals, although rare, are indispensable for certain scientific and industrial uses. However, during the past half century the increase in knowledge about these metals has lagged badly behind the general growth of science and technology. For several years past the bureau has been engaged in a number of studies on some of the more important physical and chemical properties of platinum and the metals closely related to it. Projects now completed or nearly so, are: Procedures for the preparation of the several metals in the extremely pure condition necessary for scientific use, method for their analytic determination, and a technic for the fabrication of rhodium and platinum-rhodium alloys. Work on a complete analytical procedure for the group is in progress and studies of the physical properties of some of the other metals and alloys are planned.

Work related in character to this is carried out on other metals, particularly those of industrial importance, the object being the determination of the fundamental properties of the metal in the highest state of purity available. The most recent studies of this kind were carried out on nickel, the total impurities of which were of the order of only 0.05 of 1 per cent. A necessary part of the preparation of these metals of high purity is the development of suitable refractory materials for containers which will not contaminate the metal.

Some metals are available in amounts exceeding considerably the inustrial demand for them. A striking example is bismuth. Studies have been carried on by the bureau in active cooperation with one of the largest producers with the aim of extending the industrial usefulness of bismuth. A development worthy of mention is the use of low-melting alloys, in which bismuth is a very essential constitutent, which appears very promising as an increased outlet for bismuth. The use of such an alloy as an embedding matrix to aid in carrying out certain difficult stamping and metal forming operations is greatly increasing.

Deterioration as a result of corrosion is usually associated with iron and steel. It is important also with many of the nonferrous metals, in which case the corrosive attack may appear in a rather mysterious guise. For example, some of the wrought structural alloys of aluminum have, in the past, become weak and brittle as a result of atmospheric corrosive attack without any very marked surface indications of the change. Extensive laboratory and field tests have been carried out in cooperation with other governmental agencies interested in the use of such materials for aircraft and with leading manufacturers on both the aluminum and the magnesium alloys with the aim of showing how the alloys may be treated so as to prevent embrittlement and what may be expected from various protective coatings. The results obtained have greatly clarified the situation, and light alloys for use as structural materials which are entirely reliable in service are commercially available. Another typical corrosion study on nonferrous metals relates to certain types of failure in copper roofs, as in soldered joints, in which it was found that the temperture at which the soldering was done has a very important bearing on the subsequent behavior of the seam.

Atmospheric exposure tests of nonferrous screen wire cloth in cooperation with the American Society for Testing Materials are yielding some interesting information on the life of such materials under various atmospheric conditions. For example, an atmosphere constantly contaminated with sulphurous fumes, as in an industrial center, is very severe on a nickel-alloy wire cloth.

At present the bureau is cooperating with the American Electroplaters' Society and the American Society for Testing Materials in an extensive investigation of the protective value of electroplated metal coatings on iron and steel. A large number of steel samples are being plated with chromium, copper, nickel, zinc, or cadmium, or combinations of these metals, applied under specified conditions. Part of these samples will be subjected to atmospheric exposure tests in various parts of the country, including Sandy Hook, New York City, Pennsylvania State College, Pittsburgh, Washington, D. C., and Key West, Fla. These samples will be inspected at regular intervals to determine their behavior in the atmosphere. Corresponding samples will be tested in the laboratory in order to determine what methods of test are suitable for use in specifications for electroplated coatings to meet different conditions of exposure. It will probably require at least one year before any definite conclusions can be reached in this investigation.

Through the Federal Specifications Board, the Bureau of Standards has assisted in the promulgation of 31 specifications for nonferrous metals in various forms varying from ingot to wire. Twenty-eight others are on the way. In accordance with plans worked out in cooperation with an advisory board composed of official representatives of 14 national organizations interested in the utilization of specifications, there was issued by the Bureau of Standards in 1925, the National Directory of Commodity Specifications giving in convenient form information regarding the best known specifications for more than 600 commodities. A revised edition of this directory has been made available. In it is found listed and briefly described, the standards and specifications of trade asso-

ciations, technical societies, and organizations that are representative in a national way of industry, as well as those of agencies representing the Federal Government as a whole. To supplement this directory there has been issued an Encyclopedia of Specifications to contain the actual text of the specifications. Of the 10 parts in which the Encyclopedia will be issued, one is found entitled "Standards and Specifications for Metals and Metal Products," and another "Standards and Specifications for Nonmetallic Minerals and Their Products."

Upon request from industry, the bureau assists industrial and commercial groups to establish trade standards to serve as a basis for marketing. Such commercial standards for brass pipe nipples made from red brass, yellow brass, and Muntz metal have been established. Each grade is furnished in two weights, standard and extra strong. Nipples are specified as being made only from tested, new, full-weight brass pipe, free from flaws and defects which might affect its serviceability. The chemical composition of the materials is specified, as well as dimensional requirements with tolerances. Other commercial standards have been established for builders' hardware, template and nontemplate; and cover items which are made of cast and wrought brass and bronze in addition to iron or steel. The specifications for these materials cover those in the natural finish, as well as hardware plated with nickel, chromium or silver.

The commercial standard on foundry patterns of wood is of very considerable interest to the nonferrous casting industry. The essential feature of this standard is a color code for marking the various parts of the pattern to indicate the characteristic features of the finished casting.

Another project of immediate interest in this industry is the formulation of a safety code for the protection of workers in foundries. This code which represents the combined efforts of a number of groups, including the National Foundries Association and the American Foundrymen's Association, is nearly completed.

A number of the nonferrous industries have given thought to the application of simplified practice; that is, the elimination of seldom-called for varieties and sizes. Representative commodities on which definite simplified practice recommendations have been adopted by industry are: Brass lavatory and sink traps, screen wire cloth, builders' hardware, metallic cartridges, loaded paper shot shells, grinding wheels, and abrasive grain to mention only a few of the latest recommendations.

FOOD GRADE LABELS MEET GROWING FAVOR

The quality of canned vegetables as established under Federal standards will be shown on the labels of the products of several manufacturers, who have advised the U. S. Department of Agriculture that they intend to adopt this practice. The quality will be stated as "grade A (fancy," "grade B (extra standard or choice)," and "grade C (standard)," the department explained in its announcement. The labeling is expected to aid housewives in selecting their foods.

In its announcement the department states that "read the label" is to have a new meaning for housewives in view of the fact that a number of manufacturers of canned vegetables have informed the Department of Agriculture that they are planning to show the quality of their products on the label. Substandard products must be labeled in accordance with provisions of the food and drugs act.

The Bureau of Agricultural Economics of the Department of Agriculture, has been making extensive tests of the quality of canned fruits and vegetables, and official grades have been promulgated for canned corn, canned peas, and canned tomatoes. Tentative grades have been issued for canned beets, lima beans, pumpkin, sauerkraut, snap beans, spinach, succotash, tomato pulp, and grapefruit, and the bureau now has under test and consideration grades for canned applesauce, asparagus, carrots, mushrooms, okra, pimientoes, plums, and sweetpotatoes.

Canners have been using official inspection to obtain from wholesalers premiums for the higher grades of canned goods, and in some instances grade requirements have been incorporated in contracts between processors and distributors. The grading system reaches back to the farmers, since grades for some cannery crops have also been developed by the Bureau of Agricultural Economics, and these are being used increasingly as a basis for payments to farmers. Now the grading system is being extended by canners to the labeling of canned products.

