

Bureau of Standards

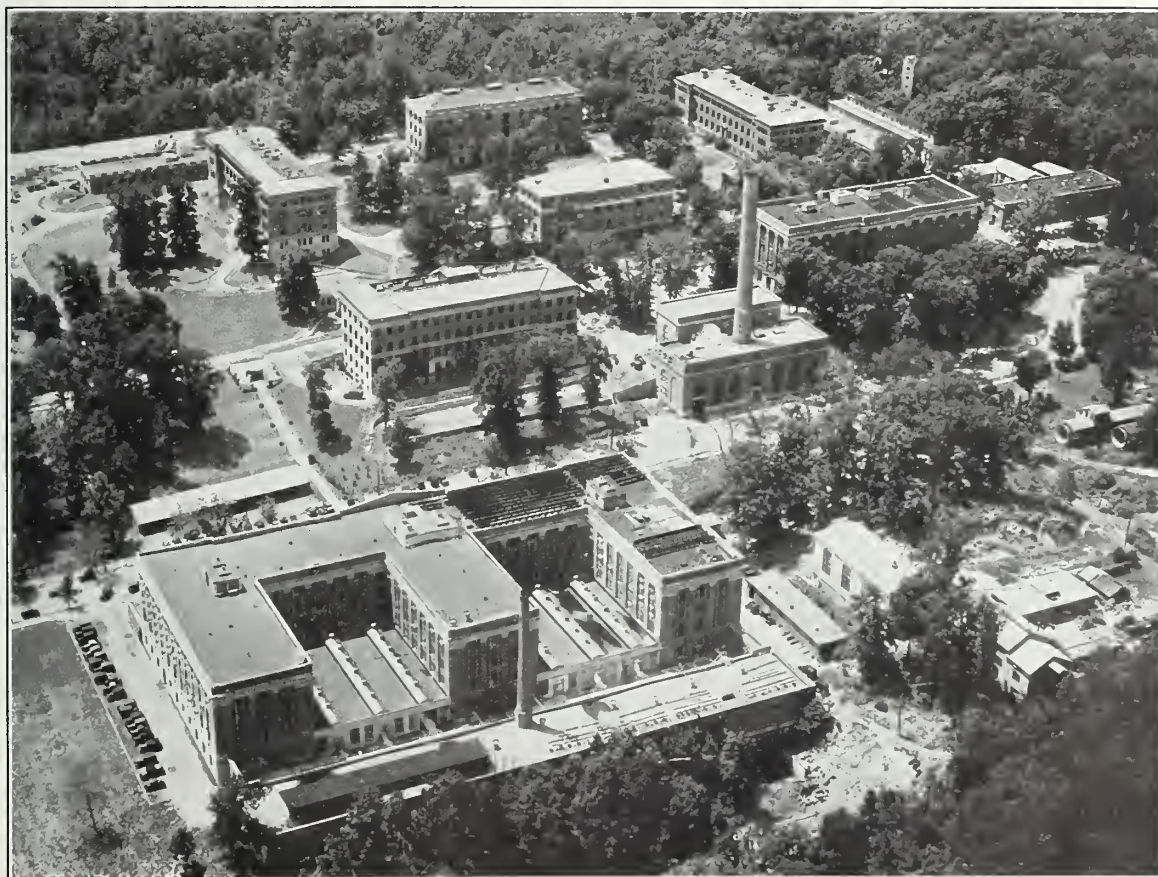
JUN 5 1933

COMMERCIAL STANDARDS MONTHLY



Reference book not to be taken from the Library

*A Review of Progress in
Commercial Standardization and Simplification*



Photographed by Army Air Corps

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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May 1933

The Commercial Standardization Group

A. S. McALLISTER, Assistant Director

DIVISION OF SIMPLIFIED PRACTICE

Edwin W. Ely

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

BUILDING AND HOUSING DIVISION

J. S. Taylor

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

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

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

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

DIVISION OF SPECIFICATIONS

A. S. McAllister

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

STANDARDIZATION
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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., MAY 1933

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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.

Uphold QUALITY Through STANDARDIZATION



Engineers know the fallacies and dangers in lowering costs below the minimum which permits production of goods having adequate quality for the service intended, recently stated Arthur W. Carpenter, chairman of the A.S.T.M. committee on membership. He added "They know that safeguards must be established which permit evaluation of quality in terms of service life and which prevent the acceptance of materials which do not conform to the established safe limits."

In periods like the present, of depression and falling prices, when competition is exceedingly keen and consumers and producers alike are faced with the necessity of cutting costs wherever possible, then, if ever, the temptation arises to accomplish the required results even at the expense of lowering quality, he pointed out. The pressure on the technical organizations responsible for upholding quality both in manufacturing operations and in purchasing of materials may become so great as to seem almost irresistible.

"At such times", said Mr. Carpenter, "standard specifications and methods of test which have been expertly prepared and carry authority of * * * are of inestimable value in maintaining goods 'built up to a standard instead of down to a price'."

LABELING PROCEDURES OF FOREIGN COUNTRIES

Review of Certification and Labeling of Commodities in Foreign Countries

By ROBERT A. MARTINO, *Bureau of Standards*

The increasing demand by consumers for better grade and quality of goods has led to the development of various plans in order to bring this about.

Within the past few years more than 100 American technical societies and trade associations not only have been encouraging manufacturers to produce commodities conforming to accepted standards and specifications, but also have taken definite steps to provide means and methods by which the buyer can identify goods complying with specifications requirements.

Similar activities are at present being carried on in foreign countries. Many of the foreign national standardizing bodies and other organizations have already developed or are now working out programs relating to certification and labeling of certain types of commodities as conforming to well-established standards and specifications.

There are given below brief outlines of the various programs now in actual operation in several foreign countries. Much of the following information was obtained through the very helpful cooperation of the British Standards Institution, and from material recently received from several foreign standardizing bodies.

Austria.—The Austrian national standardizing body has obtained a copyright on an association mark to be placed on products as an indication that they comply with the requirements of certain standard specifications. This mark carries with it a statement of guarantee to the purchaser that commodities so stamped or labeled do actually comply with certain specifications. The right to use this mark is under the control of the standardizing body, and license will be issued only upon sufficient evidence and proof that the products which are to be stamped or labeled are in accordance with certain standard specifications formulated by this body. Any willful abuse or illegal use of the mark, such as its use without approval of the Austrian body or its use on products which are not in accordance with standard requirements, will subject any individual or concern to criminal prosecution.

All specifications and rules covering the manufacture and installation of electrical apparatus in Austria are prepared by the Elektrotechnischer Verein. A committee of this organization is entrusted with the responsibility of stating, at the request of the manufacturer, whether electrical apparatus and supplies are built in accordance with the rules and specifications laid down by the electrical association.

Belgium.—The Belgian Electrotechnical Committee grants the use of the quality mark to manufacturers of insulated wiring circuits, overhead lines, lead and steel armored cables, low-voltage apparatus, and electrical heating appliances. This mark certifies to purchasers that the material so marked conforms to certain requirements for construction, performance, durability, and safety. The quality mark must be associated with a distinctive "maker's mark" so that the manufacturer can always be identified.

Permission to use the mark may be granted to Belgian manufacturers and also to foreign firms having Belgian agents who are acceptable to the B.E.C. as jointly responsible for the obligations contracted by the manufacturer. This permission cannot be granted, however, if there is, in the country of a foreign manufacturer, a recognized quality mark similar to that of the B.E.C., and if the Belgian manufacturers cannot be permitted to use it.

Manufacturers who make use of this mark undertake certain obligations, one of which is that they are not to place on the Belgian market any unmarked specimens of articles for which authority to use the mark has been granted.

Permission to use the mark is in the hands of a board specially constituted by the Belgian Electrotechnical Committee.

Articles submitted to the board are subjected to a preliminary examination and, if this proves satisfactory, they are then tested to determine compliance with the appropriate specifications. Where Belgium standard specifications issued by the Belgian Electrotechnical Committee exist, these are taken as a basis for the tests, but where such specifications do not exist recourse is had to foreign specifications, mainly those issued in conjunction with the Installations Fragen Kommission (mentioned below). In the absence of a standard specification the committee sometimes prescribes special tests of its own.

If the apparatus submitted to either the preliminary examination or the test is rejected, the manufacturer has the right to appeal to the board. The board, however, is not bound to justify its decision nor to return the samples submitted.

The manufacturer may not make any alteration in a marked article without the permission of the board.

Provision is made for check tests on samples selected at random from stocks held by the manufacturers, wholesalers, or retailers. Such tests are carried out at the expense of the committee. If these tests prove any violation of the conditions under which the mark is used, fines are imposed or permission to use the mark may be withdrawn.

The Belgian Electrotechnical Committee reserves the right to publish in the daily technical press notices of the withdrawal of permission to use the mark, and to take all measures that they consider necessary to uphold the value of the mark.

Canada.—The "Power Commission Act" gives authority to the Hydro-Electric Power Commission of Ontario to make rules and regulations governing the construction, installation, and inspection of apparatus and equipment used in the transmission of electric power in Ontario. The commission maintains a continuous check upon the quality of apparatus by means of label and reexamination service.

The label service applies to certain specified types of equipment. Labels are sold by the commission and affixed by the manufacturer to the equipment. The

control of the use of these labels is provided for in a label service agreement.

In connection with the reexamination service, apparatus other than that included in the label service, carries a name plate which contains the number of the commission's approval. This serves to identify the equipment and is an indication to prospective purchasers and instructors that the equipment has been approved.

Under the label and reexamination service, laboratory inspectors visit the factories periodically and make reports to manufacturers, giving the results of their inspection.

Steps are being taken to form a Canadian Government laboratory for the purpose of granting approval to electrical apparatus which conform to the requirements of the Canadian National Code.

Czechoslovakia.—Standardized electrical products are controlled by the Czechoslovakian Standards Society, and a quality mark is affixed to them which signifies that the products conform strictly to the requirements of the standards applying to the goods. Quality marks are now attached or placed on insulators, switches, electric bulbs, flatirons, vacuum cleaners, electric stoves, refrigerators, physicians' apparatus, etc. These marks guarantee the purchaser products of standard quality.

Denmark.—The Danish Standards Council has adopted the symbol "DS" as a mark which may be used by manufacturers to show that they conform to the requirements of Danish standards. The right to use the symbol is given free upon application, with the proviso that the product be manufactured in Denmark, and that it actually conforms to the requirements of the standard concerned. Penalties are attached to the misuse of the symbol.

Germany.—Electrical apparatus conforming to the specifications of the Verband Deutscher Elektrotechniker may be approved by either the VDE mark or by the word "Kennfaden" for cables and wires, or by the word "Codex" printed on boxes, wire, and cable drums. It is important to note that the VDE approval does not claim to be a proof of quality, but only claims that apparatus bearing one or the other of the above indications of "approval" is fireproof and safe. Since products which comply with these two conditions, however, are considered to be of good quality, the VDE mark has been more or less regarded as a sign of quality.

The VDE mark may be used by German firms who are members of the Verband and who manufacture fuses, lampholders, plugs and sockets, switches, heating apparatus, small transformers, wireless apparatus, insulated wires and cables, etc. The mark may also be used by foreign firms manufacturing the above-named products by forwarding their application through an authorized agent living in Germany and who is a member of the Verband.

Products furnished with the mark must be on sale within 1 year from the date on which the mark was granted, otherwise the approval expires. Besides the VDE mark, a special mark of the firm must be visibly and durably affixed.

The VDE mark, when granted, can be used in advertisements, together with the firm's mark, but no confusion as to the product, type, voltage, and current rating must be possible.

Another agency in Germany which makes use of an identification mark on goods to denote quality is the Reichsausschuss Für Lieferbedingungen. This organization corresponds roughly to the Federal Specifications Board in the United States. Through the cooperation of producer, merchant, and user organizations it prepares specifications for raw materials and finished products.

The label issued by this organization carries the letters "RAL", signifying that goods so labeled are guaranteed to comply with quality conditions and tests given in the specifications covering these commodities.

Great Britain.—In Great Britain there is no official body responsible for approving electrical apparatus except in the case of electricity meters, the approval in which case is given by the Minister of Transport on the basis of a report from the National Physical Laboratory, and ships' lights, the approval of types of which is given by the Board of Trade on the basis of tests carried out by the National Physical Laboratory. Electrical and other domestic apparatus is, entirely unofficially, approved by the Good Housekeeping Institute. Gas meters and apparatus, such as gasoline pumps, are officially inspected and tested by inspectors appointed by the local authorities.

In connection with domestic appliances, manufacturers are free to submit them to the Good Housekeeping Institute for routine testing, and all equipment which reaches the institute's standard of efficiency is awarded a certificate of approval, and manufacturers are free to use the seal of approval. A detailed report of the institute's investigation is also drawn up and sent with the certificate. The certificate given must be renewed yearly, and before issuing a new one, the institute asks the manufacturers whether the design of the apparatus has been altered in any way. If so, the new model is submitted to further tests before another certificate is granted.

During the early part of this year there was organized in London the National Asphalt Mine-Owners and Manufacturers' Council for the purpose of standardizing the manufacture and application of mastic asphalt for building construction. In order to afford users of mastic asphalt a ready means of identification, the council adopted a trade mark and a design of asphalt block, which together make up the mark of quality. This mark is to be used only on materials manufactured according to the council's specifications.