The Bureau of Agricultural Economics recently has made it possible, to a limited extent, for canners to prefix "U. S." to the grade designation. The first action of this kind was by a canner of lima beans on the Eastern Shore of Virginia. The bureau requires that when the prefix "U. S." is to be used, the products thus labeled must have been canned in a plant under the supervision of a Government grader who must subsequently grade representative samples after the cans have cooled and after there has been time for defects in processing to become apparent.

FORMS FOR CONCRETE JOIST-CONSTRUCTION FLOORS

The printed copies of the revised Simplified Practice Recommendation No. R87–32, entitled "Forms for Concrete Joist-Construction Floors," are now available, and can be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents each.

This simplification program, which was originally suggested and formulated by the industry in 1928, was modified at a meeting held on September 30, 1931, in order to bring the simplified list of sizes abreast with the development of concrete ribbed floor construction.

As a result, the 12 and 16 inch special filler forms were eliminated. In addition to this change, a table of end-taper forms was added. The latter list should make the recommendation of greater value to architects and structural engineers interested in detailed specifications for this type of ribbed floor construction.

APPLICATION OF SIMPLIFIED PRACTICE TO THE NONFERROUS INDUSTRIES

Development of Simplified-Practice Recommendations by Bureau of Standards in Cooperation with Industry

Simplified practice recommendations have been developed for a number of nonferrous metals and mineral products. For example, simplified practice recommendation No. 4 deals with penetrations for asphalt; No. 13, No. 14, and No. 15 with sizes of slate for various purposes; No. 19–28, with dimensions and weights of asbestos paper and millboard.

The fact that many natural products occur in varying forms, in different geographical areas, tends to multiply the number of local standards. In consequence, the question of uniform specifications and selection becomes complicated and involved—in many cases, needlessly. While lumber, per se, is a manufactured product, it is not too distantly related to logs, which are a natural product, to serve here as an example of what one industry has accomplished in the matter of unification of specifications. The elaborate and effective recommendation on lumber is excellent proof that simplified practice is readily applicable to such products. An estimate made by that industry shortly after the simplified practice recommendation was adopted indicated annual savings in excess of $200,000,000.

Periodically the cushioned smoothness of a newly paved surface recalls to mind the important contribution asphalt has made to comfortable and efficient transportation. To the average person asphalt when ready for use appears to be a homogeneous substance in which few variations could be expected. It is surprising therefore to learn that in 1923 the production and use of asphalt was complicated by 88 varieties for paving purposes and 14 varieties for brick and stone filler. For construction, ranging in type from asphalt macadam penetration to sheet asphalt pavement, the survey showed nine grades of material to be ample, but under conditions of nonuniformity on specification requirements more than 80 grades were called for. This naturally added a host of complexities to the operation of the refineries, not only in running the stills but also in the necessity of enlarged storage space for stocks of different grades.

The industry and its customers, with the cooperation of the Bureau of Standards, set up a simplified practice recommendation reducing this variety of penetrations to 10. A survey made three years later showed 90 per cent of the reported tonnage as falling within these 10 varieties. Similarly, varieties of structural slate for plumbing purposes were simplified from 827 to 138, roofing slate from 98 to 9, sizes of blackboard slate from 251 to 52. Twenty-one thicknesses of asbestos millboard were reduced to 4, and size variations of asbestos paper now number 25 compared with 72 before the recommendation was established.

These instances are sufficient to show that through cooperative effort the natural product and extractive industries can remove the burdens caused by nonessential variations in sizes, types, or other characteristics of their output.

The list of manufactured products, composed wholly or in part of nonferrous metals and minerals, on which simplified practice recommendations exist is large and varied. Grinding wheels, coated abrasives, clay tiles, brick, chinaware, porcelain insulators, plumbing fixtures, and metallic cartridges are only a few such combinations. These programs of waste elimination are initiated and developed by the industries concerned. Their acceptance is voluntary and the obligation purely a moral one. A standing committee representing the producers, distributors, and consumers has charge of all matters of adherence and of periodic revision when desirable.

For many years the wire insect screen cloth industry has been manufacturing a complete line of black painted, electro galvanized, bright galvanized, copper and commercial bronze wire screen cloth, in meshes 12, 14, 16, and 18, and in an ever increasing variety of widths. Because of change in demand, many of the items manufactured were no longer required.

Recognizing the need for simplification in the industry, the Wire Screen Cloth Manufacturers' Institute appointed a committee to study production and demand, and to prepare a tentative list of meshes, widths, and qualities of wire insect screen cloth. The proposed program, which was based on a survey of current demand and manufacturing requirements, represents a progressive step in the industry. The resulting recommendation, as finally accepted by the industry, retains for regular stock purposes 154 items, covering the several descriptions, meshes, and widths. Formerly there were 360 items, and the elimination of 206 items represents a reduction of approximately 57 per cent. The eliminated items are 4 meshes of bright galvanized and 3 meshes of black painted wire in 20 widths each; and 6 widths each of all retained varieties.

In 1923 the Vitrified China Manufacturers' Association, in cooperation with the American Hotel Association, proposed an elimination of excess varieties of hotel chinaware. The simplified list of sizes and varieties of china for hotel use, as finally accepted by all interests, retained for regular stock purposes 214 items, as compared with the former variety of 700. Following the general conference it was stated by members of the industry that the savings made possible by the deletion of a large number of molds would be considerable. The simplification of hotel chinaware served as a starting point for similar action by the affected industries in connection with chinaware for other uses. Cafeteria and restaurant chinaware was recommended for a reduction in variety, from 700 to 243; dining-car chinaware, from 700 varieties to 276; and hospital chinaware from 700 varieties to 279.

The part played by the Bureau of Standards in developing simplified practice recommendations is to provide, upon request, a neutral agency to coordinate the efforts and interests of the various groups concerned, to present the recommendations to the potential acceptors for final action, and to promulgate the results. To date more than 140 simplified practice recommendations have been developed as described.

PURCHASING RUBBER PRODUCTS

Review of Value of Specifications for Rubber Products to Show Decreased Cost and Increased Serviceability

By A. T. McPherson, *Bureau of Standards*

Virtually all the rubber products used by the Federal Government from truck tires to surgeons' gloves are purchased under specifications which set standards of quality, dimension, and performance. The advantages of specification buying by the Government are twofold. In the first place, millions of dollars are saved in the decreased cost and increased serviceability of rubber products. In the second place, there is an indirect benefit to the public in that the Government specifications frequently set standards for the industry which ultimately benefit every consumer.

The especial need for specifications for rubber products may be illustrated by reference to surgeons' gloves. Two gloves may be so similar in appearance, "feel," color, and other characteristics that even an expert can not distinguish between them by looking at them, and yet one of them may become hard and brittle in a few weeks while the other may be practically unchanged after several years. Two or three sterilizations may render the one glove flabby and useless, while the other may still be serviceable after a dozen or more treatments with live steam. The latest Federal specification for gloves will enable the Government to secure the latter type. Important features of this specification are a sterilization test and an accelerated life test whereby a few days in an oven or in a bomb containing oxygen gas under pressure affords a convenient and reliable index of the quality of the rubber.

The majority of the Government specifications for rubber products are promulgated by the Federal Specifications Board, which was organized to compile or adopt and promulgate standard specifications for materials and services and to bring Government specifications into harmony with the best commercial practice. The Director of the Bureau of Standards is chairman, ex officio, of this board, and various members of the bureau staff serve on the technical committees which formulate the specifications. In addition to the Federal specifications, several of the departments of the Government issue specifications of their own. These concern particular or highly specialized products that are required by only one branch of the service, as, for example, the field-telephone wire used by the Signal Corps of the Army, of the gas masks required by the Chemical Warfare Service.

In addition to the Government specifications for rubber products, there are many nationally recognized standards, specifications, and methods of test which have been prepared by technical societies and trade associations. All these specifications have been rendered available in convenient form in the new revised edition of the National Directory of Commodity Specifications compiled by the division of specifications and recently issued by the Bureau of Standards. In this directory each standard or specification is listed by title, designating number, and name of sponsoring organization, and is also summarized as to technical characteristics, scope, and special applications. The standards and specifications for rubber products mentioned in the directory are too numerous to list in full here, there being, for example, specifications for no less than 16 different kinds of hose alone, and for 11 different kinds of druggists' rubber sundries, these having been prepared by various national technical societies, trade associations, and the Federal Specifications Board.

> Continuing his discussion of the work of the Bureau of Standards in relation to the rubber industry, Doctor McPherson in this article describes three avenues through which the bureau comes into direct contact with the rubber industry — specifications, commercial standards, and simplified practice. In the next issue of Commercial Standards Monthly he will continue the discussion with an article on The Testing of Rubber Goods.

The use of commercial standards affords a means whereby the small purchaser may have the advantages of the specification plan of buying without the necessity of familiarizing himself with the technical details of specifications or engaging in the testing of small lots of goods which might involve a greater expense than the saving effected.

The division of trade standards of the Bureau of Standards has cooperated with industry in developing and promulgating commercial standards for rubber sheeting and surgeons' gloves, the annual purchases of which by the hospitals and physicians of the country amount to nearly $5,000,000. The projects for developing these standards were initiated by the American Hospital Association in cooperation with the Rubber Manufacturers' Association. The standard for rubber sheeting calls for the same high grade of material as the Federal specification, and has been published by the Bureau of Standards under the designation, Rubber Sheeting (Hospital), CS38–32. The standards for gloves are designated as Surgeons' Rubber Gloves, CS40–32, and Surgeons' Latex Gloves, CS41–32.

The function of the Bureau of Standards in connection with these projects is that of bringing the various interests of the industry together by means of conferences and correspondence with leaders and by ascertaining the acceptability of the specifications, ultimately arrived at in conference, to the majority of the industry.

The mushroomlike expansion of the rubber industry during the past two decades has led to the production of an unnecessarily large number and varieties, sizes, and kinds of the same rubber article, and in consequence material savings to the industry can be effected by carefully planned and intelligently directed

simplification. As in the establishment of commercial standards the Bureau of Standards acts on requests from the industry and assists commercial groups in the establishment of simplified practice recommendations. The division of simplified practice cooperates with such 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.

A simplified practice recommendation for industrial truck tires developed by the industry resulted in a substantial reduction in the number of sizes of these tires, which range from 9 inches to 27½ inches, outside diameter. In the dental industry and profession, a recommendation has been approved for the color of, and method of packaging, dental veneering, and base rubber.

Simplified practice recommendations are intended to benefit alike producers, distributors, and users.

STANDARDS FOR FARM HOUSING

Program to Raise Standards of Farm Housing Offered by President's Conference on Home Building and Home Ownership

To the 5,000,000 American farm homes in which all water for household use is still carried in from the well by hand, waste is carried out in pails, and lighting is by kerosene lamps, the President's Conference on Home Building and Home Ownership offers, in the publication of its final report on "Farm and Village Housing," a program for the improvement of these primitive conditions.

The report is the work of a committee of 45 specialists in various fields of agriculture and housing, under the chairmanship of Provost A. R. Mann, of Cornell University. It is based upon a survey of the physical conditions of rural housing throughout the Nation, a survey of financing practices, of taxation difficulties, and of the agencies available to work for the improvement of farm homes. It recognizes that the incomes of farmers must increase before most of them can afford new homes of suitable standard, and that this increase must be preceded by more intelligent use of land, involving particularly the withdrawal from agriculture of submarginal land.

But meanwhile, the report finds, much can be done by the farmer himself and by the agencies devoted to his welfare to improve rural housing. If farmers can not afford new dwellings, they can repair and remodel those they have. The authors of the report believe that the poor physical quality of most farm homes, indicated by the fact that the average value of farmers' dwellings in the United States according to the 1930 census, is only $1,126, by the presence of piped-in water in less than one-sixth of America's farm dwellings, and by the general absence of labor-saving devices, is due as much to indifference and to lack of information on how to make improvements economically as it is to low income.

Accordingly, a major feature of the report is that it brings together existing information to serve as a manual for the farmer. There are instructions on how the farmer can acquire plumbing, electricity, and heating equipment bit by bit at a cost which the majority could probably afford. There are also comprehensive instructions on the mixing and use of paints, on the building of frame houses, on the protection of health, and on the planning of the farmstead for beauty and utility. In this connection the report points out that so far even less attention has been paid to making the farm home attractive than to making it comfortable.

But the lasting service of the report is perhaps its revelation of the lack of information extant on farm housing. The authors find that in comparison to the need little has been done; there are no suitable house plans to meet the varying needs of different sections of the country and different types of farming; there have been on attempts to adapt the farmhouse to its special functions; there are no comprehensive studies on reconditioning. That these deficiencies must be met is self-evident and the report calls for the establishment of a central agency for research on farm-housing problems to inspire and coordinate investigations to get at the facts by which better homes for America's farmers can be provided.

Of special interest in connection with the present tendency to return to the land is the section of the report on part-time farmers, who have increased tremendously in the past 20 years. The special problem of all part-time farmers is said to be the "high cost of credit." "The evidence is that credit at 6 per cent is too costly to induce many wage earners to settle on the land or to facilitate improvement in the housing conditions of those who are already engaged in part-time farming."

The report contains also a splendid history of rural architecture in America, a study of village economy, and summaries of the housing conditions of Indians and of migratory laborers—conditions so bad as to constitute a social problem. An extensive bibliography of publications dealing with the many aspects of farm housing is included. Secretary Ray Lyman Wilbur, of the Department of the Interior, wrote the foreword, and there is an introduction by the editors, John M. Gries and James Ford. The volume is an invaluable textbook and guide to action for farmers, agricultural extension agents, and all those interested in rural problems.

This report forms part of the complete program, formulated by the President's Conference on Home Building and Home Ownership, at its meeting in Washington last December, to raise the standard of American housing. The entire program is presented in 11 volumes of which 9 have now been published. The volumes can be purchased for $1.15 each postpaid, from Dr. James Ford, the President's Conference on Home Building and Home Ownership, Department of Commerce Building, Washington, D. C.