Where the council's standard specifications are called for in the contract, purchasers will be entitled to receive a warranty issued by the council under seal. This warranty will be in addition to the guarantee given by the contracting company.

It is the aim of the council to exercise strict supervision over materials, not only from their source and through all stages of their manufacture, but even to the actual execution of the contract.

Holland.—The Dutch Testing Service for Electrical Materials has been organized as a limited company by the principal electricity supply undertakings of the country. In order to give manufacturers a guarantee of impartiality there has been set up a control committee consisting of neutral experts, such as representatives of the Government, the universities, etc.

The specifications to which material must comply are those drawn up by the Dutch General Standardization Committee. Where such specifications do not

exist, provisional specifications are used. These are formulated by committees of experts and are adapted as much as possible to regulations already valid elsewhere, such as the German VDE rules. In this way are obtained the minimum requirements with which the material must comply in order to be approved.

The results of every test are given in a report issued by the "testing service", and a list of approved materials is published every 3 months. Such materials, however, must not be confused with those which have been granted a distinctive mark; that is, a quality mark. This is conferred only on products of especially good quality, and which comply with supplementary requirements regarding the efficiency of the apparatus, its life, suitability for the purposes intended, etc.

The quality mark consists of an equilateral triangle containing the letters KEMA (Keuring van Electrotechnische Materialen, Arnhem). The word "Keur", meaning test, the date and a number indicating the kind of material and the manufacturer are also included in the mark. This mark must be indelibly stamped on the material or on the package containing the material. For electric wires, this mark is replaced by a distinctive thread. If a manufacturer obtains the distinctive mark for one of his products he must make a contract with the "testing service". This contract is valid for only 1 year because of possible revision of the specifications, but it can be renewed. It contains, among other things, stipulations that the manufacturer must collaborate in the periodic testing of the product in question by supplying samples regularly. If the material examined in this way does not correspond with the approved samples, or if the manufacturer violates other provisions of the contract, the "testing service" can revoke his right to the distinctive mark, and can impose a fine, the maximum amount of which is also fixed in the contract.

Italy.—Labeling is being carried on to some extent in Italy. The Italian Electrotechnical Association

grants the use of a label, bearing the monogram of the association, to electrical manufacturers whose products are built in accordance with the specifications prepared by the standardizing body in that country (Ente Nazionale per l'Unificazione nell'Industria).

Switzerland.—In Switzerland the duty of inspecting electrical apparatus and installations is assigned by the Government to the Association Suisse des Electriciens. All apparatus which is in accordance with certain required standards is labeled with a quality mark issued by the Association.

International.—Several years ago there was organized in Holland the Installations-Fragen Kommission consisting of delegates of associations representing electric supply manufacturers in 12 countries, as follows: Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Hungary, Norway, Sweden, and Switzerland.

The main object of this organization is to secure international cooperation in the elimination of faulty installation of material and accessories. A number of countries, as has been shown in the preceding notes, have issued regulations with a view to preventing the use of accessories, such as switches, fuses, plugs, and appliances which, because of conflicting requirements, have not been approved by some recognized agency. It is the aim of this body to design and make fittings which would be generally acceptable in various countries.

Specifications drawn up by the I.F.K. are intended to form the basis for national specifications of various countries participating in the work; and now that a high degree of uniformity has been attained, a further step is the mutual recognition of each other's "national mark" or its equivalent. In this way a design approved for use by the authorities in one country, will be usable with but formal approval in another country. Negotiations along these lines are still in progress.

HANDBOOK ON SHEET COPPER

Announcement of the publication of a new manual "Sheet Copper" for the information and guidance of architects has been made by the Copper and Brass Research Association, No. 25 Broadway, New York, N.Y.

"Sheet Copper" supersedes earlier editions of "Copper Refinings" and "Copper Flashings." It contains revisions and rearrangements of all the important details on the application of sheet copper in building construction which appeared in those handbooks, and also much more new data on the subject. One section is devoted entirely to specifications.

Material presented for the first time includes a presentation of research studies on the effect of temperature changes, the strength of seams and joints, and data on lead-coated copper in the general section. Also, corrugated roofing, vertical surfaces, and spandrels, which were not treated in the preceding handbooks, are covered. Special attention is invited to the details and discussions of gutter expansion joints and of auxiliary drains. The section on drainage is virtually all new, and is intended to be of possible aid to designers.

IDENTIFICATION OF CHEMICAL PIPE LINES

The British Standards Institution has published a specification dealing with the identification of chemical pipe lines carrying inflammable, explosive, toxic, and corrosive gases.

A careful survey of existing conditions in the chemical industry showed that it was essential that the system adopted should be inexpensive to operate, and simple and easy to memorize. In case of emergency, the system should also permit of the quick identification of the fluids or gases conveyed through the pipes. The British standard scheme differentiates between the type or nature of the fluid or gas conveyed by means of a series of enameled identification plates placed adjacent to the control valve and at such intervals along the pipe as is deemed necessary by the user.

The identification plates are designed in such a manner as to suggest to the workman the nature of the fluid or gas conveyed therein, and are so shaped that sufficient room is allowed at the base for the name or chemical symbol of the gas or fluid, if so desired. It is expected that their adoption will constitute a further step forward toward safeguarding those engaged in operating chemical plants.

RADIO SYSTEM FOR LANDING OF AIRCRAFT

Tests Conducted by Bureau of Standards at Newark Airport Prove Most Successful

Practical tests of the radio system for the blind landing of aircraft, developed by the Bureau of Standards for the Aeronautics Branch of the Department of Commerce, are being carried on at the Newark (N.J.) municipal airport. In some of these tests the pilot lands the airplane while sitting in a hooded cockpit, so that nothing outside is visible. Other tests are being made in foggy weather, a condition which is generally not as severe as the artificial one first mentioned. The equipment at Newark is available for use by any airplane having the necessary receiving apparatus.

The present system was developed as the result of several years of research work, divided roughly into three stages: Fundamental experiments to devise the component parts of the system; practical development of these component parts and demonstration of their practicability in tests at the bureau's experimental flying field, College Park, Md.; and the present tests of the complete system at a commercial airport.

The system, as illustrated by the installation at Newark, includes 3 elements—a runway localizing beacon; a set of 2 marker beacons; and a landing beam. These 3 elements give the airplane its position in all 3 dimensions continuously while landing. The runway localizing beacon operates on about 300 kilocycles and is similar to the visual-type transmitters designed by the Bureau of Standards for radio range-beacons of the Federal airways.

Small low antennas are employed, so that the ground equipment does not constitute an obstruction to flying, and a goniometer allows the course to be swung over an arc of 40°. This covers the northeast quadrant from which winds are usually blowing at Newark during foggy weather. The marker beacons operate at 10,000 kilocycles. One is placed about 2,000 feet beyond the edge of the landing area while the other marks the edge of the field. These are low-power transmitting sets with long, low, horizontal antennas. They operate from the commercial power supply, and different modulation frequencies make it easy to identify the two beacons. The landing-beam transmitter employs an ultra-high frequency (about 100,000 kilocycles). Its antenna array consists of 12 half-wave horizontal antennas, so grouped as to give the necessary directivity of beam in the vertical plane, while spreading the beam out horizontally to cover the 40° sector. This results in a fan-shaped beam which provides vertical guidance for all orientations of the runway beacon course, within the limits specified. In using the landing beam the pilot follows a course of equal signal intensity, below the axis of the beam, this path being a curve tangent to the ground, thus giving proper conditions for landing.

The receiving equipment on the airplane consists of the regular medium-frequency receiving set commonly used on air transport airplanes, augmented by a reed converter and automatic volume control, for picking up the signals of the runway localizing beacon; a marker-beacon receiving set operating on 10,000 kilocycles and giving aural signals in headphones;

and a landing-beam receiving set employing a detector tube, audio-frequency amplifying tube, reed filter, and cuprous oxide rectifier, and operating at 100,000 kilocycles.

The reed converter of the medium-frequency receiving set and the landing-beam receiving set are connected to the vertical and horizontal pointers, respectively, of a combination indicating instrument mounted on the instrument board of the airplane. The vertical pointer shows whether the airplane is on or off the course laterally, while the horizontal pointer shows whether the airplane is on, above, or below the vertical path marked out by the landing beam. A control panel is provided for controlling the receiving sets, for reversing the vertical pointer to take care of flights toward and away from the beacon, and for adjusting the steepness of the landing path to suit the airplane. A switch permits connecting the horizontal pointer to the output of the reed converter to test out the receiving sets.

The method of landing is similar to that ordinarily followed, except that the pilot, instead of watching the horizon and the ground, watches the two pointers of the combination indicator and listens to the signals of the marker beacons.

The experiments at Newark cover the determination of the most suitable radio-frequency (from the point of view of the airline operator) for the marker beacons. In some of the tests the marker beacons were operated on frequencies in the aircraft communication band (3,000 to 6,000 kilocycles), so that the high-frequency radio receiving sets usually carried on aircraft were utilized.

During the past few weeks many pilots, airline operating officials, and others have tried the system under operating conditions at the Newark airport. They have commented unanimously upon its thorough practicability and convenience.

THE AMPERE

The value of the ampere has been determined in absolute units at the Bureau of Standards, using a current balance, in which the force between coils carrying a current is measured.

The current balance originally used by Rosa, Dorsey, and Miller was employed, but the apparatus has been modified in many important respects. Four sets of coils were used. The important constant in the computation of the current from the force between the coils is the ratio of their radii.

Eight experimental determinations of these ratios have been made giving results which are self-checking and which show no errors larger than ± 6 parts in 1,000,000. Four series of determinations of the force give results in which the average deviation from the mean is about ± 3 parts in 100,000. The present international ampere is shown to be slightly smaller than the absolute ampere, the difference being about 6 parts in 100,000.

STANDARDIZATION AND RESEARCH

Standardization Is a Continuing Process Whose Aim Is Not Fixity or Stagnation but to Apply and Generalize New Science in Design and Construction

By HENRY D. HUBBARD, *Bureau of Standards*

Standardization is the outstanding note of this century. It ramifies to the remote details of our industrial regime. Its trends are highly significant. They tap all sources of scientific knowledge and affect every phase of design, production, and utilization.

Research is the vital factor in standardization chiefly through seven lines of approach: (a) Measuring the need to be met, (b) analysis of factors adapted to meet the need, (c) fixing measured controls for producing predictable quality or performance, (d) basing such controls on correlation of fitness factors with service utility, (e) devising methods of test of quality, (f) analysis of service experience or simulated service to aid in improving the standard, and (g) most important—research fundamental to the pure sciences involved.

Measures of the need are the matrix for the specification. Point by point the measured quality must match the measured need. The measured curvature of the lens is made to match the measured defect of the eye, and the result is perfected vision. The measure of the need is basic. Modern science is making it possible not only to measure every need, but to create new stimuli and new desires to enrich life—aviation, radio, cars, motion pictures, and the camera are examples. Fitness for use is the definition of quality. Fitness is best assured only when the need to be met is scientifically measured. Such measures should be the basis for all standardization.

Research affects every phase of the choice, treatment, and use of materials and energy, specifically through the discovery and correlation of the properties of matter and energy with useful service to man. In commerce the properties of materials are, of course, the real utilities sold, bought, and used. The utility of things depends upon the nature, magnitude, and stability of these properties. To determine these is the purpose of research, to correlate them with their uses is its main problem. By eliminating the useless or harmful properties and developing the magnitude of useful properties, the net service is enhanced.

Discarding mere guess or opinion, research is directed toward verifiable determinations through study of those quantities or properties which assure maximum utility. This affects quality at its source, in the design of the product, or the layout of the process by which it is produced.

The tendency is away from mere duplication of material once found acceptable, away from mere "brand" designation, still further away from mere descriptive or qualitative prescription. The trend is toward a precise statement in measurable terms of the magnitudes of the pertinent dimensions or properties which determine the utility.

The tendency is toward a minimum of standards of quality for each service to be rendered, perhaps a single national or even international standard for each need to be met. With precise methods of arriving at the data comes the natural unification of specifications,

the reduction in their number as they approach ideal measures of the quality desired, as science and service make possible, and as the size of the groups interested in a given specification widens.

Standardization is becoming an active principle in organization and administration in every field. This is evidenced by the multiplication of standardizing agencies, including technical committees on standards in the great national societies of experts. Standardization is becoming an essential factor of all well-ordered activity rather than an incidental activity supplemental to others.

The art of the standardization procedure itself is being gradually standardized. A set of principles of practice is slowly forming as to the initiation, sponsorship, participation, technical basis for requirements, criticism, revision, adoption, jurisdiction, promulgation, and adherence. As the scientific basis for such procedure becomes more convincing, acceptance by wider jurisdiction becomes relatively easier and standardization is accelerated on a broader basis of acceptance.

The boundaries of the standardization field are expanding, with the prospect that they will eventually include systematically all industry and science, securing the full cooperation of all concerned, focusing all pertinent facts on each item standardized, feeding back service experience to standardizing agencies, adopting the presumptively best feasible, making this a general standard. The standard size postcard serves the Nation acceptably for billions of communications annually. Modified as utility may dictate, it might serve the world.