HOSPITAL STANDARDIZATION

Work of American College of Surgeons Directed Toward Proper Care of the Patient

Hospital standardization celebrates its fifteenth birthday this year. It presents an enviable record which shows that its accumulated total of individual surveys of hospitals throughout the United States and Canada has passed the 30,000 mark. The phenomenal success of the movement—its wide scope and ever-extending influence—has so improved hospitals in making them adequate for the safe and efficient care of the sick and injured that more than any other single factor has it succeeded in promoting the growth of the hospital as an institution outstanding in devotion of service to the public. Moreover, it has acted as an invaluable aid in developing the consensus of opinion that the modern hospital is an accurate index of an advancing and progressive civilization.

Hospital standardization is a movement to promote the right care of the sick and injured. It aims primarily at establishing and maintaining proper environment in the hospital for the doctor, his associates, aides, and coworkers so that the most scientific service may be rendered. It promotes better hospitalization in all its phases, thus affording the patient the greatest benefits that medical science can offer.

Although the foremost aim of hospital standardization is to benefit the public through the improvement of hospitals, it was the advancement of surgery which was responsible for the birth of the movement. The American College of Surgeons, established in 1913 to improve the practice of surgery and place it on a higher, more ethical plane, required that its candidates submit 100 case records of patients upon whom they had operated as evidence of surgical judgment and technical ability. Few candidates could readily or acceptably comply with the requirements since the majority of hospitals in the United States and Canada failed to keep records providing accurate data. Further inquiry revealed that the average institution lacked a clinical laboratory, X-ray department, and other diagnostic and therapeutic facilities now recognized as extremely essential in the scientific care of the patient. Medical staffs were unorganized and the professional work of the institution was generally without proper supervision.

The American College of Surgeons realized at once how greatly the public could be benefited were conditions in hospitals improved. It, therefore, undertook a plan which has marked an epoch in hospital history—the hospital standardization movement. Following two years of study and investigation, and after having consulted the most eminent medical and hospital authorities, the minimum standard was carefully formulated, and is as follows:

1. That physicians and surgeons privileged to practice in the hospital be organized as a definite group or staff. Such organization has nothing to do with the question as to whether the hospital is "open" or "closed," nor need it affect the various existing types of staff organization. The word "staff" is here defined as the group of doctors who practice in the hospital inclusive of all groups such as the "regular staff," the "visiting staff," and the "associate staff."

2. That membership upon the staff be restricted to physicians and surgeons who are (*a*) full graduates of medicine in good standing and legally licensed to practice in their respective States or provinces, (*b*) competent in their respective fields, and (*c*) worthy in character and in matters of professional ethics; that in this latter connection the practice of the division of fees, under any guise whatever, be prohibited.

3. That the staff initiate and, with the approval of the governing board of the hospital, adopt rules, regulations, and policies governing the professional work of the hospital; that these rules, regulations, and policies specifically provide: (*a*) That staff meetings be held at least once each month. (In large hospitals the departments may choose to meet separately.) (*b*) That the staff review and analyze at regular intervals their clinical experience in the various departments of the hospital, such as medicine, surgery, obstetrics, and the other specialties; the clinical records of patients, free and pay, to be the basis for such review and analysis.

4. That accurate and complete records be written for all patients and filed in an accessible manner in the hospital—a complete case record being one which includes identification data; complaint; personal and family history; history of present illness; physical examination; special examinations, such as consultations, clinical laboratory, X-ray and other examinations; provisional or working diagnosis; medical or surgical treatment; gross and microscopical pathological findings; progress notes; final diagnosis; condition on discharge; follow-up and, in case of death, autopsy findings.

5. That diagnostic and therapeutic facilities under competent supervision be available for the study, diagnosis, and treatment of patients, these to include, at least (*a*) a clinical laboratory providing chemical, bacteriological, serological, and pathological services; and (*b*) an X-ray department providing radiographic and fluoroscopic services.

With interested national organizations approving that the college take the initiative, the minimum standard was put into effect. The first annual survey was made in 1918 and included 692 institutions of 100 beds and over, only 89 of which were found to meet the requirements. The minimum standard has never been altered. Therefore, it can not be said that more institutions are meeting the requirements to-day because of a lower standard. The principles are the same to-day as they were when established in 1918, but their interpretation has broadened to meet the changing conditions of society. Hospitals must develop and progress so that they may keep pace with the growing demands of the public. The minimum standard seeks to standardize hospitals so far as the fundamental principles or essentials of good hospital service and

The use of standardized surgical dressings, as recommended by the American College of Surgeons three years ago, continues to increase in a large number of hospitals since they are found to be practical as well as economical if used under proper conditions. Already most of the 21 types of dressings recommended are in use. These standardized dressings, which during the past year have been approved by the American Hospital Association and promulgated under the auspices of the Bureau of Standards, include sponges, abdominal packs, gauze dressings, and pads.

safe and efficient care of the patient are concerned, but in no way does it deprive an institution of its individuality. The minimum standard promotes independence in adaptation to local and varying conditions. A hospital by maintaining the minimum standard qualifies itself for individual growth and development.

The founders of hospital standardization based their recommendations on fundamental principles which can be adapted successfully to any type of institution caring for the sick and injured. These principles have been amplified and a broader interpretation applied so that they might embrace every phase of hospital administration which has to do with the proper care of the patient. Hospital standardization was intended by its founders to promote medical science through the medium of the hospital. They believed that in this way it would be possible to bring to every practitioner in medicine the most enriching knowledge and experience as a part of his complete armamentarium in diagnosis and therapy. Through improving the organization and utilization of existing personnel and facilities, the founders believed that the hospital could do much toward bettering the quality of the service rendered its patients as well as enlarging that service to a considerable degree.

Hospital standardization does not depend upon legal enforcement. No institution is compelled by law to adopt the principles and incorporate them into its organization. Acceptance of the standard is entirely voluntary, as is maintenance of the requirements. The worthiness of the movement has been manifested by its rapid growth and extension, and the increased esteem accorded those institutions which have adopted the standard. Further evidence of its value is the fact that but few hospitals fail to comply with the requirements after they are once adopted. The movement is not limited to any one part of a hospital; it is not restricted to one group, nor to one specific locality. It takes into consideration all clinical aspects of an institution; it includes all groups and applies equally well to every hospital so long as that institution manifests a true desire to focus every phase of its organization and service toward the proper care of the patient.

USE OF TRANSMISSIONS OF STANDARD RADIO FREQUENCIES

The Bureau of Standards announces the availability of a letter circular (LC335) on uses of transmissions of standard radio-frequencies. This circular, which is in mimeographed form, gives methods of frequency measurement for utilizing the standard frequencies transmitted by radio by the Bureau of Standards. It is in three parts.

Part 1 gives methods of using the 5,000 kc transmissions for the calibration of standard oscillators in simple cases, where the frequencies have such numerical values as to be readily checked directly in terms of the transmissions.

Part 2 gives specific information for the use of the transmissions to check with great accuracy the frequency standard used in any broadcasting station (for example, the monitor required by F. R. C. rule 145). The discussion is divided into three sections, A, B, and C, progressing in difficulty of measurement. Section A deals with two frequencies, 1,000 and 1,250 kilocycles, which could readily be measured as explained in section B. Very little apparatus is required for measurements at these frequencies. Section A includes information on the measurements required when a station standard is used which differs from the assigned frequency by 500 or 1,000 cycles per second. Section B gives the method of measurement when an auxiliary generator is required. The method described in this section applies when the frequency in kilocycles is a multiple of 50. Section C gives the method of measurement for any broadcast frequency (multiples of 10).

Part 3 is a bibliography in which references to other methods of frequency measurements may be found and devices for use in frequency measurements are described. The references give other methods, which range from those using very simple apparatus giving results accurate to 1 per cent, to those using complicated and expensive apparatus giving results accurate to better than a part in a million.

VITRIFIED PAVING BRICK

The revised simplified practice recommendation (1–32) covering vitrified paving brick has been accorded the required degree of acceptance by all interests in the industry. This simplification program, which was originally suggested and developed by the industry in 1921, has been reviewed by the standing committee on eight occasions. The revised recommendation is to be effective as of December 1, 1932.

In the revised schedule, which was prompted by the results of a survey conducted by the standing committee of the industry, the 4 by 3 by 8½ inch vertical fiber lug brick has been included, and the 3½ by 4 by 8½ inch vertical fiber lugless brick has been eliminated. The former size represents 22.6 per cent of the 1931 shipments of vitrified paving brick, while the latter averaged, during the past four years, less than 3 per cent. With these changes the new list of six recognized stock varieties will cover 75.9 per cent of the total shipments as compared with 56.1 per cent for the previous list.

BRITISH STANDARD FOR TRAIN-LIGHTING ACCUMULATORS

Following upon the publication of the two specifications for portable and for stationary accumulators, respectively, a corresponding specification for train-lighting accumulators of the lead-acid type has been issued by the British Standards Institution.

The position in which such accumulators are installed on the train varies greatly according to the practice of the individual railway companies, with the result that it has not been found possible to standardize a rigid design of battery. The dimensions and the materials of a number of the component parts are, however, standardized, and tolerances are given. The chemical purity of the electrolyte is covered, and the method of testing for output fully dealt with. A test for the chemical inertness of molded composition and ebonite boxes is included.

BUYING BLANKETS

American Home Economics Association Issues Leaflet As a Guide to Purchasing Blankets [1]

Bed blankets should last for a number of years. It is highly desirable, therefore, that the blankets purchased be of the kind and quality to give continuing satisfaction to the users.

Most blankets are made of wool, cotton, or a mixture of these fibers. Since wool is more expensive than cotton, the price of a good all-wool blanket is usually higher than that of a part-wool blanket and much higher than that of a cotton blanket. When choosing a blanket, consider the various factors which influence its value and select the one at a price which can be afforded that most nearly meets your own needs.

The physical properties of a blanket are greatly influenced by the kind of fiber used in making it. Because of the characteristics of wool fibers, a well-made wool blanket retains heat, is warm when new, and continues to be warm over a long period of service. The warmth of a blanket results from the abundance of air spaces between the fibers. Cotton blankets may be made to retain heat when new, but this ability usually decreases because the air spaces are reduced as the blanket is used and laundered.

As a rule wool blankets of a given warmth value are much lighter in weight than cotton blankets of similar warmth. It is usually conceded that 20 or 25 per cent wool fiber is required in a part-wool blanket to increase its warmth appreciably over that of an all-cotton blanket. Since cotton is much less expensive than wool, mixed or part-wool blankets tend to have very little wool in them. Unless the percentage of fiber is given on the label, it is doubtless less than 5 per cent.

In March, 1932, a conference (held under the auspices of the Bureau of Standards) of representatives of manufacturers, distributors, and users of wool and part-wool blankets, adopted rules (Commercial Standard CS39–32) which are to be effective after December 31, 1932, for the labeling of these blankets as follows:

No finished blanket containing less than 5 per cent wool shall carry the word "Wool" in any form.

Blankets labeled with the word "Wool" in any form and containing: (*a*) Between 5 and 25 per cent wool shall be labeled "Part Wool, not less than 5 per cent wool." (*b*) More than 25 per cent wool shall be labeled with the guaranteed (minimum) wool content in percentage.

(*c*) Above 98 per cent wool shall be labeled "All Wool."

The wool percentage above refers to the fibers employed and means the percentage of wool in the entire blanket and not in the filling alone.

Therefore, insist on exact information as to the percentage of different fibers in the blankets you buy.

The durability of a blanket depends largely on its tensile strength. This means the pull (measured in pounds) it will stand before breaking. In a recent report on a number of blankets which gave unsatisfactory service, the tensile strength of the warp varied from 17 to 50 pounds and that of the filling from 3 to 15 pounds. The warp of these blankets was cotton and the filling was wool. Probably the minimum tensile strength of the warp of a blanket should be not less than 30 to 40 pounds and that of the filling not less than 20 to 30 pounds. Information as to the tensile strength of warp and filling will probably not be given on the labels for some time, but the purchaser should ask the dealer for it and urge that in the future the manufacturer provide it on the labels of all blankets.

The weight of different blankets of the same size and construction and of the same kind of fibers is a significant indication of their relative warmth and durability; for unless other factors vary, where the amount of fiber is increased, the warmth and durability are increased. Since the properties of wool and cotton are so different, there is no advantage in comparing the weight of a cotton blanket with that of a wool blanket. But one may advantageously compare the weights of different wool blankets of the same size with one another and the weights of different cotton blankets of the same size. In mixed or part-wool blankets one may compare weights where the percentage of fibers is the same. Insist, therefore, on learning the weight of the blankets as well as the kind and relative amount of fibers present.

Construction is important. It has much to do with the warmth and durability of the blanket. The more nap a blanket has, the warmer it is, since it will hold more air; but the filling or crosswise yarns in blankets with a very thick nap have often been greatly weakened in the process of raising the nap, hence an excessively napped blanket will not wear well and the yarns will tend to pull apart when subjected to strain. The purchaser may be able to discover if a blanket has been unduly weakened in the napping process by pressing the nap aside and examining the yarns beneath, or in the case of a lightweight blanket by holding one thickness of the blanket up to the light. Thin places in the blanket and in the individual yarns are evidences of overnapping. The yarns which are used in weaving stripes in the blanket should be similar in construction and of the same fiber as the other yarns and the tension in weaving should be uniform so that when the blanket is cleaned certain stripes or portions of it will not shrink and cause a puckered appearance.

The characteristic of the binding which should be given most consideration is durability. If the binding is a lightweight or a weighted silk, it will have to be replaced long before the blanket is worn out. Furthermore, the binding should be applied in such a manner and be of such material that it will not shrink more than the blanket when it is laundered.