Standardization in varying degrees is universal in industry. The details of industry, its processes and devices are being standardized, some by individuals or firms, others by technical organizations, still others by the users. Many are being standardized by the Government. There is no natural limit to standardization, and the benefits to be secured from the perfected service on well-standardized products are immeasurable. Most of all, standardization is now recognized not as a stage to be completed but as a continuing process—literally a systematic harvesting of experience and discovery used in perfecting industry. The Government as a buyer in its program of standardization of quality through specifications may eventually include all articles and services used by the Government. The trend is to cooperate for the broadest jurisdictions, and this points toward national standards assuring the best feasible products for the Nation.

Everywhere standardization is active through older organizations and through newer agencies, both national and international. Nor is such activity limited to the industrial field. The terminology of science, its methods, instruments, and constants are being standardized to secure accurate and comparable results for ease and speed of diffusing data. In medical research and practice measured procedure is increasing in diag-

nosis, experiment, and treatment. The progress is notable—the struggle for new standards based on new experience; new knowledge—innovation winning through merit. Always the chaotic, chance qualities and sizes give way to orderly, efficient qualities and sizes. Evolution shows the development of standard types of life forms adapted to a given environment. Even the fine arts bear the impress of standards—the metrics of verse, the rhythm of ornament and motion, the proportions of structures. The interplay of standards is seen in unsuspected fields where their role is mandatory, sometimes with a rigor superior to legal enactment.

Since 1901, when the Bureau of Standards was founded, the varieties of measurement have multiplied manifold. Each requires units, standards, devices, and methods of measurement. Their variety increases rapidly and will continue to grow, for every aspect of matter and energy calls for a type of measurement with characteristic problems and becomes material for standardization. Our mastery of nature depends on such measurements. Precision today may be many times that of 25 years ago within ranges then measurable. Today we measure wave lengths of light correct to within 1 part in 20,000,000 with absolute errors less than one two-hundred-and-five-billionth of an inch. We measure mass to a part in a billion. We rule scales accurate to a millionth of an inch, grind quartz true flats to within one five-millionth of an inch. Not only so, but the measurable ranges of each kind of measurement have been extended incredibly, from the microcosm—diameters of atomic nuclei—to the macrocosm with cosmic distances of hundreds of millions of light years.

With the rapid growth of measurements, their varieties, ranges, and precision, we now measure also quality—the fitness for use; performance—the utility of devices; practice—the effectiveness of processes. These call for standards of quality, performance, or practice, complex, perhaps, but stating in measurable terms the pertinent magnitudes which determine net utility. They are called specifications. As they approach definiteness through precise measures they become service standards. Their full scope would cover all industry when scientifically ordered, for measures must guide every step, every factor in making or doing things, to insure their utmost utility.

When a Federal, State, or municipal Government, or a corporation buys commodities, the quantities involved forbid risk of poor quality. The demand for quality must not be impracticable, hence to secure a product producible in the mill and usable in service all concerned must be consulted—maker, seller, buyer, user. A typical case of this was in formulating the Federal specification for electric lamps in 1907. This was drafted in conference with Government lighting experts, lamp buyers, representatives of makers and sellers, and Bureau experts in photometry. The variety then in use was promptly simplified to a moderate number meeting all needs. The specification was revised many times, as progress made it possible, with the joint approval of all. Its provisions are feasible mill practice; the Bureau inspects at the mills to minimize cost and delay, and the lamps accepted under the specifications serve their purpose effectively. Today the Government specifications affect a vertical cross section of the entire American public largely be-

cause all concerned are parties to their formulation and revision. A similar story may be told of Portland cement.

While service is the ultimate test of fitness, production must precede service. The designer and the producer must use the skill and data at hand, for the buyer is waiting in the market. As a basis for purchase, sale, and use standards are drafted with diverse degrees of thoroughness, loosely at first, definitely as knowledge permits. The cycle begins empirically, the expert drafting a tentative specification in such terms as the mill may be able to apply in making the product. As the public must pay, its voice must be heeded, but the public is less concerned with the details of the measurement controls which assure the quality.

Standards are means by which research is applied to the production of serviceable things. In given cases there is a best standard humidity for cotton spinning, a best compression ratio in the motor, a best volatility curve for a gasoline, or a best diameter for a conductor for a given current avoiding both overheating and undue cost. These are matters of standardization. They are its principal task. They cannot be fixed by service experience, for the ideal magnitude may not, usually does not, occur in experience. It occurs as a matter of course in experimental research which measures the effect of each factor and finds by experiment the maximum and optimum.

Research is the appeal to the nature of things. Its findings must, through standardization, enter into the control of the processes of industry to serve man. Congress gave the Bureau of Standards the task, among others, of measuring numerical constants or numerical data which express the behavior of matter and energy. They are unlimited in number, they inhere in the nature of things, and accuracy is their sole merit. They are indispensable in planning processes in science and industry. They become permanent service elements in industry, playing their part no less than the tool or the energy. Dimensions are important, but the measurement of properties is now quite as essential and exacting as control of size, and far more productive of new and superior kinds of service. Such constants are as vital to the functioning of a process as are the size and form of a key to the opening of a lock.

Research has a field in devising tests. Perhaps the test may be regarded as a temporary expedient until the standardized process makes the prescribed quality inevitable. Then, with all essential factors of the productive process standardized, the process will unfailingly deliver uniformly high quality and exact dimension.

Service research, formerly random, is becoming recognized as the true complement of laboratory research in completing the standardization cycle. Research discloses facts which service alone cannot reveal. It finds faults in materials, defects in devices, imperfections in service. It finds their cause and cure. It does far more, for it lays down new principles of nature which permit progress not only by steady increments along old lines but by entirely new methods creates new possibilities.

With active cooperation between maker, seller, user, and the research laboratory the specification becomes a means of steady progress in the industry concerned, and combined with service experience facilitates the

more efficient adaptation of materials to their uses. Inflexible specifications or standards retard advance, but if allowed to grow apace with new service experience and research data, the specification becomes a distinct aid to such progress. Standardization in the nature of the case implies something of an ideal, a practical ideal it is true, but nevertheless an ideal. When it ceases to be such an ideal it ceases to be true standardization and becomes simply fixation.

Research takes service experience, analyzes it, and gives the data to the standardizing agencies as helps in revising the specification. Service integrates all factors determining net utility. Use is the dictator, hence the appeal to service is logical. Service usually can tell the whole story. An excellent example is the test structure erected by the Bureau of Standards in which 50 or more varieties of outdoor stuccos were built into separate panels, each of a different variety. The weather alone performed the test, the conclusions were obvious—the fittest survived. Poor types were removed from the market. Without debate a steady progress in the quality of market stuccos resulted from this service experience made available in a carefully planned investigation.

Wise industrial groups may anticipate the users' desires, even educate them to ever higher standards of service demands. Twenty million car owners may not be able to furnish the knowledge for designing an ideal car, but their desires create a channel along which effective design may well flow. Service experience, however, must yield far more than opinions of users, namely, the scientific analysis of the service itself.

HOSIERY LENGTHS

A letter announcing the adoption of the recommended commercial standard for hosiery lengths was circulated to the industry on April 1, 1933.

This standard was established to provide standard methods of measuring and standard measurements for the various types of hosiery as a basis of understanding among producers, distributors, and users of men's, women's, and children's hosiery. It is also intended to eliminate confusion resulting from a diversity of measurements and methods and to provide a uniform basis for lengths when no lengths are specified.

The specification covers methods of measuring, lengths and tolerances for ladies' full-fashioned and seamless hosiery; ribbed cotton hosiery; men's and boys' golf, children's and misses' ribbed, children's $\frac{5}{8}$ flat knit and $\frac{7}{8}$ hosiery; infants' ribbed hosiery; and children's socks. There is also included standard folded-cuff-lengths for infants' and children's anklets, boys' golf hose, and children's $\frac{7}{8}$ hosiery.

For the convenience of the manufacturer the number of needles and size of cylinder recommended for use in the various types of children's hosiery, infants' and children's socks, and boys' golf hose have been made a part of the standard.

Mimeographed copies of the pamphlet entitled "Hosiery Lengths, Commercial Standard CS46-33" may be obtained, while the supply lasts, by addressing the Division of Trade Standards, Bureau of Standards, Washington, D.C. Printed copies will be available later.

measured as carefully as we measure the parts of a machine. Hence "tire miles", "car miles", "miles per gallon", "cents per mile", "watts per candle", and the like, are shop parlance where service efficiencies are in daily question. Service efficiencies must be measured and the data used in revision. Service experience, viewed in the light of the laboratory tests, must, however, be the criterion for judging the adequacy of the specifications themselves, or their need for improvement.

More and more through research the most effective dimensions and measures are wrought into materials and devices. The standards of control measurements are less and less a matter of opinion or even unsupported expert judgment. Experts themselves recognize that the day of arbitrary opinion is passing, that experimental research and service experience can best guide every item of the standard. With great gaps in our precise knowledge of the properties of matter and energy, empiricism still rules, but its domain narrows as research gives us measured data based on scientific experiment and measurement.

No standardization is final since science is always advancing and more effective equipment is being introduced into industry. The specification should be improved by steps not too frequent to unduly interrupt the course of industry and trade, but often enough not to lose the great gains from prompt use of new knowledge. 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.

DRESS PATTERN MANUFACTURERS BENEFIT FROM COMMERCIAL STANDARD

Reports from manufacturers on their adherence to Commercial Standard CS13-30, Dress Patterns, indicate approval of the standard and continued benefits from its adoption.

A summary of reports from various manufacturers shows that the basic measurements established by the standard average 97.1 percent of the production of each manufacturer. In addition to the basic size measurements, the standard also covers size classifications and recommended widths of material.

All reporting manufacturers indicated complete adherence to the basic requirements of the standard. One producer stated that the standard has eliminated size confusion. Others believe that the standard should be broadened to cover other important measurements.

The report also indicates that manufacturers are using the commercial standard in promotional and sales activity, especially through the medium of pamphlets, sales literature, and instructions to salesmen. In addition, others state that conformity to the commercial standard is being featured in magazine and newspaper advertising. A majority are certifying conformity to the standard by certificate, label, or trade-mark.

Several modifications to the standard were suggested but all are of a minor nature and do not warrant a revision at this time. The standard was therefore reaffirmed without change.

TRADE-ASSOCIATION AIDS

Standardization and Quality-Grade Marking Activities Are Carried Out by Various Associations As An Aid to Business

A survey of activities of 500 trade associations, made last year by the Trade Association Department of the Chamber of Commerce of the United States, clearly indicates that trade associations are rendering many invaluable services to business, and that they are an essential and integral part of business management.

The Chamber of Commerce has just released a pamphlet on this survey entitled, "Business Management Aided by Trade Associations", in which are detailed some of the aids illustrative of the service field of the trade association. Many of these aids bear on simplification, standardization, and certification and labeling, as well as the development of new-better products through research.

On the subject of uniform accounting, the pamphlet pointed out that accounting constitutes one of the most common activities of trade associations; in fact, it is one of the 10 activities most frequently engaged in by the various types of associations. There are 131 associations carrying on uniform cost accounting and the development of a uniform classification of accounts, 111 associations active in the field of cost studies, including depreciation, obsolescence, appraisals, etc., as well as others engaged in such phases as installation or supervision of accounting systems, auditing, and related services.

In a review of testing facilities, it is stated that in some cases grading rules and specifications for assuring quality of products purchased by members of the industry have been established. Inspecting or laboratory testing facilities, such as those provided by the American Institute of Baking, the National Association of Dyers and Cleaners, and the Better Fabrics Testing Bureau, are maintained by a number of associations. Some associations certify as to the suitability of particular items by authorizing the use of a seal of approval.

In addition, some associations have been active in improving purchasing procedure. Uniform contracts have been developed in order to assure the maintenance of standard conditions of purchase. Organizations of buyers, in cooperation with organizations of sellers, have assisted in the development of uniform contracts of sale or purchase; for instance, the National Coal Association and the National Association of Purchasing Agents have formulated standard contract forms.

The value of transacting business in terms of known quality, as well as quantity, has led to the establishment of grading rules or specifications, on the basis of which products may be bought and sold. A large number of trade associations have formulated definite standards. The National Lumber Manufacturers Association and the National Cottonseed Products Association are among the leaders in such efforts. Sixty-eight associations have adopted rules applying to products of the industry, and 43 associations have adopted rules applying to the purchases of member companies.

Simplification and standardization are often the basis for the rules themselves. Quality labels have been adopted as a means of identifying goods of cer-

tain standards. The Institute of Carpet Manufacturers of America, Mirror Manufacturers Association, Rail Steel Bar Association, Tanners' Council of America, and American Petroleum Institute are a few of the many associations which are promoting the use of quality labels. Certification is extensively employed as a means of guaranteeing that products or services conform to a certain recognized standard established by association agreement.

As a means of checking and enforcing rules and specifications some associations maintain an inspection service. In some instances the trained inspectors of the association are called in only in settlement of disputes. Inspectors in some lines make visits among members of the industry to see that the rules are correctly and uniformly interpreted. The Tire and Rim Association maintains one or more inspectors in the individual factories. Other associations furnish inspection service in the principal markets and ports of entry.

In discussing new-better products through research, the pamphlet pointed out that scientific studies and experiments are undertaken by many associations to alter or improve the products or services of the industry, and to discover new products or new qualities or uses for the existing products. Byproduct and waste utilization also receive careful attention in a number of instances. Twenty-eight percent of the associations carry on special research work to discover new products, new qualities, or new uses. The Cotton-Textile Institute and the Malleable Iron Research Institute have made marked progress in this field.

SHINGLES AND MOLDINGS

The Bureau of Standards has just released a supplement to Simplified Practice Recommendation No. R16-29, Lumber (fourth edition), containing a revision of those paragraphs which pertain to shingles and moldings.

The new molding sizes and designs of the 1931 revised 7,000 series were published for the benefit of the lumber trade by the Central Committee on Lumber Standards about a year ago. These new designs and sizes, which superseded all previous stock-molding series, are the result of painstaking work of a special committee representing the lumber and mill-work producing, distributing, designing, and consuming branches of the trade. Architects, consumers, manufacturer, and distributors characterize this new series as the most up-to-date and architecturally correct of any series ever published. The new standards for wood shingles as a part of the American Lumber Standards for softwood mark an advance in simplification and standardization of grades within the shingle industry.

Copies of the supplement of shingles and moldings may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C., for 10 cents.

WHY GOVERNMENTAL CONTROL?

Can Quality Standards Be Made Effective Without Governmental Control?

By I. J. FAIRCHILD, *Bureau of Standards*

The various contacts and the vast experience of the Bureau of Standards in the preparation of standards and specifications and in testing commodities for compliance therewith, provide a background which obviates any need for conjecture in the field of maintaining standards or securing adherence to specifications. It is simply a question of correlating and evaluating the significance of the broad background of experience in this field.

In addition to the wide variety of private methods in use for maintaining quality standards, a few have been applied by the Government, and some additional plans have been proposed with the Government as the central agency. National legislation has been applied in several instances as a means for protecting the consumers and the reputable manufacturers as well, from the sharp practices of a relatively small number of producers. The National Stamping Act of 1906 providing uniform markings to denote the quality of gold and silver articles is an example of such legislation. Some States also have set up certain laws affecting the quality of merchandise; for example, the bedding and upholstery act of the Commonwealth of Pennsylvania which requires the application of tags certifying as to whether new or second-hand materials have been used in the filling. Occasionally also, municipalities have found it necessary to control quality of articles sold within the city limits; for examples, regulations on the sale of clinical thermometers within New York City. There is also the type of legislation requiring that the composition or the formula of the material be stated on the label; for example, paint formulas are required to be stated in full on the labels applied to containers in the State of Nebraska (1919).

From a commercial point of view, however, legislation is generally an unsatisfactory method of correcting trade evils, chiefly because of the difficulty in obtaining an agreement on the form and substance of such legislation; the inflexibility of the system; the extension of the governmental function; and the attendant increase in taxation. Other reasons were given in some detail in the first article of this series.

One method of maintaining quality for contract buyers particularly, Federal, State, county, and municipal purchasing agencies, is the certification plan whereby manufacturers are requested to certify that a given delivery is in strict conformity with a Federal specification or a commercial standard. In order to facilitate the use of Federal specifications and commercial standards, there have been compiled for use of agencies making purchases out of tax moneys, lists of manufacturers who are willing to certify on request that a given shipment complies with the Federal specification or the commercial standard.

Perhaps the most important and most promising system now in use for maintaining quality to certain definite standards is the voluntary application of self-identifying, quality-guaranteeing labels for goods manufactured to comply with Federal specifications, commercial standards, or other nationally recognized specifications. A guarantee label is a certificate from the seller to the buyer that the goods are in complete conformity with some nationally recognized specification identified by the label. This guarantee becomes a binding part of the sales contract, thus giving the buyer a justification for complaint or redress in the event the goods are not as represented. (A more

complete description of these labels as applied to commercial standards and the method of enforcing them was given in the fourth article of this series.)

In certain quarters outside the Federal service, there has been some active advocacy of the proposition that Federal testing

agencies should publicly release information on reports of tests on various commodities by trade brands or by name of the manufacturer, and further that in the event such reports of tests do not make the relative order of serviceability clear, that the competing products be rated in a 1, 2, 3 order.

The idea of having information available on the quality rating of all competing trade brands sounds very attractive and at first glance it might seem that the advantages to the consumer would be more or less unlimited. The Bureau of Standards has had a very considerable experience with the essential elements of this problem in certain commodities where continuous tests have been in progress for several years.

In connection with such a plan the first problem that presents itself is the matter of obtaining thoroughly representative samples. If selected by the producer it would be but natural to expect an above-average sample. If purchased on the open market the matter of pedigree is frequently in doubt and the date of production is generally uncertain.

After the laboratory has made certain tests, questions frequently arise concerning the proper method of correlating the tests with the performance of the goods in actual service. Unless there is a nationally recognized specification, upon which the industry is agreed, covering the relationship between tests and performance, the relationship assumed by the laboratory must remain a matter of assumption and opinion, at least until such time as results of performance in service are available for a better correlation with the laboratory tests.

The testing laboratory, of course, has no control over the quality of subsequent production. If reports indicate a low rating, the manufacturer most likely

This is the fifth of a series of articles by Mr. Fairchild, chief, Division of Trade Standards, Bureau of Standards, on the whys and wherefores of commercial standards. This one, the last of the series, responds to the question, "How are commercial standards made effective without extension of governmental function?"

will immediately strive to improve the quality of his product so as to obtain a better rating, or if this seems impracticable he will lower the price in an effort to maintain production and sales. If the report indicates a high rating, the natural tendency is (1) to attempt to increase sales on the basis of the superior rating, or (2) to raise the price so as to obtain a greater profit. Manufacturers may also bring out new designs which may prove either superior or inferior to the product tested, and when the new product bears the same trade-mark or brand, as is frequently the case, the consumer has no means of making any distinction between the two when attempting to follow the laboratory rating.

Such a system would lead to grave injustices to the manufacturer who subsequently improved his products, but who through loss of reputation as a result of the Government ratings might find it impossible to weather the storm until a more favorable report could be obtained. Even then the unfavorable rating, through inertia of the public mind, would continue to be a millstone about his neck. Such reports would be misleading also to the consumer, since he would quite naturally assume that all of the products of the leading company or bearing the leading trade brand would rate similarly or be of top-notch quality. In fact, quality ratings by a really authoritative body, such as the Government, would tend, at least temporarily, to focus all business on certain highly rated brands and lull the buyer into a sense of security and complacency in making purchases of such brands.

The more or less continuous tests on dry cells at the Bureau of Standards for the Federal Government show that the relative order of quality among the various producers is constantly changing and that the manufacturers are continually striving for advantages over their competitors, much like jockeys in a never-ending horse race, so that a report of relative position at any given time holds little or no continuing significance.

Some 70,000 leading trade brands and trade names are listed in Thomas' Register of American Manufacturers and this list is by no means complete. Therefore it is quite obvious that if a Federal testing laboratory should attempt to obtain representative samples of each of the leading trade brands; to conduct the necessary laboratory tests; prepare, correlate results, and promulgate the report; it would be a stupendous task, requiring a vast extension of laboratory facilities and personnel at tremendous cost. The necessary lag between the procurement of the representative samples and the distribution of the index ratings on competing items, even on a basis of highest possible efficiency, would be great enough to introduce a very grave question as to the reliability of the information at the earliest possible moment it might be put into use by the consumer.

After release of the report it is reasonable to assume that the price of the poorest products would immediately drop and the price of the best items would begin to skyrocket so that in a short time the value-over-price ratio might be expected to adjust itself to a point where the consumer would receive no more service for his dollar from the items carrying the high ratings than from the poorest.

It therefore appears that assumption by the Federal Government of the function of issuing quality ratings

on all manufactured goods is a task of incomprehensible magnitude, entailing a tremendous cost, requiring the presence of a Government inspector in every factory; impracticable not only because of its magnitude and cost, but because resulting price adjustments would erase any practical advantages. The results in many instances would be misleading to the buyer and harmful to the seller; it would constitute an unwarranted extension of governmental function; it would place the Federal Government in the position of guaranteeing the quality of all manufactured products to the consumer; it would constitute an attempt on the part of the Government to insure the purchaser against all loss in purchasing transactions; and when compared with the present going plan to provide the buyer and seller with standards or specifications embodying simple tests as a basis for rating, inspection, acceptance, or certification of quality direct from the seller to the buyer, the quality rating proposal seems quite fantastic. In fact, when considered in the light of experience, a critical examination of the quality rating proposal leads in every direction to absurdity.

A basic question presents itself, "How far should Government go in the direction of maintaining quality standards?" Patents, trade marks, and copyrights are keystones to certain phases of all commerce and it seems to the writer that there is a single principle which underlies governmental participation in each of these contacts with private enterprise. The Government provides, upon application and a satisfactory representation of the facts, a starting point (in the form of a patent, a trade mark, or a copyright) as a basis from which the company or the individual may proceed in defending himself against the unwarranted encroachment of competitors. The holder of the patent, trade mark, or copyright must discover for himself infringements or encroachments, he must find the necessary evidence, initiate action in the courts, and prove his case before a remedy is granted.

In that field of commerce where personal safety and health are not involved, it seems reasonable to accept this same principle as a basis for limiting the Government function with regard to quality standards. In other words, I believe that the Government should, on request of representative organizations or groups, cooperate in the adjustment, establishment, and recording of quality standards as a nationally recognized and voluntary basis for grading, inspection, testing, acceptance, or rejection, certification or labeling of staple goods or services entering into daily trade. That is, the Government should assist in establishing yardsticks which the prudent buyer or seller may employ on his own initiative as a safeguard for his own protection in business.

Both the procedure for the establishment of commercial standards and the guarantee labeling plan voluntarily adopted by many industries in making such standards effective, as described in this series of articles, are based upon the above-named principle. With a mere handful of employees it has been found practicable through this method to direct the procedure; to guarantee the integrity of the process; to see that every organization or individual directly concerned is given an opportunity to be heard; to provide, for the benefit of the consumer, a practical outlet for results of research data or Government tests; to insure a full consideration of research data and labora-

tory suggestions in the process of drafting or adjusting the commercial standard; and to confine the promulgation of standards to those really representing the combined thought of the companies and individuals directly concerned, whether representing consumers, distributors, or producers.

A good example of the bearing which laboratory data has on the final commercial standard is found in Knit Underwear (Exclusive of Rayon), Commercial Standard CS3-32. The essential measurements, tolerances, and method of measuring all types of knit underwear as contained in this commercial standard are based almost entirely upon the results of a research conducted at the Bureau of Standards by C. H. Hamlin, as research associate from the Associated Knit Underwear Manufacturers of America.

With this work as a foundation and with adjustments which were made at the general conference, it will be clear that the commercial standard epitomizes the results of research as well as the experience and the best judgment of the manufacturers, retailers, and the consumers.

We are informed that at one time a large retailer rejected and returned to the producer three carloads of knit underwear which failed to comply with the measurements and tolerances set forth in this commercial standard.

The reader will recall Commercial Standard CS31-31, Red Cedar Shingles, described in the second article of this series. According to Arthur Bevan, secretary-manager of the Red Cedar Shingle Bureau, the effective use of this standard as a basis for guarantee labels, backed by the manufacturers and the Red Cedar Shingle Bureau, operated to so increase the sale of red cedar shingles during 1932 as to cause a shortage of red cedar logs in the Seattle district.

One misguided mill in order to keep busy began sawing shingles from "sinkers" (logs which have become water logged and have sunk to the bottom). It so happened that a dealer in Wisconsin ordered a carload of no. 1 grade shingles but failed to stipulate that they must bear the guarantee label. In the meantime the Red Cedar Shingle Bureau had refused to permit the application of the guarantee label to these shingles and the manufacturer supplied a carload without labels to the Wisconsin dealer. The latter was naturally upset and obtained, upon complaint, a very material adjustment in the price on the shipment. He also wrote the Red Cedar Shingle Bureau, asking why they did not bear the guarantee labels, since he found it difficult to dispose of them without the label. The answer of course was obvious and he was advised on future orders to require that the no. 1 grade shingles bear the guarantee label. This instance indicates rather forcibly the ease with which quality standards can be made effective through guarantee labels without governmental control or interference.

From the broader aspects, with special emphasis on the functional aspect, it has been shown that (a) commercial standards are essentially voluntary standards established at the request of and with the cooperation of producers, distributors, and users; (b) commercial standards are established by means of a procedure, the integrity of which is guaranteed by the Government to be above reproach; (c) commercial standards form a basis for guarantees of quality direct

from seller to buyer for which the Government assumes no responsibility; (d) commercial standards provide a solid foundation from which the producers with the aid of the consumers and distributors can proceed to correct the evils attending undercut quality and misrepresentation; (e) commercial standards form a natural, logical, and effective outlet for such results of Government research and testing as can justify themselves to the extent of acceptance by both buyer and seller; (f) commercial standards do not extend the field of governmental function nor interfere with the private control of business; (g) commercial standards require no expansion of Government testing facilities, inspectors, or other personnel; (h) commercial standards are handled with a minimum of Government cooperation and expenditure; (i) commercial standards require no legislation to make them effective; (j) commercial standards can be made effective (experience has so proven) without governmental control; and (k) commercial standards and guarantee labels based thereon are in full accord with American ideals and principles.

DOMESTIC STOKERS FOR ANTHRACITE

The Anthracite Institute, maintained by the producers of Pennsylvania anthracite, which operates a research and development laboratory at Primos, Pa., is sponsoring the establishment of a Commercial Standard for Domestic Stokers for Pennsylvania Anthracite (Underfeed Type) based on that Institute's Approval Code.