The size of a blanket is usually indicated on the label and, if not, can be readily determined. Too often the blankets chosen are too short to tuck in adequately at the foot of the bed and come up well over the shoulders. One should know the width of the bed on which a blanket is to be used and allow 18 inches or more in addition for the width of the blanket. Standard size beds are 74 inches in length:

[1] Consumer Purchasing Leaflet No. 2, entitled "When You Buy Blankets," prepared by committee on standardization of consumers' goods, American Home Economics Association, 620 Mills Building, Washington, D. C. Copies are obtainable direct at prices approximately equivalent to postage.

therefore, a blanket should not be less than 80 inches long, while 90 inches is desirable.[2] Widths and lengths in inches as recommended for blankets are: For single beds, 60 by 80, 60 by 84, 60 by 90; for three-quarter beds, 66 by 80, 70 by 80, 72 by 84, 72 by 90; and for double beds, 72 by 84, 72 by 90, and 80 by 90.

[2] The sizes of bed blankets recommended by the industry in its Simplified Practice Recommendation No. 11, effective Nov. 1, 1924, are as follows: 54 by 76, 60 by 76, 60 by 80, 60 by 84, 64 by 76, 66 by 80, 66 by 84, 66 by 90, 68 by 80, 70 by 80, 72 by 84, and 80 by 90. This recommendation is scheduled for revision by the standing committee of the industry.

As yet no tests have been developed by which to measure the effect which laundering will have on a blanket, although some blankets tend to retain their original value after laundering much better than others. If a blanket is properly made, one may expect very little shrinkage when properly laundered. All colors should be fast.

It is recommended that the label on a blanket give the consumer reliable information on the following: (1) Size in inches, (2) per cent of wool and cotton, (3) tensile strength of warp and filling, and (4) weight in pounds.

STANDARDIZATION BOARD APPOINTED IN VIRGINIA

Governor Pollard, of Virginia, has announced the appointment of an advisory standardization board to work with the State purchasing agent in an effort to standardize as far as practicable the equipment and supplies used by the various agencies and institutions of the State of Virginia.

The board will include J. R. McCauley, of the medical college; Dr. J. A. C. Chandler, of the College of William and Mary; Capt. Frank Smith of the State penitentiary convict road force; Dr. Julian A. Burrus, of Virginia Polytechnic Institute; Col. William Couper, of Virginia Military Institute; R. E. Skinner, of the Central State Hospital; A. Lambert Martin, of Catawba Sanatorium; Dr. W. E. Brown, of Blue Ridge Sanatorium; and Dr. J. L. Jarman, of State Teachers College.

STANDARDIZATION OF RAILROAD EQUIPMENT

Criticizing the railroads has long been a favorite pastime, recently observed the American Machinist in an editorial on Railroad Critics and Research, adding "and, while much of the criticism has been unwarranted because of a lack of understanding of the problem, there has been plenty of reason for some of it."

One of the latest criticisms claims great losses to the railroads because of lack of research. As a matter of fact, as pointed out by the editor of the American Machinist, considerable research has been and is being done, some of it through the American Railway Association. Many railroad executives feel that the number of types of locomotives can be greatly reduced, and a considerable saving effected both in operation and maintenance. Such a step would not only reduce the cost of carrying spare parts, but would also simplify machining operations in the shops.

Simplification of types of locomotives, and such details as crank pins, bearing and shoes, and wedges will help reduce the cost of operation. Similarly, research might well extend to shop equipment and shop practice, not with the idea of imposing fixed standards or methods on all shops but to aid in eliminating both machines and methods that are obsolete.

As explained by the editorial appearing in the American Machinist, standardization does not mean that no new types of locomotives will be developed, but rather that spasmodic designing and testing by individual railroads would give way to organized research in the interest of the whole industry.

GENERAL CONFERENCE ON WALNUT VENEERS

A recommended commercial standard for walnut veneers as adopted by the general conference of October 20, 1932, was circulated by the division of trade standards for written acceptance under date of November 10, 1932.

This commercial standard provides standard grading specifications for three classes of half-round and sliced walnut veneer based on cutting yield and quality as determined by manufacturing and natural defects.

It is the desire of the walnut-veneer industry to establish these standard rules for the basic grades and thus eliminate the wasteful and cumbersome method of taking several full-sized samples from each flitch. Under the new plan swatches will be used to designate the grain character and texture of the veneer offered for sale under the different grades, and the plan should prove especially beneficial to the manufacturers of walnut veneer as well as panel manufacturers and furniture companies that make their own plywood panels.

A glossary of terms used in the walnut-veneer industry is included in an effort to clarify some of these expressions which are sometimes interpreted differently in various parts of the country.

The standard as recommended was proposed by the American Walnut Manufacturers Association.

STANDARD STEEL SAMPLES OF KNOWN NITROGEN CONTENT

As a result of an apparently increasing general interest in the determination of nitrogen in ferrous materials, the Bureau of Standards has received numerous requests for iron or steel samples of known nitrogen content, for standardizing purposes.

As described in Research Paper No. 494, which is published in the November, 1932 issue of the Bureau of Standards Journal of Research, the nitrogen contents of four of the current standard samples have been determined, and these four samples, with nitrogen contents ranging from 0.005 to 0.028 per cent, are now available as standards for analysts interested in the determination of nitrogen.

Data are presented to show that the nitrogen contents of several standard samples of iron and steel have not changed during periods as long as 13 years. These data are offered in answer to the question that has been raised as to the permanence of the nitrogen content of these samples.

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:

Scientific charts for lantern slides.—A new standard which will be a boon to those who have had to sit through many hours of lectures and papers illustrated with poor and even illegible lantern slides has just been approved by the American Standards Association in the form of an American recommended practice for engineering and scientific charts for lantern slides. The standard, which provides rules for widths of lines, lettering, and symbols designed to assure a maximum of legibility, was developed by a special subgroup of the committee on engineering and scientific graphs of the sectional committee on standards for graphic presentation.

In developing the standard, the subgroup directed its attention chiefly to the most common variety of engineering and scientific charts, namely, line charts which show the relationship between two variable quantities. The purpose of the recommendations is the presentation of the data concerned in a systematic way by means of charts suitable for use as lantern slides when reduced to one-third of their original dimensions. With slight modifications as to line widths the recommendations usually are also applicable to charts that are prepared for use both as lantern slides and as illustrations for publication.

The new standard gives rules for the essential set up of the charts; it further specifies types and sizes of lettering, as well as different line widths, and sizes of four symbols commonly used in graphs—an open circle, a solid circle, a triangle, and a square. The size of about 7 by 10 inches is suggested for the over-all dimensions of lantern-slide charts. This rectangle can be used either vertically or horizontally according to which method presents the data most effectively. The recommended sizes of lettering and widths of line for letters are based on ophthalmological data, actual tests, and an investigation of the conditions under which standard projection equipments are used. For example, the focal length of the projection lantern was assumed to be 12 inches, and the farthest spectator was assumed to be at the same distance from the screen as the lantern.

An appendix, which does not form part of the standard but simply serves as useful information, contains a table of commercial lettering templates and lettering pens with which the charts may easily be produced in the manner recommended. The appendix also contains a list of references to publications dealing with graphic presentation.

Safety Code Correlating Committee.—The recent meeting of the Safety Code Correlating Committee initiated two projects—methods of test and performance requirements for nonshatterable glass, and a project on work in compressed air. Action was taken recommending the initiation of these two projects to the standards council. The recommendation of the committee in reference to the project on nonshatterable glass has already been acted upon by the standards council and the development of the project will be under the sponsorship of the National Bureau of Casualty and Surety Underwriters. No formal action has been taken on the safety code for work in compressed air, as a definite decision has not as yet been made concerning sponsorship.