The tentative specification covers the construction, operating requirements, and installation of underfeed stokers having a capacity not to exceed a maximum of 50 pounds of coal per hour. Provision is made for certification, both by the manufacturer and the installing contractor, designed to insure the utmost satisfaction to the users of these devices. Safety features and trouble-free operation are given due consideration.

The stoker code, formulated as the result of an extensive study upon practically every existing domestic stoker designed for anthracite, is the first of a series of codes which the institute laboratory plans to submit to the Bureau of Standards for establishment as commercial standards.

The submission of such codes in the series as those covering magazine feed boilers, blowers, thermostatic controls, grates, and other firing devices are designed to place the entire domestic utilization of Anthracite upon a sound basis.

The Anthracite Institute Laboratory has been engaged for the past two and one half years in a comprehensive program of equipment testing in order that devices intended for the use of this fuel might reflect credit to the industry.

Approval codes used by the laboratory for this work are based upon standards which safeguard the consumers comfort and interest insofar as the performance of the various types of equipment are concerned. Compliance with these laboratory standards entitles the manufacturer to use the Anthracite Institute's insignia on advertising and equipment. It is intended that this approval plan will be continued and the buyer will have the additional assurance of certification based on conformance to the commercial standard applied to his installation.

ECONOMIES IN RAILROAD OPERATIONS

Experience in Railroad Valuation and Maintenance Work Indicates Vast Possibilities of Scientific Standardization

A vast saving could be effected each year by the railroads of the country through adoption of uniform standards for a large proportion of the huge number of items of equipment, materials, and supplies, according to Riley E. Elgen, vice chairman of the District of Columbia Public Utilities Commission.

Mr. Elgen has set forth numerous possibilities of economies in railroad operation in statements laid before Commissioner Joseph B. Eastman, of the Interstate Commerce Commission, and the organization of railroad executives. He points out that his statements are based on many years' experience in maintenance and valuation work in the railroad field. Prior to his appointment with the District of Columbia Government, he served with the Interstate Commerce Commission as an expert on valuation, specializing on depreciation and costs of reproduction.

"There are vast unexplored realms abounding in economy plums", Mr. Elgen declared. "It is, however, a form of savings which only a strong and determined dictator can effect, but the possibilities of such permanent year after year reductions in construction and operating expenses are real and can be brought about."

Again after outlining numerous technical possibilities, Mr. Elgen declared, "the attainment of such uniformity could not be possible except through the action of an authority empowered to represent all of the railroad companies. The consolidation of railroads into larger systems, of course, would help materially to reduce the number of different standards now in use, but would not make unnecessary a scientific investigation, and would not have any immediate effect tending to cure this lack of uniformity".

"There is no such thing as a national standard for railroads as a whole, each operating according to its own set of rules, methods, and practices, except as to those laid down by the Interstate Commerce Commission or where movements of equipment require certain uniformity", he stated. "If standard rules, methods, and practices were applied scientifically to all railroads, it would result in tremendous savings annually in construction, operation, and maintenance expenses. Even the specifications for track spikes which are driven into the cross ties to hold the rails in place are not standard for all railroads".

As to possibilities of uniformity in specifications for like conditions, Mr. Elgen reported that one railroad will require 3,400 cross ties per mile of track while an adjacent road will require, under similar traffic conditions, only 3,000 ties. He added that one road will require the use of tie plates on all cross ties, while a neighboring road makes no such requirements. "There is bound to be a waste in either the practice of one or the other", Mr. Elgen said.

Citing other instances of the lack of uniform requirements for meeting similar conditions, he mentioned wide differences in the weight of rails used, in the treatment of timbers used for cross ties, differences in the costs of ballast material for use under tracks carrying comparable traffic, and the wide variety of designs used for freight cars.

"If freight cars did not have to be returned to their home roads until tonnage was available", he continued, "a very large saving in car rental could be made. Such economies could only be accomplished, however, by pooling all equipment now separately owned. However, as most of the equipment is purchased through equipment trust bonds it should not be difficult to refinance and transfer to one national company."

Many of the best-informed railway executives, as well as representative large shippers, have expressed opinions similar to those of Mr. Elgen. The experience of many of our largest industries offers conclusive evidence as to the savings that can be made through the elimination of unnecessary variety of products, materials, and methods. The railroads themselves made an outstanding accomplishment of this kind more than 40 years ago, when they established the present standard gage of track. The adoption of interchangeable couplers and other similar features represented further progress along the same line. Ample experience and technical knowledge are available to apply the same principles on a greatly extended scale.

TEMPLATE HARDWARE

The Commercial Standard CS9-33, Builders' Template Hardware (second edition) is now available in printed form and is obtainable from the Superintendent of Documents, Government Printing Office, Washington, D.C., at 5 cents per copy.

The standard covers the necessary dimensions and tolerances to provide complete interchangeability of template lock fronts and strikes, as well as the leading varieties of template hinges, such as full mortise, half mortise, full surface and half surface. It also includes standard template identification symbols and minimum clearances on butt hinges designed for painting.

Most of the screw spacings and detailed dimensions with tolerances which are covered in the commercial standard have been in actual use for a period of 5 years or more and therefore may be said to have passed the experimental stage and represent practices already well established.

Upon recommendation of the standing committee, this commercial standard, originally published as CS9-29, was revised to include a few minor changes adopted by the Hollow Metal Manufacturers' Association and the Manufacturers' Advisory Committee on Standardization of Builders' Hardware. In general, the changes constitute refinements which have developed as a result of experience with the standard.

This standard should materially assist the hollow metal door manufacturers and building contractors in obtaining earlier delivery, complete interchangeability and ready replacement of the more important items of builders' template hardware, regardless of source of manufacture.

The recommendations as set forth in the commercial standard became effective on January 1, 1933.

EXTRACTED HONEY CONTAINERS

Industry Has Appointed a Committee to Prepare Recommendations for Simplification of Extracted Honey Containers

By WILLIAM E. BRAITHWAITE, *Bureau of Standards*

During the past few years the honey producers and bottlers of extracted honey have given considerable thought to the improvement of packages as a means of stimulating sales of honey. Many types, shapes, and sizes of containers are now in use and it is the opinion of several leaders in the industry as well as marketing specialists in this field that the excessive variety in sizes and types of containers has not only resulted in confusion but has acted as a deterrent to sales.

In 1927 and 1928 a national survey of the honey-marketing situation was undertaken by the Division of Cooperative Marketing of the United States Department of Agriculture in cooperation with the New York State College of Agriculture at Cornell University. The purpose of this study was to obtain data concerning the sale and distribution of honey and to determine ways and means whereby the marketing situation might be improved in connection with the retail distribution of honey. This survey, conducted under the supervision of Dr. M. P. Rasmussen, revealed the information that extracted honey has been packed in the following types and sizes of containers:

Glass.—1, 1 $\frac{3}{4}$, 2, 2 $\frac{1}{2}$, 3, 3 $\frac{1}{2}$, 4, 5, 5 $\frac{1}{2}$, 6, 6 $\frac{1}{2}$, 6 $\frac{3}{4}$, 7, 8, 8 $\frac{1}{2}$, 9, 10, 10 $\frac{1}{2}$, 11, 11 $\frac{1}{2}$, 12, 12 $\frac{1}{2}$, 13, 14, 15, 15 $\frac{1}{2}$, 16, 17, 18, 20, 21, 22, 23, 24 (pint), 24 $\frac{1}{2}$, 28, 29, 30, 32, 33, 36, 41, 42, 44, 48 (quart), and 72 ounces; aovidupois, 1 pint, 1 and 2 quart.

Tin cans and pails.—1, 2 $\frac{1}{2}$, 5, 6, 10, 12 (1 gallon), 30, 36, 40, and 60 (5 gallons) pounds; 1 and 5 gallons.

Wooden kegs.—132 (Puerto Rican imported) and 160 pounds.

Wooden barrels.—25, 30, 35, 50, and 55 gallons.

Metal drums.—50 gallons.

It will be seen that extracted honey is sold in at least 65 different types and sizes of containers. It is surprising, however, to observe the small amount sold in a majority of the sizes used. For instance, a number of honey producers in New York State used 21 different sizes and 3 types of packages in selling extracted honey in 1926. Of the total amount of honey sold by the original producers in New York State (996,116 pounds) 96.52 percent was sold in only 6 sizes of containers. These 6 sizes, together with the percentage of volume of honey sold in each, were listed as follows: The 60-pound can (41.17 percent), 5-pound tin pail (31.81 percent), 160-pound wooden keg (17.14 percent), 10-pound tin pail (3.65 percent), 16-ounce glass jar (1.60 percent), and 36-pound can (1.15 percent).

Data were obtained from 42 honey-packing firms which packed about 18,000,000 pounds of extracted honey. In the Eastern States, approximately 97 percent of the extracted honey purchased by honey packers, bottlers, and shippers was delivered in the 60-pound tin. This size is decidedly the type of container preferred by the packers for buying extracted honey in bulk. These 42 honey-packing concerns merchandised honey during 1926 and 1927 in 40 sizes and

3 types of containers. Southern packers used 7 sizes of containers, yet 4 sizes constituted 99.79 percent of total sales. Packers in both the eastern and midwestern districts used 18 sizes of containers. Honey packers in the Pacific Coast States used 33 different sizes. The capacity of many of these sizes varied but from $\frac{1}{2}$ to 1 ounce from the next size.

It was found that the wholesale grocery store as well as the retail grocery store operators complained, almost without exception, that honey is put up in too many sizes and types of containers—that the multiplicity of size of honey containers is confusing to the consumer and actually serves as a deterrent to sales. Many honey packers believe that honey can be sold only in relatively small quantities to the average consumer. This opinion undoubtedly influences the merchandising methods of honey packers and accounts for the many small-sized containers in use.

According to Dr. Rasmussen's report, packers in the East sold approximately 22 percent of their output of extracted honey in so-called family-sized containers holding from 1 to 12 pounds; the equivalent figure for the Middle West was approximately 29 percent; for the South approximately 57 percent, and for the Pacific Coast area 21 percent. Since a large proportion of honey is purchased through grocery stores of some type the quantity of honey purchased at one time is probably determined by the sizes and types of containers carried in stock by these stores. These sizes of containers are in turn largely determined by what honey packers believe to be the popular sizes and types of containers.

In making a survey of the consumers' attitudes toward honey Dr. Rasmussen mailed out at random 5,000 questionnaires to heads of families in four localities—the New York metropolitan district; Chicago, Ill.; Kansas City, Mo.; and the cities of San Francisco, and Oakland, Calif. Data were sought concerning actual consumption of honey and the factors that might influence such consumption. For the four localities as a whole the 8-ounce glass jar seemed to be the most popular individual type of container, constituting 19 percent of sales. The next most popular size was the 16-ounce jar, followed by the 48-ounce jar, the 24-ounce (pint) jar, the 5-pound tin pail and so on.

It is significant that containers (in either glass or tin) holding 1 pound or more of honey, constituted approximately 72 percent of sales. It would appear from the results of this survey that honey packers could probably increase sales by packing honey in containers that hold 1 pound or more and by standardizing containers in such a way that only about half a dozen well-recognized sizes will be used. In summing up his conclusions, Dr. Rasmussen directed attention to the need for an organized effort to standardize grades and containers so that the consumer can at all times buy a uniform quality and quantity.

In line with this recommendation the American Honey Institute, the American Honey Producers' League, and several of the State and regional honey producers associations cooperated in organizing a honey container simplification committee. This committee is to be responsible for the development of a simplified practice recommendation for honey containers. H. L. Enzelberger, assistant sales manager, Food Container Division, Owen-Illinois Glass Co., is the chairman; and he also represents the Glass Container Association of America on the committee.

A meeting of this committee was held in St. Louis, Mo., on February 28, at which time the simplification of containers for extracted honey was discussed. Consideration was given to the question of the most desirable method for indicating the quantity of contents—whether by liquid measure or by weight. The point was made that most beekeepers are not equipped to check on liquid measure whereas accurate scales for weighing honey are easily obtainable. Also attention was directed to the fact that honey is purchased from beekeepers by weight and is shipped by weight. It was felt that the variation in specific gravity and density of honey would not interfere with the standardization of containers. It was pointed out also that if honey is bottled and sold according to liquid measure there would be a great deal of confusion as to filling points, overflow interpretation, etc. A motion was made and adopted that the quantity of contents in container be specified on weight basis and that this action be taken into consideration in connection with future work on the simplification of honey containers.

There was considerable discussion at this meeting regarding the type, size, and design of containers that is best adapted for use in marketing extracted honey. Several of the bottlers present considered it necessary to have a tall slender jar to create eye appeal for customer and to make the honey appear as light as possible. Others considered this type of jar deceptive and hard to handle, also a type of container that retarded sales on account of the difficulty encountered in removing the contents. It was decided that the matter of design or shape should be given further consideration and the secretary of the American Honey Institute was asked to continue studies along this line.

Another resolution was adopted at this meeting recommending to the committee that standard sizes be limited, on the basis of avoirdupois weight, to the following: Glass jars holding 2½ ounces, 5 ounces, 8 ounces, 16 ounces, also the pint (24 ounces) and quart Mason jars; Tin pails holding 2½ pounds, 5 pounds, 10 pounds, and 60 pounds. It is believed the adoption of this resolution is a big step forward in connection with the honey container simplification program.

For a number of years the Division of Simplified Practice of the Bureau of Standards has been of service to a large number of industries in working out their container simplification problems. The Division is cooperating closely with the honey container simplification committee and it has been proposed that the recommendations of this committee be submitted to the industry for approval through the cooperative procedure of the Bureau of Standards. After the majority of the honey producers and distributors have approved a simplified list of containers, the Bureau of Standards will then publish and promulgate the recommendations as representing the standard prac-

tice of the industry, subject to the periodic revision by a standing committee of the industry to keep the recommendation in line with current practice.

As pointed out by Harold J. Clay, of the U.S. Department of Agriculture, in his article on "Simplification of Containers," many industries have enjoyed benefits from container simplification. Among the industries that have recently adopted simplified practice recommendations for containers is the mayonnaise industry. At a general conference of representatives of glass container manufacturers, mayonnaise manufacturers, grocers' organizations, and other interested groups, held on June 30, 1931, a simplified practice recommendation was approved reducing the sizes of mayonnaise jars from 25 or more to 5 standard sizes on the basis of liquid capacity. This voluntary container simplification program was developed and promulgated under the cooperative procedure of the Bureau of Standards at the request of the Mayonnaise Manufacturers Association. The five standard sizes for mayonnaise jars have since been generally adopted. It is claimed by some of the leaders in the mayonnaise industry that the acceptance of this container simplification program has already reduced production costs, eliminated considerable confusion in distribution and has resulted in better marketing methods.

It is reasonable to assume that the same benefits that have accrued to the mayonnaise industry through container simplification may likewise accrue to the honey industry. It is to be emphasized of course, that realization of the economies and advantages inherent in the honey container simplification program is definitely dependent upon the wholehearted voluntary cooperation of all elements of the honey industry in the matter of adherence to a simplified list of sizes after such a list has been approved by the majority of those interested or affected.

It is hoped the honey producers and packers will give the honey container simplification committee their undivided support and that they will submit constructive suggestions for the benefit of the committee in working out a simplified list of containers.

BRITISH METHOD OF MARKING FOUNDRY PATTERNS

The existence in England at the present time of a great diversity in the methods of marking and coloring foundry patterns has led to a proposal that a standard system be adopted in that country.

The British Standards Institution appointed a representative committee to consider the matter and this committee has recommended a standard system, which, it is believed, will interfere to the smallest possible extent with current practice. In order to make effective this standard, designated as Method of Marking and Coloring Foundry Patterns, it will be necessary for some members of the British industry to make some changes in their current methods of marking and coloring patterns. As pointed out by the British Standards Institution, however, it is believed that the gain which will result from the adoption of a uniform method will be so great as to justify the small amount of trouble involved in certain instances of putting a new standard into operation in England.

ACTIVITIES OF AMERICAN SOCIETY FOR TESTING MATERIALS

Review of Current Activities Made by Various Committees of the Society

Current developments of the following standardization projects under the auspices and procedures of the American Society for Testing Materials have been reported by that society:

Steel.—The committee on steel has completed the preparation for new specifications for alloy-steel castings for structural purposes. These specifications provide for three classes of castings: class A, full-annealed, class B, normalized, and class C, liquid quenched, for use in applications at mechanical stress where no high temperatures prevail. The completion of new specifications for heat-treated carbon-steel elliptical springs has also been reported for publication as tentative.

A revision of the standard specifications for lap-welded and seamless steel pipe for high-temperature service in the form of new tentative specifications has also been acted upon by the committee. The revised specifications contain supplementary requirements of an optional nature for pipe intended for use at steam pressures of 400 pounds per square inch or over and temperatures up to 750° F., or other applications where a superior grade of pipe is required. Approval has also been given to changes in the specifications for steels for high-temperature service, including those for castings, bolting material, flanges, and pipe, covering in detail the use of materials at temperatures above and below 750° F., as well as proposed tables containing allowable pressure ratings at temperatures above and below 750° F.

The committee has taken action to recommend for advancement to standard in June a number of specifications under its jurisdiction, including tentative specifications for soft-steel track spikes, structural rivet steel, marine boiler steel plates, structural steel for ships, heat-treated carbon-steel helical springs, steel and iron boiler tubes, and open-hearth iron plates of flange quality.

The committee has also approved revisions in the standard specifications for steel tie plates, for billet steel and for rail steel concrete reinforcement bars. Revisions affecting the size tolerances of commercial-quality hot-rolled bar steels and cold-finished bar steels and shafting in order to bring the specifications in line with standard practice have been accepted.

Wrought iron.—The committee on wrought iron has approved the adoption of the tentative revisions in the specifications for stay-bolt, engine-bolt, and extra-refined wrought-iron bars. In recommending the advancement of these revisions to standard, the committee took action to add requirements for flat bars three sixteenths of an inch in thickness and less. This class of material is being used for window sash, and a demand for physical requirements has arisen. The requirements include a tensile strength of 47,000 pounds per square inch, a yield point minimum of six tenths ultimate strength, a minimum elongation of 22 percent, with a minimum reduction of area of 30 percent.

The revised definition of "double-refined iron" has been approved for inclusion in the Standard Definitions of Terms Relating to Wrought-Iron Specifica-

tions. A new definition for "muck bar" has been prepared and will be adopted as standard this year. The definition reads: "Muck Bar.—A bar rolled from a squeezed bloom." Requirements for micrographic examination will also be included in all of the wrought iron and wrought-iron products specifications with the exception of those covering common bars.

Cast iron.—The committee on cast iron will recommend the adoption as standard of the tentative specifications for gray-iron castings. It will be recalled that these specifications were formulated by the committee with the cooperation of the Gray Iron Institute, and were approved for publication as tentative at the June 1932 meeting of the society. These specifications which cover seven classes of castings ranging from 20,000 to 60,000 pounds per square inch tensile strength were drawn up to supersede all individual specifications previously existing. The introduction of the specifications as tentative has already removed an element of uncertainty in buying and selling castings and the specifications have been well received by the industry during the past year. Once they have been adopted as standard, it is expected that their value to the industry will be still further increased.

For the past three years this committee has conducted a very extensive investigation on impact testing of cast iron. Based upon a careful appraisal of the comprehensive data resulting from this work, a report on this subject will be presented at the annual meeting of the society in June.

Copper and copper alloys.—The committee on copper and copper alloys has approved revisions in the present standard specifications for brass pipe to cover Muntz metal, high brass, Admiralty metal, and red brass for use in the fabrication of pipe suitable for use in plumbing, boiler feed lines, etc. Favorable action has also been taken to revise the standard specifications for copper plates for locomotive fire boxes, copper bars for locomotive stay bolts, and copper and brass boiler tubing and pipe, to require a minimum copper content requirement of 99.90 percent instead of 99.88 percent as heretofore. The committee has also approved for advancement to standard, revisions in the specifications for sheet high brass. The specifications as revised will cover 2 grades of sheet brass instead of 1 as formerly and 2 additional tempers have been added, three quarters hard and extra spring.

Hollow masonry building units.—Action has been taken by the committee on hollow masonry building units to propose several important changes in the several standard specifications covering structural clay tile. These revisions relate to the classification of structural clay tile, and if approved by letter ballot, will eliminate the old designations of "hard, medium, and soft" classification, which are considered misleading in that they give a wrong impression of the quality of the ware under each classification. The product will be reclassified on the same basis of absorption limits as now used, except that the "hard and medium" grades with absorption limits of from 6 to 16 percent will be known as "6-16", instead of "hard and medium". The first and second numbers

in these designations represent the minimum and maximum absorption limits, respectively, of the classifications.

Revisions in the methods of specifying standard weights of structural clay tile units has also been considered by the committee. The committee has voted

to delete the tables of standard dimensions and weights of units and to substitute therefor limitations on the weights per unit of area and minimum number of cells in thickness. If approved by letter ballot of the committee, the amendments will be presented for publication as tentative at the annual meeting in June.

DETERIORATION OF VEGETABLE-TANNED LEATHER

It has long been known that leather is deteriorated by sulphuric acid, but the amount of acid different leathers will stand without damage and a method for determining this amount of acid have never been satisfactorily established.

A direct analytical method for determining acid is used in this country at the present time, and it is open to the criticisms that (1) all of the acid present may not be determined, (2) sulphur from any source present in the leather may be determined as acid, and (3) no indication is obtained relative to the presence of strong organic acids which may be harmful. The development and increased use of sulphonated and sulphited leather-making materials, such as sulphonated oils, sulphited vegetables tanning materials, sulphited waste liquors, and synthetic tanning materials, makes the above-mentioned limitations of great importance. Thus the lack of a satisfactory means of evaluating leather with respect to harmful acidity is a handicap to both the consumers and producers of leather and leather-making materials.

This situation has led to an examination of pH methods for indicating the acidity of leather. Thus the activity of hydrogen ions, which can be easily determined electrometrically, in a water solution in equilibrium with leather may be taken as an indication of the complex destructive action of the acid in the leather. This idea was first proposed by Kohn and Crede in 1923 but substantial evidence of its value has been lacking.

This has now been secured as a result of researches at the Bureau of Standards extending over a period of 6 years, during which time the deterioration of 13 lots of vegetable-tanned leather treated with varying amounts of sulphuric acid has been studied. The loss in strength on aging was used as a measure of the deterioration, and the results considered in relation to the original pH values of the leathers. All of the leathers started to deteriorate at or near pH 3 regardless of the kind of vegetable tanning material used, the degree of tannage, the amount of sulphuric acid added to the leather originally, the aging conditions, and the pH of the original leather before treatment with acid. The disintegration of the leather, as measured by the nitrogen extractable with cold water, also increased sharply near pH 3, indicating that the hide substance itself exerts the major influence in the resistance of leather to destruction by acid conditions.

This evidence warrants serious consideration of the value of a pH measurement for indicating the harmful acidity of leather with limiting values to be governed by the length of service expected and the conditions of use. Research Paper No. 547, published in the April number of the Bureau of Standards Journal of Research, contains a complete account of this work.

UNIFORMITY OF GASOLINE HOSE NOZZLES

Standardization, with special reference to gasoline hose nozzles, was the basis of the talk by W. Hayes Sims, Tulsa, Okla., distributor of a line of marketing equipment, before the recent meeting of the Purchasing Agents Association of Tulsa.

Hose nozzles come in such a wide variety as to be a burden on the user and results in obsolescence, due to changes from time to time. Most hose nozzles are simply designed for use in filling gasoline tanks and that's all, in the opinion of Mr. Sims. The meter pump, with its delicate machinery requires a nozzle that is definitely satisfactory. For this reason manufacturers and oil companies were urged to get together in an effort to standardize the item. Improvements have been made in types of hose nozzles, but without greater uniformity users are compelled to carry a large stock of parts to repair the various types.

MARKETING OF FARM PRODUCTS

"Research in Marketing of Farm Products", Report No. 7 in a series on "Scope and Method" of research in the various subfields of agricultural economics and rural sociology, has just been released by the Advisory Committee on Social and Economic Research in Agriculture, Social Science Research Council (230 Park Ave., New York, N.Y.). This series of reports is part of a program of assistance to research in these fields, upon which the committee set forth in 1925. Each report outlines the research of some subfield of agricultural economics or rural sociology and then reviews the problems in methodology that are peculiar to it.

In the chapter relating to Government grades for agricultural commodities the statement is made that the formation and revision of grades and standards is a never-ending task. Both the quality of farm products and the preferences of the markets for various qualities change from time to time. New inspection methods are developed, allowing the measurement of new factors and the more accurate determination of factors already recognized in the grades. The report further points out that it is important if the marketing process is to function smoothly that the grades and standards be so revised from time to time as to keep pace with these changes. Research is necessary as a basis for revision as well as for the initial formulation of the grades.

According to the committee this study should be made continuously to cover a number of crop years. Variations in the quality and size of the crop and in the purchasing power of consumers may cause abrupt changes in market demand, and the grades set up as a result of 1 year's study may be unsatisfactory the following year. Grades must be made so as to give the best possible fit to different sizes and qualities of crops and different conditions of the market.

SERVICES TO GOVERNMENTAL PURCHASERS

Cooperation of Division of Specifications, Bureau of Standards, Extended to State, County, and Municipal Agencies with Respect to their Purchasing Methods

By SPENCER H. REED, *Bureau of Standards*

In the days of the Delphic Oracle, and the Witch of Endor, certain services to consumers in the form of predictions were rendered by prophets through the medium of mumbled incantations and brewed magic messes. Today prophets make predictions with the aid of the microscope, the test tube, the slide rule, and the testing machine. As in ancient times there were fraternities or brotherhoods of prophets, so in modern times the prophets combine into governmental and nongovernmental associations and societies, all having for their ultimate goal—service to consumers.

Not the least of these numerous groups is the Bureau of Standards. Among the many services it constantly renders consumers, through the Division of Specifications, are those found in the realm of purchasing. These are patently in keeping with the need of the times, for there is an unquestionable trend toward more efficient procurement methods, not alone by commercial organizations, but by Federal, State, county, and municipal agencies as well.

In view of the fact that the average government today spends anywhere from 20 to 30 percent of its annual operating budget for supplies, materials, and equipment, it is not surprising that concerted efforts are being made to reduce such costs through the utilization of more scientific purchasing methods. Incidentally, it has been said that scientific purchasing is a preeminent characteristic in distinguishing a good government from a poor one.