Important action was also taken by the meeting on two projects which have been inactive for a number of years and which are of prime importance to industry in general. These projects apply to ventilation and to exhaust systems. In connection with the ventilation code, a recommendation for the continuation of sponsorship by the American Society of Heating and Ventilating Engineers was made, and the sponsor is now proceeding with the organization of the sectional committee. This committee will have for its immediate consideration the code recently approved by the sponsor, which has been forwarded to A.S.A. for consideration as the basis of American standard specifications for heating systems.

In reference to exhaust systems, the committee recommended the approval of the New York State Code for the Removal of Dust, Gases, and Fumes as American recommended practice, and the immediate formation of a sectional committee to undertake a revision of this code for advancement to American standard. This recommendation has been submitted to formal letter ballot of the correlating committee before final recommendation is made to the standards council.

Concrete reinforcing rods.—A revision of the American standard on Steel Spiral Rods for Concrete Reinforcement (Simplified Practice Recommendation No. R53–26) has been submitted to the American Standards Association by the joint sponsors, the Bureau of Standards of the U. S. Department of Commerce, and the Concrete Reinforcing Steel Institute. The revision has been accepted by industry as a revision to the simplification under the procedure of the Bureau of Standards. Approval of the revision is now under consideration by the American Standards Association. The revision consists largely of a rearrangement of the tabular form in which certain data are presented, and the placing in an appendix of tables of other data now given for informational purposes.

Wires and cables.—The following standards, recently approved by the American Standards Association, have been published by the sponsors, the American Institute of Electrical Engineers: American tentative standard for weatherproof wires and cables, American tentative standard for heat-resisting wires and cables, and American standard definitions and general standards for wires and cables.

Screen testing of ores.—The American recommended practice for methods for screen testing of ores (hand method), approved by the American Standards Association in July, 1932, has been published by the American Institute of Mining and Metallurgical Engineers, sponsor for the project.

Specifications for cement.—Minor editorial changes, to include tolerances of limits of chemical properties, have been made in the text of American standard specifications for Portland cement. As originally issued, limits for chemical properties appeared in section 2 of the standard specifications for Portland cement; and tolerances for these limits were given in the standard methods of testing Portland cement. A revision of

the standard methods of testing Portland cement is now being considered by the sectional committee, following its adoption by the American Society for Testing Materials, sponsor for the project. In connection with this revision, tolerances for the chemical limits have been transferred to the standard specifications and now appear in section 2 as follows:

	Limits	Tolerance
	Per cent	*Per cent*
Loss on ignition	4.00	0.25
Insoluble residue	.85	.15
Sulphuric anhydride (SO_3)	2.00	.10
Magnesia (MgO)	5.00	.40

ARMY-NAVY AIRCRAFT STANDARDIZATION

The Army-Navy aircraft standardization conference, held recently at the Air Corps matériel division, Wright Field, Dayton, Ohio, marked the eighth annual meeting of this kind. Beginning in 1923 in an attempt to unify the requirements of the Bureau of Aeronautics of the Navy Department and the Air Corps of the Army, for materials, with a view to simplifying their manufacture, procurement, and stocking by the trade as well as by the services, the first standardization conference was held at McCook Field in December, 1923.

It was agreed at the first meeting that the work of standardization should be extended to cover hardware and equipment as well as raw materials, and though the first conference was devoted to materials alone, all subsequent meetings included in their agenda items of hardware and equipment.

The work is handled under the supervision of two officers, one an officer of the staff of the matériel division, usually the chief engineer, and the other an officer of the matériel division of the Bureau of Aeronautics, the head of the specification group. These officers select the subject for study, correspond with the trade and each other, arrange for and conduct the conference, and sign and promulgate the standardized master drawings and specifications. It has been the custom to hold two meetings a year, the first, a preliminary conference, held in the winter alternately at Wright Field and in Washington, and a main conference in the summer held alternately at Wright Field and at the naval aircraft factory.

The work has gone forward steadily, strongly supported by the trade, to which such standardization means reduced production costs, simplified stock, and fewer inspection difficulties. From a bare handful of men seated around a small table the conference grew to almost convention proportions. The meetings of 1928 and 1929 were attended by from 200 to 300 manufacturers' representatives. Since then the attendance has been tapering off—partly because of the present business conditions—but principally because most of the commonly used materials and parts have been covered, and the meetings have become more specialized.

From being just a standardization of requirements between the two military services, the Army and Navy standards have to a great extent become the standards of the commercial aircraft industry as well. They have been adopted, where applicable, practically in toto by the Society of Automotive Engineers as aircraft standards.

Probably one of the outstanding accomplishments has been along the line of aircraft instruments, although at the beginning standardization appeared almost hopeless. At that time the Army had switched practically completely to the vertical scale instruments. The Navy, on the other hand, was developing a set of small diameter round dial instruments using only two diameters. At the present time the instrument standardization is practically complete, the Navy small round-dial instruments being used. In some cases where ideas differ as to the "innerds" of an instrument, standardization has consisted of seeing that the case and mounting dimensions are the same so that they are interchangeable on the instrument boards. The instrument standardizers' work has now come to be merely the correction and revision of existing standards and the consideration of new instruments.

The benefits of the Army and Navy standardization activities can not be measured wholly by the concrete results in the form of specifications and drawings. The personal contact between Army, Navy, and commercial personnel has done much to eliminate misunderstandings and to aid all hands in joining forces in the main purpose, making the United States first in the air.

WOOL AND PART-WOOL BLANKETS

The Commercial Standard for Wool and Part-Wool Blankets, CS39–32 is now in printed form and is obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents per copy.

This standard protects the distributor and user of blankets, by establishing a standard method of labeling the percentage of wool contained in the finished blanket, and a standard method of test for the determination of wool content.

It is effective for new production and clearance of existing stocks December 31, 1932.

COLORS FOR GAS CYLINDERS

The British Standards Institution has issued a revision of its specification dealing with identification colors for gas cylinders. It will be recalled that the specification, first published in March, 1931, provided for identification colors for the cylinders containing the gases most commonly used, the underlying principle of the scheme being that yellow should represent the toxic or poisonous gases, and red or maroon, the inflammable gases.

The specification has now been extended to provide for cylinders used for medical purposes, containing such gases as oxygen, carbon-dioxide, ethyl chloride, ethylene, and nitrous oxide. The value of the scheme is to be to some extent contingent upon the general adoption of the standard valves specified in specification No. 341—1931, of the British Standards Institution.

NEW TYPES OF PAPER TESTING EQUIPMENT

As the result of recent work at the Bureau of Standards, three new instruments have been made available for testing paper—one for measuring water resistance, another for measuring the opposite quality of absorptiveness, and a third for removing coatings from paper so that the paper base can be inspected and tested.

It was found that about 40 methods are available for measuring the rate of penetration of water, writing fluids, etc., and, as might have been suspected from their multiplicity, most of them are unsatisfactory for the purpose. A simple and effective method was developed, which consists in floating the paper on water after having sprinkled on the upper surface of the paper a little powder containing some water-soluble dye.