Coincident with the efforts to reduce procurement costs is the added importance given to standards and to the formulation and use of specifications. It would probably come as a distinct revelation to many to learn that the National Government, acting through the Federal Specifications Board, of which the Director of this Bureau is chairman, has adopted and promulgated up to the present time more than 800 Federal specifications, covering a broad range of commodities.

The Division of Specifications is engaged in facilitating the use and unification of these specifications in response to requests from Federal, State, and local governmental purchasing agencies. The services rendered by the Division were undertaken at the express request of the official representatives of State Governors for assistance in solving their purchasing problems, and they have been conducted in accordance with plans endorsed by the Chief Coordinator and approved by the Director of the Bureau of the Budget. They have been given specific recognition and publicity by the Federal Standard Stock Catalog Board.

That these specifications are playing an important part in Federal, State, county, and municipal purchasing is well attested by recent surveys of the Division of Specifications, made in order to determine the best way to make its services helpful to local governments. It was found, for example, that at least 26 State purchasing agencies, and 30 State highway departments use Federal specifications.

Further, many States which purchase according to their own-government specifications, report the use of Federal specifications as the basis of their own specifications. Seventeen percent of 422 counties furnishing data also purchase on Federal specifications. In more than 80 cities specifications are based on those of national associations or on those of the Federal Government.

Considerable savings are reported from States and counties utilizing centralized purchasing methods, based on standard specifications. The average savings made by States is about 21 percent; by counties, 22 percent. Eleven States reported a savings of 20 percent or better; and 2, a 40 percent saving. According to the last biennial report of the department of control, State of Washington, more than \$4,000,000 have been saved that State's taxpayers during the last 8 years through centralized purchasing. The report emphasizes the fact that "no small part of the present splendid condition of the State treasury is due to the enormous saving made possible through standardization and truly competitive buying of the State's requirements." Milwaukee reports similarly made savings of \$600,000 on \$4,000,000 worth of purchases during the past year.

A second distinct service to consumers is furnished by the division through the "National Directory of Commodity Specifications", which gives in convenient form information regarding nationally recognized specifications for more than 6,000 commodities.

Besides the "Directory", the division, in compliance with many requests from State, county, and municipal agencies for aid in solving some of their purchasing problems, is preparing an encyclopedia of specifications, which it proposes to issue in 10 volumes. These volumes will contain the full text of the specifications, as contrasted with the "Directory", which contains only titles, with brief descriptive items. Three volumes of the encyclopedia have already been published: (1) Standards and Specifications in the Wood Using Industries, (2) Standards and Specifications for Nonmetallic Minerals and their products, and (3) Standards and Specifications for Metals and Metal Products. Governmental purchasers utilizing these volumes report them to be of great value.

A third service rendered consumers lies in the so-called "certification plan". In carrying out this plan there have been compiled lists of manufacturers who have expressed their desire to supply material in accordance with certain selected Federal specifications and commercial standards, and their willingness to certify to the purchaser, upon request, that the material thus supplied is guaranteed to comply with the requirements and tests of the specifications. The lists of "willing-to-certify sources of supply" thus far compiled relate to 349 Federal specifications and 38 commercial standards, representing 18,000 signed requests for listing from 8,000 firms.

Information concerning the separate lists of sources of supply is set forth in the Federal Standard Stock Catalog, utilized by all Federal purchasing agencies, and to an ever-increasing extent by other progressive tax-supported purchasing agencies. More than 30,000 copies of these lists have been sent to Federal, State, county, and municipal purchasing agencies, about 50 percent of them going to agents for municipal governments. The usefulness of this service, which is given free of charge, can be readily seen.

Associated with the certification plan, is the "labeling system", also sponsored by the Division. In accordance with this system, manufacturers are encouraged to affix self-identifying labels to their products, guaranteeing that the products comply with the requirements of certain nationally-recognized standards and specifications. This system is being carried out successfully in numerous commodity fields, not only by manufacturers, but by trade associations as well. Whereas the certification plan is particularly useful to large quantity buyers, the labeling system is intended to apply more especially to "over-the-counter" purchasers.

The foregoing paragraphs have set forth, in a summarizing manner, a few of the more representative services rendered consumers by the Division of Specifications. The following material discusses, somewhat in detail, the assistance given by us, with respect to specifications, to two municipal consumers—New York City and Philadelphia.

Some months ago the then acting mayor of New York City, Joseph V. McKee, appointed a purchasing committee to make a report on the methods of purchasing, inspection, and storage within the city, together with recommendations for their improvement. The following data, taken from the committee's report, furnish a brief background of New York City's purchasing regime with respect to the standardization and use of commodity specifications.

Between 1913 and 1918 the city had a nation-wide reputation in the field of standardization, and its specifications and standardization methods were highly respected and widely copied. During that period the city's bureau of standardization prepared and adopted more than 1,600 standard specifications for mandatory use by all branches of the city.

In 1918, however, the bureau of standardization was abolished, and its highly competent staff disbanded. As a result of this abolition, the city's specifications are, in many cases, now out of date, some of them not having been altered in 19 years.

The purchasing committee summed up this part of its report by saying that there was strong need for a thorough-going investigation of all the city's specifications. To determine what, in general, was the situation, the committee was instructed to collect from the various departments copies of their specifications regularly used in the purchase of staple articles. These copies, approximately 1,800 in number, were forwarded to the Bureau of Standards, where they have been classified by the Division of Specifications and are now being appraised, specification by specification.

The extent of the preliminary work alone involved in this undertaking, and the exacting care required in its execution may be recognized from the fact that every one of the 1,800 New York City specifications

was compared (by title) with those of the Federal Government, and of national technical societies and trade associations, listed in the National Directory of Commodity Specifications. This preliminary survey showed that in a large majority of cases the New York City specifications have not been revised to meet current practice.

The preliminary report of the Division was favorably received and included in toto in the report of the New York Purchasing Committee to the acting mayor. Later, at the request of the Purchasing Committee and Judge McKee, as president of the Board of Aldermen, the Bureau of Standards began a comparison of the detailed textual requirements of the New York specifications with the requirements of nationally recognized specifications for similar commodities. This work, handled group by group, and specification by specification, according to the decimal system employed in the National Directory of Commodity Specifications, is nearing completion.

The final report will consist of a general detailed statement for each commodity group, such as the one given immediately below for the completed textile group, and in addition will contain comments regarding each specification under the group.

With respect to the New York City textile specifications, except in a few cases, where the requirements are considerably out of line with present day nationally recognized specifications, no suggestions for changes have been made regarding the physical properties called for. It is thought that the assignment of values to the various properties of any textile rightly belongs to the specifying body which is familiar with the uses to which the material is to be put, the properties of commercial goods most nearly suitable for the uses contemplated, the availability of material, prices, etc. Where nationally recognized specifications are available for materials similar to those called for in the New York City specifications, they have been cited for purposes of comparison. Specific comments with respect to widths, weights, thread count, tensile strength, color requirements, and testing have also been given.

In comparing the specifications relating to animal products, and vegetable products, the division enlisted the aid of several agencies of the United States Department of Agriculture, chiefly the Bureau of Agricultural Economics and the Food and Drugs Administration.

The lumber group, covering materials of construction, was reviewed with a representative of the National Lumber Manufacturers Association. It was found that the entire group, except for a certain few items, is now obsolete so far as present purchasing practice is concerned. Most of the specifications covering lumber are dated as of 1914. Naturally, marked changes have taken place in lumber purchasing methods since then. Lumber, today, it is pointed out, is purchased on the basis of grading rules established by lumber associations, copies of which can be obtained from these organizations.

With respect to the nonmetallic minerals specifications, wide use is being made of the information to be found in the 1930 volume of the Encyclopedia of Specifications series, Standards and Specifications for Nonmetallic Minerals and Their Products. Additional data, incorporated in our files since the publi-

cation of this book, have also been used. As for the metals specifications, use is being made of the 1933 volume of the Encyclopedia of Specifications, Standards and Specifications for Metals and Metal Products.

Specifications relating to chemicals, and to miscellaneous commodities, are being compared with those prepared by the United States Pharmacopœial Convention, the American Chemical Society, and the Federal Specifications Board.

It is pertinent to wonder at this point just what savings may accrue to New York City through a revision of existing specifications and the adoption of new specifications, based in part, at least, on our survey and recommendations. While it is, of course, impossible to give a definite answer to such query, it is to be noted that in the summary of major recommendations made by the Purchasing Committee of New York, the estimated savings on commodities through centralized purchasing, based upon standardized specifications, is given as \$4,000,000.

Work similar to that done for New York City has been done for Philadelphia. Some months ago, at the instigation of an official of the board of public education of that city, specifications for a new administra-

tion building for one of its school districts were carefully compared by the Division of Specifications, commodity by commodity, with the specifications for four other Government buildings. As a result of such comparison, copies of 118 Federal specifications, 3 commercial standards, and specifications for the 4 Government buildings were forwarded to the board.

In conclusion, the highly significant fact should be pointed out that many farsighted purchasing officials are giving renewed attention to the belief that a large factor in reducing the costs of running their respective units lies in the wisdom used in selecting materials—materials whose cost, strength, and durability are well balanced in carefully drawn specifications. New York City's present mayor, in keeping with this tendency, has listed as the first item on his economy program "the creation of a centralized purchasing department for the purchase of all supplies paid for from funds in the city treasury." And this is done in accordance with the recommendations of a committee which has advocated the standardization of the city specifications and the bringing of them into harmony with good commercial practice, through the cooperation of the Bureau of Standards.

CONNECTORS FOR TIMBER CONSTRUCTION

Introduction in this country of a "revolutionary" method of making wood joints through use of metal connectors, strengthening timber construction at its critical point and hereby making it available for wider consideration in major structures, is forecast in a handbook on Modern Connectors for Timber Construction issued by the National Committee on Wood Utilization of the United States Department of Commerce, and prepared jointly by engineers of the committee and of the Forest Products Laboratory of the Forest Service, United States Department of Agriculture.

Lumber, construction, and metal stamping and casting interests, as well as architectural and engineering groups, it has been reported, have been awaiting this report with unusual interest through its several years of preparation. The new practices it makes available for engineering use should result in marked economy in construction, serve as a stimulant to the advantageous investment of capital therein, and prove an innovation and a boom in several special fields to which it will afford new avenues for activity and development.

"The application of 'Modern Connectors for Timber Construction'", said the Secretary of Commerce in releasing the report, "should be given careful study by architects, engineers, and builders. The principle involves economy in construction cost and increased service from building materials".

"Modern Connectors for Timber Construction" is a 147-page handbook explaining the connectors and their use, giving the relative value and fields of utility of the several types as determined by European practice and analyses made in this country, and American use data including a discussion of stress and load factors. It is paper-bound, amply illustrated, and may be obtained at 15 cents per copy from the Superintendent of Documents, Government Printing Office, Washington, D.C. It may also be secured direct from the National Committee on Wood Utilization, U.S. Department of Commerce, Washington, D.C.

METAL AND FIBER FLASHLIGHT CASES

The proposed revised simplified practice recommendation no. 68, covering metal and fiber flashlight cases, has been mailed to all interests in the industry, by the Division of Simplified Practice of the Bureau of Standards, for their consideration and written approval.

It is expected that the regular stock items listed in the proposed revision, as formulated by the standing committee of the industry, will adequately serve the purposes for which the conventional types of flashlight case is intended. The proposed revised recommendation is to be effective one month after the announcement by the Bureau of Standards that the required degree of support has been accorded the recommendation.

NEW FEDERAL SPECIFICATIONS

Ten specifications were acted on by the Federal Specifications Board during April. Of this number, 5 proposed specifications and 5 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.
AA-S-271	Trays, photographic, enameled ware..... Dry mounting tissue, photographic..... Shelving, steel, storage..... Brass, naval, bars, rods, shapes, sheets, and strips..... Pencils, lead, carpenters.....	
REVISIONS		
AA-F-801	Furniture and cabinets, office sectional, wood.....	359
PP-H-191	Headcheese.....	56ta
PP-P-571	Pork.....	571a
QQ-Z-301	Zinc, plates, sheets, and strips.....	531
WW-P-521	Pipe-fittings, malleable-iron (threaded) 150 pounds.....	535

HIGH-TEMPERATURE HEAT INSULATION

The development of good refractory insulations is one of the most important achievements in the refractories field. There are now many new products which are reported to save operating costs, especially in intermittently operated furnaces, by the use of insulation. In a good many cases these insulations are so refractory that they have been used to face the flame with or without a thin coating of refractory cement. The savings reported in many cases, for example, in heat-treating furnaces, have been phenomenal.

In view of the great importance of this work the A.S.T.M. Committee on Refractories has decided to begin work on the preparation of tests and specifications for high-temperature insulation and for insulating refractories. Once the committee has developed standard test methods and specifications, it is expected that some of the problems of the consumer in purchasing these materials will have been solved.

Three proposed tests for use in specifications have been considered by the committee cover (1) shrinkage under heat treatment, (2) transverse strength, and (3) crushing strength.

STANDARDIZATION OF AIRCRAFT POSITION LIGHTS

The Air Corps of the Army and the Bureau of Aeronautics of the Navy are cooperating with the Aeronautics Branch of the United States Department of Commerce in a movement to bring about greater uniformity in the red and green colors used for aircraft position lights.

Three steps are involved in the program—the preparation of suitable specifications for the colored glassware, the selection and measurement of the standard filters to represent the color limits, and the provision of the photometers required to test the glassware for conformity with the limits. Definitions controlling the colors of position lights have been published by the Aeronautics Branch of the Department of Commerce. These definitions, which are a part of the airworthiness requirements for such lights, follow:

Left-wing lights shall be aviation red having a dominant wave length of not less than 0.613 micron and 1.00 purity. Right-wing lights shall be aviation green having a dominant wave length not greater than 0.530 micron and purity not less than 0.42.

When colored glass is used to obtain colored light the resulting color is principally controlled by the color of the glass, but it is also somewhat affected by the color of the light source. In preparing standards for color limits and specifications to control the color of glassware, it is necessary to take this into account. For lamps to be used with standard filters, the color is usually defined by the "color temperature." The present primary standards of aviation red and green have been selected for use with lamps of "color temperature" 2360° K. Such lamps have about the same color as the ordinary vacuum tungsten lamps.

Copies of the primary standard filters are now being prepared for the use of the inspectors of the Air Corps of the Army and of the Bureau of Aeronautics of the Navy Department. When filters of the required

color are not available filters of denser color must be ground and polished step by step until the correct color is obtained. The transmission of the reference standard is then carefully measured by a number of observers so that it can be used as a standard for measuring the transmission of other glassware.

The research division of the Aeronautics Branch of the Department of Commerce is carrying out this work in collaboration with the Bureau of Standards.

PAPER-TESTING METHODS

Tentative methods of testing for alpha cellulose, copper number, total acidity, ink absorption of blotting paper, absorption of water by bibulous papers, such as toweling, and water resistance were completed by the paper-testing committee of the Technical Association of the Pulp and Paper Industry during the past year.

The methods for alpha cellulose and copper number, used as measures of chemical purity of cellulose, are based on well-known procedures for pulp, with modifications by Burton and Rasch to adapt them to paper. Total acidity is determined essentially according to the Kohler-Hall method. The distinctive feature of this method is three successive aqueous extractions of finely ground test specimens to obtain the acid for titration. The methods for absorption of ink and of water are similar; a measured quantity of the liquid is delivered on the surface of the paper, and the time for complete absorption as indicated by no further reflection of light from the liquid is noted. Reed's method for ink absorption of blotting paper was used as the basis of these methods. The water-resistance method is based on the dry-indicator method developed by Carson. In this method the permeation of water is measured by finding the time required for change in the color of a sugar-dye mixture on the upper surface of test specimens floated on water.

In most cases the details of these methods are developed through joint laboratory testing by members of subcommittees. Considerable work of this kind is in progress for development of new methods or improvement of existing methods. Further study is being made of means of measuring water resistance and grease resistance. A subcommittee on chemical methods is studying determination of pH, active sulphur, iron, and resin. Another subcommittee, through cooperative testing, is finding whether or not improved accuracy in fiber analysis of paper can be obtained by "weight factors" for fibers to take into account the differences in specific gravity of fibers. In making paper, fibers are mixed by weight; but in testing paper, their relative proportion is estimated by volume. The association method for strength and other physical properties are being revised by a subcommittee recently formed for the purpose. This work is of particular interest, as it is being done on an international scale through the cooperation of several foreign organizations interested in paper-testing standards.

The testing of paper is not simple, because of its heterogeneous nature, but these cooperative studies of the problems involved are leading to ultimate solution of them.

BRITISH LUMBER STANDARDS

A conference convened by the British Standards Institution in November 1932, recommended to the institution that a committee be created at once to prepare a series of British standard specifications for timber, including sizes and grading.

The conference included representatives of all timber supplying and using interests in the United Kingdom, as well as representatives of the British Columbia lumber millers and of the Australian, New Zealand, and South African Governments.

"This step should have far-reaching effects in increasing trade between the mother country and Canada in particular among the timber-growing countries of the Empire", states the *Canada Illustrated Weekly* of London, in commenting on the measure. The magazine then points out that one of the main obstacles to this trade has been differences in standards and specifications, and that this will now be removed by the adoption of the proposed British standards specifications.

ACTIVITIES OF THE AMERICAN STANDARDS ASSOCIATION

Electrical insulating materials.—A letter ballot is being taken on the questions involved in the initiation of a project on the subject of electrical insulating materials in general. The project would have the following formal scope: Specifications and methods of test for electrical insulating materials.

Code rubber insulation.—A letter ballot is being taken on the question of recommendations to the standards council on the approval as American standard of specifications for code rubber insulation. These proposed specifications were prepared by the sectional committee on insulated wires and cables, which is under the sponsorship of the electrical standards committee. The specifications cover the grade of insulation known to the trade as code rubber insulation. These are not specifications for the complete insulated wire but only for the insulation, it being the program of the sectional committee to prepare the specifications for braids, insulation, the copper wire, etc., as separate specifications.

Transformers.—A ballot is being taken on the question of recommendations to the standards council on the approval of standards for constant current transformers as American standard. These standards were submitted by the American Institute of Electrical Engineers and constitute a revision of the existing A.I.E.E. Standard No. 12, edition of May 1930. Future revisions of these standards will be handled by the sectional committee on transformers, the organization of which is now practically complete. This committee will also take care of standards for a large variety of other types of transformers. The proposed standards for constant current transformers cover the type of transformer which is used for supplying series street-lighting circuits.

Protection against lightning.—A letter ballot is being taken on the question of recommendations to the standards council on the approval as American standard of a revision of parts 1 and 2 of the Code for Protection Against Lightning for which the Ameri-

can Institute of Electrical Engineers and the Bureau of Standards are joint sponsors. Part 1 of the code covers the protection of persons against lightning while part 2 covers the protection of buildings and miscellaneous property. Part 3 of the code, which covers the protection of structures containing inflammable liquids and gases and is approved as American tentative standard, is not changed by this proposed revision.

Coal classification.—Progress of the work of the sectional committee on classification of coals, under the sponsorship of the American Society for Testing Materials, has been so favorable that a new subcommittee has recently been appointed. This group, called the technical committee on nomenclature, has been set up to recommend names for the groups, classes, and subclasses of coal according to rank and type. Although the literature of coal technology, including the reports of previous work of this sectional committee, contains names that have been customarily applied to coals of various types, it is understood that this new technical committee will present recommendations based upon its own investigations in this field.

Portland cement.—The association recently approved the A.S.T.M. standard methods of sampling and testing portland cement as a revision of the American standard methods of testing cement. The title of the revised American standard has been changed to "Methods of Sampling and Testing Portland Cement." As has been the customary practice of the A.S.T.M. and the ASA, orders for specifications for portland cement will be filled by including with the specifications copies of the standard methods of sampling and testing portland cement, since these two standards are closely related.

ASA Yearbook.—The establishment during the past 12 months of 31 new national industrial standards affecting the construction, electrical, mining, oil, steel, radio, and almost every other major American industry is recorded in the American Standards Yearbook, just published by the association. The book is issued as a record of the cooperative achievements of nearly 3,000 scientists and engineers representing more than 500 national technical and trade organizations in the development of a unified system of basic technical standards for industry.

DOUGLAS FIR PLYWOOD

The Commercial Standard for Douglas Fir Plywood was released under date of March 29, 1933, to the acceptors of this standard who include the various manufacturers of the commodity, together with a great many distributors and consumer organizations.

The commercial standard establishes grading rules for this commodity which is a laminated board for paneling, sheathing, concrete forms, cabinet work, and industrial uses. In addition, there is included grade specifications for door panels and concrete-form material, together with export designations and a glossary of terms.

Copies of this standard designated "Douglas Fir Plywood, Commercial Standard CS45-33", are available from the Superintendent of Documents, Government Printing Office, Washington, D.C., at 5 cents per copy.

RUG CLEANING

On March 30, 1933, a representative group of rug cleaners met in New York and considered a proposed commercial standard for rug cleaning, the purpose of which is to provide standard methods of cleaning for use by rug cleaners as a basis for certification to their customers. The standard covers cleaning process for all classes of rugs, carpets, and floor coverings.

In the development of this standard the cleaners have considered the hardness of the water and the types of soap to be used under varying conditions, the tests necessary for determining the fastness of colors and the precautions necessary in their handling. The proposed standard also includes the detailed steps to be taken in three cleaning processes, viz, grade A, grade B, and grade C. Methods of test for application by the customer to determine whether a rug has been cleaned in conformity with the standard are also included in the specification.

Finally it is proposed that the following guarantee be stamped on the invoices and on the back of identification tags attached to the rugs.

The ----- Company certifies that this rug was cleaned on ----- 19-- by the grade ----- method in conformity with Commercial Standard CS ----- issued by the United States Department of Commerce.

In due course it is planned to hold a general conference to obtain the users' views and to make any adjustments in the proposed standard which may be required.

THE OHM

A determination of the ohm in terms of the units of length and time has been made at the Bureau of Standards. The method depends on the measurement of a self-inductance in terms of time and the present unit of resistance, and on the computation of the inductance from measurements of the dimensions of the inductor.

Three single-layer solenoids were measured. They were constructed with such care that the inductance can be computed from the measured dimensions with an error of only a few parts in a million. The inductance can be measured in terms of resistance and time with about the same accuracy. The results indicate that the present international ohm is larger than the true (cgs) ohm by about 45 parts in 100,000.

TESTING FOUNDRY SANDS

In Letter Circular No. 363, just announced by the Bureau of Standards, the methods of determining the properties governing the usefulness of foundry molding sands are discussed and illustrated by results obtained in tests of a number of widely used commercial sands.

The principal properties are the moisture content (degree of tempering), amount of clay or bonding substance, and the fineness and distribution of the silica grain, the strength in compression of molded specimens, the permeability to the flow of gases through the molded sand, and the temperature at which the grain will sinter onto a metal surface. The various methods proposed for grading of sands for specification purposes are discussed and some data

on the suitability of sands for different foundry purposes are included.

Copies of this letter circular may be obtained on application to the Bureau of Standards, Washington, D.C.

COATED ABRASIVE PRODUCTS

The majority of producers of coated abrasive products who have accepted simplified practice recommendation no. R89-32 have expressed their intention to extend their present methods of identifying the simplified lines by including statements in catalogs and other trade literature. Labels identifying the simplified coated abrasive products are also being attached to packages by manufacturers.

This recommendation, which was proposed and developed by the industry, is concerned with the size, backing, coating, and grade numbers of the various types of coated abrasive products.

A number of national associations representing users of simplified commodities have for some time strongly urged the identification of products by manufacturers who have accepted the various simplified-practice recommendations. The general adoption of the identification plan should assist the abrasive industry in maintaining closer adherence to the waste-elimination program. Cooperation by distributors, buyers, and others will greatly increase the benefits and economies possible through simplified practice. When the simplified lines are so identified in trade literature their selection can be made without difficulty and much waste formerly incurred in checking files and auxiliary records for these data are eliminated.

Manufacturers of other of the 140 commodities, for which simplified-practice recommendations have been developed, have recently commenced identifying in their catalogs those products which conform to the simplified line. The identification plan, as applying to simplified-practice recommendations, is described and illustrated in a mimeographed report entitled "Identification of Simplified Lines in Trade Literature", copies of which may be had on request to the Division of Simplified Practice, Bureau of Standards, Washington, D.C.

PRESSURE AND VACUUM GAGES

The sectional committee on standardization of pressure and vacuum gages of the American Society of Mechanical Engineers has prepared a proposed list of definitions for the parts of pressure and vacuum gages of the dial type, which has been circularized in the industry for comment and criticism.

These definitions have been limited to the dial type of gages utilizing an elastic container for confining the pressure medium and include terms for the various types of gages, structural details, auxiliaries, and manufacturing and operating variables.

The committee has developed also a set of general rules and a standard form for gage-purchase specifications which are intended for general application by both users and manufacturers. The proposed purchase specifications are intended to assist the buyer in obtaining the exact type of gage best fitted for a particular application.

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

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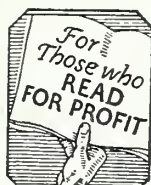
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DANIEL C. ROPER, Secretary of Commerce

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



AERONAUTICS BRANCH, CLARENCE M. YOUNG, Assistant Secretary of Commerce for Aeronautics.

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

BUREAU OF THE CENSUS, W. L. AUSTIN, Director.

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

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

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

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

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

The publicity of statistics on imports and exports.

The study of the processes of domestic trade and commerce.

BUREAU OF STANDARDS, LYMAN J. BRIGGS, Acting Director.

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

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

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

BUREAU OF MINES, SCOTT TURNER, Director.

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

BUREAU OF MINES—Continued.

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

Research on helium and operation of plants producing it.

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

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

BUREAU OF FISHERIES, FRANK T. BELL, Commissioner.

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

BUREAU OF LIGHTHOUSES, GEORGE R. PUTNAM, Commissioner.

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

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

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

BUREAU OF NAVIGATION AND STEAMBOAT INSPECTION, ARTHUR J. TYRER and DICKERSON N. HOOVER, Assistant Directors.

Superintendence of commercial marine and merchant seamen. Construction and administration of navigation laws covering documentation, ship mortgage act, entry and clearance, movement of vessels, welfare of seamen, admeasurement, load line, adjudication of fines, collection of fees, tonnage tax, etc. Compilation of Federal statistics of tonnage and merchant seamen.

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

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

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

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