More recently a simple apparatus to facilitate the test has been devised. The paper is clamped over a hole in the bottom of an aluminum float, a watch glass and a spring clamp being used to hold it in place. The float is placed on a vessel of water so that the underside of the paper becomes wet. Before clamping the watch glass over the paper a little of the dry indicator powder is sprinkled on the upper surface by means of a shaker made of a small screw-cap vial in the end of which is fastened a disk of fine-mesh wire screen. A stop watch is used to determine the time required for the water to penetrate through and cause the color to develop in the powder.

Paper towels are required to absorb rapidly a thin film of water from the skin. In testing paper toweling for absorptive quality it is difficult to provide a film of water of known, uniform thickness which can be used to measure the relative time required by different towels to absorb a given amount of water. Since the towels are thin, only a very small volume of water can be soaked up at any one spot. Hence, if one can place very small drops of water of constant, known volume on the different towels and measure the time required for each to be absorbed, the testing conditions practically duplicate the service conditions, provided the drops are so small that they are absorbed by sinking into the paper rather than by spreading sideways very much.

The Bureau of Standards has developed an apparatus for placing on the surface of paper accurately measured drops of water little larger than the head of a pin. The apparatus consists of a small graduated pipette mounted at an angle and provided with a needle valve so that small, measured amounts of water can be valved out and touched to the surface of the paper to be tested. A stop watch is used to time the absorption period.

Federal specifications for carbon paper require the measurement of the ream weight of the tissue base on which the carbon coating is applied. It is a rather difficult matter to remove the carbon coating completely from a fairly large sheet of carbon paper. Formerly this was done, although with indifferent success, by immersing the sheet in chloroform and rubbing off the coating with pads of cotton. Obviously such a procedure would not be popular with the laboratory or stock-room personnel.

An improved extractor and friction cleanser has recently been developed, which can be used to clean satisfactorily not only carbon paper but also a variety of other sheet materials, such as waxed paper, case-lining paper, sheathing paper, balloon fabric, and artificial leather in sheets nearly a foot square. The apparatus consists of a special form of reflux condenser in which the paper is carried on a rotating cylinder and is scrubbed lightly with a brush. The combination of fresh, hot solvent and scrubbing is very effective.

GLASS CONTAINERS FOR MAYONNAISE AND KINDRED PRODUCTS

Simplified practice recommendation No. 131–32, covering glass containers for mayonnaise and kindred products, is now available in printed form, and can be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents each.

This recommendation, which was proposed and developed by the industry, provides a simplified list of capacities of stock glass containers for these commodities, and has been instrumental in reducing the number of capacities from 25 to 5, or an 80 per cent elimination.

SIMPLIFICATION FOR ASPHALT REAFFIRMED

Simplified practice recommendation No. 4, asphalt (first revision), has been reaffirmed, without change, by the standing committee of the industry.

This action is based on a recent survey of production which showed that 94 per cent of the asphalt produced by the 16 companies reporting, conformed to penetrations recommended in the simplified schedule.

PAPER CONES AND TUBES

Simplified practice recommendation R143–32, paper cones and tubes, has been accorded the required degree of support by all interests in the industry, and is to be effective from January 1, 1933.

This simplification program, which was proposed and developed by the industry, is concerned with the length, inside diameter, weight per thousand, and color of parallel paper cones and tubes. These cones and tubes are used for winding textile materials, such as warp and knitting yarns, silk, rayon, hosiery yarns, tire cord, thread packages, and wire insulating yarns.

SAVINGS TO NAVAL-STORES INDUSTRY

Savings of hundreds of thousands of dollars a year have been effected, and additional savings running into the tens of millions a year are being sought in research by the U. S. Department of Agriculture into the problems of the naval-stores industry, according to an announcement made by the Bureau of Chemistry and Soils of that department.

Development of a system of standards for rosin has had an estimated value of $100,000 a year to the industry, and improvements in equipment and operation of stills, developed by the Bureau of Chemistry and Soils, are giving higher yields of turpentine and better grades of rosin, the statement said.

LACK OF UNIFORMITY IN LABOR LAWS

A lack of standardization in employment hours for women characterizes the Nation as a whole, while no one State has regulated each industry or occupation by the passage of all types of hour laws, according to a recent statement made public by the Women's Bureau of the Department of Labor, dealing with labor laws for women.

However, the statement pointed out, there are only four States which are without legal limitation on the hours of work to be performed. Using the 8-hour day and 48-hour week for women as an example, it was stated that six States have adopted this measure for the protection of women workers.

APPLE WRAPS

General approval of the commercial standard for paper apple wraps has been indicated by the acceptance of this standard by practically all manufacturers of the product and by a large group of apple packers. Accordingly, a letter announcing its adoption by the industry was circulated by the division of trade standards on November 1, 1932.

The standard concerns dry and oiled apple wraps and specifies the method of packing, standard sizes and weights, oil content, bursting and tensile strength, together with suitable tolerances and methods of testing.

Mimeographed copies are obtainable gratis from the division of trade standards, Bureau of Standards.

CONCRETE BUILDING UNITS

The required degree of support, by all interests in the industry, has been accorded simplified practice recommendation No. R32–32, covering concrete building units, as revised by the industry's standing committee at a meeting held on March 1, 1932.

In the modified simplified schedule, the length dimension for three items was changed from the nominal dimension of 12 inches to the actual dimension of 11¾ inches; the maximum permissible variation for block and tile, over and under the given dimensions, was placed at one-fourth inch; and in the case on concrete brick, it was decided to follow the tolerances prescribed by the American Society for Testing Materials in connection with clay and sand-lime brick masonry units, so that the tolerances for concrete brick will be one-sixteenth inch in height, one-eighth inch in width, and one-fourth inch in length.

The revised recommendation became effective December 15, 1932.

FUEL OILS

Upon recommendation of the standing committee, the Commercial Standard for Domestic and Industrial Fuel Oils, CS12–29, has been revised and given the abbreviated title of "Fuel Oils," and will soon be sent to the industry for acceptance.

Minor changes were recommended in the brief descriptions of the grades as indicated in Tables 1 and 2, but the most important change is the provision of a table of maximum sulphur content for grades 1 to 4, inclusive. This table is included for convenience in specifying fuel oil of low sulphur content used in connection with heat treatment, nonferrous metal, glass and ceramic furnaces, and other special uses.

Mimeographed copies of the recommended revision of the Commercial Standard for Fuel Oils are obtainable from the division of trade standards, Bureau of Standards, Washington, D. C.

STAPLE SEATS FOR WATER-CLOSET BOWLS

Following consideration of the adherence report on the Commercial Standard for Staple Seats for Water-Closet Bowls, the standing committee recommended the reaffirmation of the standard without change for another year, or until an authorized revision is duly indorsed by the industry and an announcement issued to this effect.

Eighty-eight per cent of production conforms to the requirements of the commercial standard CS29–31 according to the unweighted average among those reporting.

S-P-E-C-I-F-I-C-A-T-I-O-N-S

To determine whether an applicable specification exists for any commodity—consult—

National Directory of Commodity Specifications, 1932

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THE UNITED STATES DEPARTMENT OF COMMERCE

ROY D. CHAPIN, 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

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